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2016

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Inducing Application of Interdisciplinary Frameworks: Experiences from the Domains of Information Literacy and Responsible Conduct of Research

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Both authors contributed equally to this work.

In this chapter, we explore how information literacy and research ethics constructivist frameworks can be developed and nurtured in the context of an interdisciplinary course. Students in a writing-intensive interdisciplinary English class ask the question, “What does it mean to be human?” from a range of STEM and non-STEM disciplinary perspectives. While the guest lecturers offer responses to this question from their disciplines, the students must synthesize the disciplinary frameworks and the new knowledge introduced in combination with the content from assigned readings and class discussions.

Anne Leonard, information literacy librarian and subject specialist for the department of English and professor, developed an information literacy module with the goal of helping students develop their abilities to find and evaluate scholarly and other information sources for their research papers. Jean Hillstrom, psychology professor and experienced Institutional Review Board Chair, Vice Chair, and administrator was invited to develop a module that illustrates principles of responsible conduct of research and human subjects research. Using the lenses of constructivism and social constructivism, we analyze how the modules are constructed and delivered in an interdisciplinary course. We explore how students approach the intersection of research ethics and information literacy by reviewing written work, class discussions, and student feedback. We then explore and interpret how students strive to become more

information literate while engaging in responsible conduct of research in context of interdisciplinarity.

Constructivism and Social Constructivism

Constructivism, a theory about how people learn, proposes that individuals construct their own understanding and knowledge about the world from experiences and reflecting on those experiences. When we experience something new, we first try to understand it from previous experiences and perhaps by modifying our ideas when our prior understanding is inadequate.¹ Jean Piaget (1896-1980) heavily influenced the direction of modern constructivist theory. He believed that people are active agents in their own development versus passive recipients of knowledge. He studied his own children and, in general, became particularly interested in children's wrong answers. He proposed that knowledge is constructed gradually as individuals interact with their environments in a process called adaptation. Individuals take in information from the environment and incorporate it into existing knowledge structures or schemas (assimilation). Since most schemas are inadequate to handle all new information, disequilibrium occurs and individuals gradually adjust or create new schemas to make better sense of the information (accommodation). Equilibration is the process by which assimilation and accommodation are kept in balance.² Like Piaget, constructivism in the classroom acknowledges that students are active agents in their own learning. As noted by Brooks,³ "The teacher functions more as a facilitator who coaches, mediates, prompts, and helps students develop and assess their understanding, and thereby their learning. One of the teacher's biggest jobs becomes ASKING GOOD QUESTIONS." Active teaching techniques such as demonstrations, brainstorming, conducting experiments, role-playing, peer-review, real-world problem solving and so forth are examples of constructivism in the classroom.

Social constructivism emphasizes that knowledge is constructed through human activity in a shared sociocultural context and in interacting with the environment.⁴ Vygotskiĭ's work strongly influenced social constructivists.⁵ His sociohistorical theory of learning proposed that learning occurs through social interactions between more skilled or knowledgeable individuals and learners in the form of guided participation. Guided participation occurs when the more skilled or knowledgeable partner actively engages the learner in the zone of proximal development (the difference between what the learner can do alone versus with assistance). Thus, it is important for the instructor to have a sense of students' current knowledge and ideas so that instructors can encourage students to engage in thoughtful assimilation and accommodation of new information. For example, on the occasions where a student has plagiarized in a paper, I require the student to see me to discuss the issue. In our discussions of what plagiarism is, more often than not, students often state: "it was on the internet – I thought it was free to use" or similar. This interaction presents an opportunity to refine the student's current knowledge by expanding their understanding of what exactly plagiarism is and that information from the internet still needs to be paraphrased or quoted and cited appropriately. In students' later work, I typically find significant improvements in how information from the internet is used and documented.

Responsible Conduct of Research Module and Learning Goals

The research ethics module is typically scheduled about one-third of the way into the course - after the philosophy and biology guest lectures and a discussion of the Henrietta Lacks case. Other sections of the course also delved into research ethics including plagiarism (first week and throughout the course), the Henrietta Lacks case, and the information literacy module.

The learning goals for this module expanded upon two of the Weird Science course goals: examining cultural influences; critical evaluation of ideas and their sources; and exploring philosophical, historical, and ethical underpinnings that may impact an interdisciplinary understanding of what it means to be human. The learning goals for the research ethics module included:

- develop an understanding of what is involved in research ethics;
- appreciate the need for ethics in research;
- experience the challenges of determining what is ethical in research;
- recognize ethical and unethical research;
- identify ethical issues of failing to obtain informed consent;
- generate alternatives to unethical research that would be considered ethical;
- practice ethical research standards.

As part of their homework assignment for this module, students completed the Responsible Conduct of Research online course offered by the Collaborative Institutional Training Initiative (CITI Program) at the University of Miami at www.citiprogram.org. At the end of the semester, two questions pertinent to this module were asked: “What does research ethics mean to you?” and “What are the five most important ethical issues that students scholars/researchers need to know about as they conduct their research?” in a short free writing exercise. Results are presented later.

In the class presentation, I first defined responsible conduct of research – as multifaceted and as involving the application of fundamental ethical principles to animal and human research in addition to the more familiar academic domains such as plagiarism and fabrication of data. Even so, students often interpret research ethics as avoiding plagiarism and probably do not

consider the broader implications or potential personal relevance.⁶ When presented with the problem of research ethics, one often encounters an attitude of “who cares?” or “this doesn’t apply to me.” So, to induce personal relevance, I highlighted the immediacy of the problem with a discussion of the infamous Wakefield autism study that led to hundreds of parents not obtaining vaccines for their children. I chose this study to “hook” students into the topic because of its currency and that most students have heard about the supposed link between vaccines and autism. However, any recent study that illustrates violation of research ethics principles or even a vivid historical example (e.g., the Stanford Prison Study) could be used.

In summary, Dr. Andrew Wakefield and colleagues published a study in 1988 that linked the Measles, Mumps, and Rubella (MMR) vaccine to autism. Numerous attempts to replicate his findings failed to find evidence that the MMR vaccine caused autism in young children. Despite the lack of evidence, beliefs persisted and the number of new cases of measles steadily rose in the United States and Europe. Although the Wakefield study was resoundingly refuted on a number of grounds including that the authors falsified data, the effects on public perception still persist and have the potential of affecting everyone’s daily lives.⁷ For example, the spread of measles originating from early 2015 California Disneyland outbreak was attributed to a substantial number of children in the US that were not vaccinated.⁸

I proceeded to present various historical case studies illustrating ethical concerns and asked the following questions: (1) What was the objective of the study? (2) Was the research conducted ethically and why/why not? (3) Could this study have been conducted in a more ethical way? Throughout the discussion, I used a cartoon from “Tom the Dancing Bug” as a tongue-in-cheek rule to approaching research ethics from different perspectives and to examine personal biases. Finally, I noted that when discussing research ethics, there are often no “right”

answers and that the journey may be as important, if not more so, than a final decision regarding ethical treatment of subjects in research.

Ruben Bolling's cartoon from Tom the Dancing Bug, "Human Morality Made Simple," was used as a "tongue-in-cheek" but thought-provoking guide for moral behavior: "The more a living being is like you, the nicer you must be to it."⁹ Various categories are listed with examples in a hierarchy ranging from plants (e.g., radish) at the lowest level to immediate family members (e.g., daughter) at the highest level and asks how much the category/example is like you (the reader)? Each category is paired with an "appropriate moral response" along with a guide to answer the following four questions: (1) Should you help it?; (2) Can you harm it?; (3) Can you kill it?; and (4) Can you eat it? To illustrate, for the category pets/primates, the example is a dog. In response to how much like you is the dog, the answer is "not human, but anthropomorphized" and the appropriate moral response is "Can harm, if for research. Can put it to sleep, if necessary. Can't eat it." In response to the four questions, the guide indicates maybe you can help it "if you're in the mood;" sometimes you can harm it "depending on circumstances;" sometimes, you can kill it "depending on circumstances;" and no, you can never eat it. Throughout the research ethics module, this guide was used to facilitate examining personal assumptions about research ethics, whether human or animal, as we explored the historical case studies.

I next discussed animal research ethics to contrast with human subjects research ethics. Before the Animal Care Act was enacted in 1966, researchers and individual labs were responsible for ethical care of animals used for research purposes. An amendment four years later made provisions for animal use and care (now known as IACUC) committees to oversee animal research at institutions. I presented Harlow's research on attachment in infant monkeys

because of his careful experimentation, the ability to compare his animal studies with human studies, and because baby monkeys are often perceived as “cute” and elicit anthropomorphism. I used a video clip from YouTube that presented archival footage of Harlow explaining his research but images could also be presented via PowerPoint. Harry Harlow is probably best known for his research on attachment using rhesus monkeys. In his basic research paradigm, newborn monkeys were removed from their mothers and placed in a cage with a wire mother and a cloth mother (the wire mother covered with fabric). Half of the monkeys were fed (a bottle was inserted in the mother’s frame) by the wire mother and the other half by the cloth mother. Results showed that the monkeys spent significantly more time on the cloth mother regardless of which mother fed them. Harlow concluded that attachment in the monkeys was based on contact comfort as opposed to who fed them and generalized these results to attachment in humans.¹⁰

Harlow’s animal research was a lesson in contrasts. On one hand, his research illustrated the emotional lives of his animal subjects (e.g., attachment, effects of social isolation) in direct contrast to the dominant mechanistic behavioral theories at the time. But his research has also been criticized for its inhumane treatment of animals including brain lesioning, maternal deprivation, social deprivation, and the isolation “pits of despair.”¹¹ Students in the most recent Weird Science class generally had no difficulty identifying the purpose of the Harlow’s study and recognized why he studied animals and not humans as it would be clearly unethical to remove human babies from their mothers. In Tom the Dancing Bug, the relevant category is pets and primates. Students expressed various responses ranging from research on animals is okay if the animals are protected to we should never experiment on animals. Most students had difficulty identifying more ethical ways to conduct this research, perhaps because of

unfamiliarity with animal research protocols. Some students were surprised that despite the ethical issues of Harlow's research, a similar research study was recently approved.¹²

The next case study I chose to present was the Tuskegee syphilis study because of its seminal influence on legislation in the United States and that it clearly violated a number of ethical issues. Second, this study illustrates timelines for human and animal research legislation. I showed archival photos via PowerPoint as well as pictures of individuals with syphilis. The US Public Health Service began a study in 1932 to investigate the transmission patterns and long-term outcomes of syphilis, a poorly understood disease at that time. The subjects were 600 poor, illiterate black men in rural Alabama. The men were never told they had syphilis – just that they had “bad blood.” In return for their participation, they were given free medical care, food, free burial insurance, and a certificate after 25 years of service. In 1972, 30 years after penicillin was established as a treatment, the Tuskegee syphilis study was brought to light by an investigative reporter and led to the Belmont report and a number of reforms.¹³ Again, students had no difficulty identifying the study's objectives and were clearly able to identify that the study was unethical on a number of grounds including lack of informed consent and harm to subjects (particularly since penicillin could treat the disease). Students generated a number of solutions including fully informing the subjects about the research and stopping the study when syphilis became treatable. In using the cartoon morality guide, students had more difficulty identifying the category that would represent poor, illiterate, black sharecroppers. Student responses seemed to center around the community member category but sometimes noting the outsider category might apply, perhaps because of perceived differences between the subjects in the study and themselves. Students also had difficulty with the “appropriate moral response” presented by the cartoonist for the categories but were able to generate more ethical methods as noted earlier.

With regards to timeline, I pointed out that approximately midpoint during the Tuskegee study, the Nuremberg Code came into being in 1948 because of atrocities committed in medical research on prisoners during World War II. The Code made it clear that voluntary, informed consent in research is essential, the benefits must outweigh the risks and ten other points with regards to medical research.¹⁴

Research ethics in behavioral studies was not directly addressed until the National Research Act of 1974. I chose to present two vivid behavioral studies to illustrate ethical concerns: Milgram's study on obedience and Zimbardo's study on role-playing. For both examples, I used video clips from YouTube that presented archival footage. In the early 1960s, Stanley Milgram (1963, 1974) designed a behavioral experiment to see if people would obey authority figures even when the instructions were morally wrong.¹⁵ He presented the study as a memory experiment, deceiving the subjects as to its true purpose. The basic design of the study was as follows: two subjects arrive to the study and wait in the waiting room. The researcher "randomly" selects which subject will be the learner and which will be the teacher. In actuality, the drawing is not random; the learner is a confederate who follows a specific script and the true subject is the teacher. The researcher is present throughout the experiment. The teacher is seated in front of a machine that delivers increasing levels of electric shock to the learner. (The teacher receives a sample shock to show the machine is "real;" however no shocks are ever delivered to the learner.) The teacher is instructed to read pairs of words and then test the memory of the learner. If the learner makes a mistake, the teacher is instructed to give a shock, increasing the intensity of the shock with each mistake. The learner follows a prescribed script that includes correct and incorrect responses, actions (e.g., pounding on the wall), and silence. The experimenter also follows a script with prescribed prompts (e.g., "the experiment requires

you to continue.”¹⁶ The variable of interest was how high of a level of shock the teachers would give before disobeying the experimenter (if they disobeyed at all). Milgram’s results showed that 65% of the subjects continued to the highest level of shock (450-volts marked XXX).

I pointed out that with regards to research ethics, Milgram did consent his subjects and because he used deception, he debriefed them afterwards. The subjects were also told beforehand that they would receive payment whether they completed the procedures or not. All subjects completed the study even though observers noted that the subjects appeared to experience extreme stress during the procedures. However, Milgram expressed that there were no long-lasting effects of the stress experienced during his experimental procedure.¹⁷ In response to the question regarding the objective of the study, students did identify that Milgram was studying obedience to authority but also mentioned that perhaps certain people would be more likely to shock others (e.g., more aggressive individuals). I then posed the researcher’s question to the students – would you obey the experimenter? Results ranged from “never” to “I don’t know” to which I relayed that when we discuss Zimbardo’s prison study, we can more closely look at this issue. Students seemed challenged in generating alternatives to Milgram’s methodology, perhaps because none of the students were psychology majors. I briefly presented two recent studies that replicated Milgram’s work but with modifications to reduce subjects’ stress. Both studies found similar results.¹⁸ In applying the Tom the Dancing Bug framework, students seemed to center around the community member category.

In another famous behavioral study, Philip Zimbardo and colleagues created a simulated prison environment at Stanford University and set out to study the influence of a simulated prison setting and role-playing on interpersonal interactions as subjects took on the role of “prisoner” or “guard.”¹⁹ Potential subjects (male college students) were consented and given

psychological tests to eliminate the hypothesis that the subjects may have pre-existing dispositions towards aggressive or punitive behavior. The subjects who were randomly assigned to be a “guard” wore uniforms, worked 8-hour shifts, and were free to go about their business otherwise. According to Zimbardo, the guards were minimally instructed in how to do their jobs: “The ‘guards’ were free with certain limits to implement the procedures of induction into the prison setting and maintenance of custodial retention of the ‘prisoners’.”²⁰ The subjects randomly assigned to be prisoners remained in the prison setting for the duration of the experiment. They also received minimal instruction on what to expect in the prisoner role. Within a short period of time, subjects conformed to their roles, sometimes to the extreme. Although this study was originally planned for two weeks, it was stopped after only six days because of the greater than expected aggressive behavior of the prison guards given this was a simulation study and the mental and physical deterioration of the prisoners. Given that the subjects were randomly assigned to conditions, Zimbardo and colleagues interpreted results to show that the situation determined the resulting behaviors, not characteristics of the individuals.

Students had more difficulty identifying the objective of the Stanford Prison study with responses ranging from experiencing prison life to conformity to role-playing. They also had more difficulty generating alternatives to the methodology. Responses to Tom the Dancing Bug were also more varied but given a number of students discussed this study in their final research papers, students may have identified more with subjects in the prison study given they were college students as well. It is also possible that popular media may have affected students’ perceptions given several movies have been made on the topic (e.g., “The Experiment” 2010; “The Stanford Prison Experiment” 2015) as well as a documentary (i.e., “Quiet Rage: The Stanford Prison Experiment” 1992). I also brought Zimbardo’s conclusions to bear on the

questions students had earlier in discussion of Milgram's research – “would you obey the experimenter” noting that Zimbardo would have concluded that the situation could be more powerful than individual determinants. I also briefly discussed the Abu Ghraib scandal in this context.

After a number reviewing these historical cases, I point out that the 1974 National Research Act provided for the creation of a committee to establish basic research protections for humans in medical and socio-behavioral research. The resulting Belmont Report established three fundamental principles in human subjects in biomedical and behavioral research: respect for persons (e.g., informed consent), beneficence (e.g., benefits outweigh the risks), and justice (e.g., fairness).

Teaching research ethics in an interdisciplinary course

Several questions arise when considering teaching research ethics and include: (1) why teach research ethics? (2) Why teach research ethics in an interdisciplinary class? (3) Is there a difference in purpose or outcome? As to the first question, several answers come to mind: research ethics training may be required, it should be a part of research education, ambiguities such as authorship and sharing of data often arise, and disciplines likely vary. At the undergraduate level, research ethics involving plagiarism, proper citation, paraphrasing is often taught in courses where students learn to write papers such as English composition courses. In my academic experience, I have generally found that students often do not generalize the skills learned in the composition classes to writing papers in my psychology classes. Given this compartmentalization, it is not surprising that students may relegate avoiding plagiarism to English or similar classes and human and animal research ethics to research methods classes. Because of these issues, programs such as Writing Across the Curriculum have been developed

to help students hone their writing skills in their disciplines.²¹ Similarly, animal and human subjects research ethics is commonly discussed in disciplinary contexts such as introduction to psychology or research methods courses and often remains compartmentalized in these disciplines.

One of the challenges in teaching research ethics is to foster generalization of critical thinking skills and ethics frameworks to bear on areas outside of one's own discipline. One way to combat the specialization of research ethics within a discipline is to teach responsible conduct of research in an interdisciplinary course. The overarching goal of the interdisciplinary Weir Science course was to bring disciplinary perspectives found in the natural and social sciences, technology, and engineering fields to bear on an interdisciplinary question of what it means to be human. The interdisciplinary course is a natural vehicle for fostering the application of knowledge and skills to solve real-world problems that cannot be addressed within a single discipline. The research ethics module employed a set of questions and a framework to foster ethical reasoning as we learned about, reasoned through, and examined personal biases and assumptions while working through several vivid case studies from different domains. Further, by focusing on ethical reasoning as opposed to learning codes of ethics or rules to be followed helps students to generalize skills to other disciplines and their own lives.

Assessing responsible conduct of research competency in an interdisciplinary course

Students' responses to two of the three questions posed at the end of the semester were analyzed using NVIVO version 10 software. NVIVO eliminates articles, conjunctions, and other sentence structure words (e.g., a, an, the, for, or, and, therefore, etc.) and has the ability to categorize redundancies such as plurals and past tense into root words (e.g., cited, citing, cited = cite) as well as generalize to include synonyms (e.g., information = data, information, source,

sources). In responding to “What does research ethics mean to you?” a word frequency analysis was conducted and words were ranked according to weighted percentages (frequency of the word relative to the total number of words). Aside from the question’s stem words, research and ethics (two of the most common words), the most common words included: conducting, study, apply, information, and credit. These words appeared to center around conducting ethical research (“being mindful of how are you conducting your research”) and documenting information by crediting sources (“If doing research on a paper and information from some source is used, then the ethical thing to do is to cite this source and give credit to where it came from.”).

A word frequency analysis was also conducted for the second question, “What are the five most important ethical issues that students scholars/researchers need to know about as they conduct their research?”, using the same parameters noted above. The most common words included information (“informed consent,” “obtain relevant information”), research (“Is the researcher prepared to conduct the research responsibly... .”), subjects (“confidentiality with your subjects;” “topics”), credit (“give credit”), and using (“using creditable material”). For several of the words, “information” and “subjects,” the word frequency analysis pointed to both human subjects research topics (e.g., “informed consent, confidentiality with your subjects) as well as information literacy topics (e.g., obtain relevant information, topics”) for this question.

Students’ responses to the questions were also coded in NVIVO to reflect thematic content derived from the general and specific learning goals from each module; I discuss the first two questions here. The themes included in the general category of responsible conduct of research included recognizing unethical behavior; informed consent; do no harm, protect; norms, values, ethics; honesty, don’t mislead; and framework, process, guide. The information literacy

themes included using information appropriately; understand, learn; quality of information; proper citing; identify need for information; finding relevant information; critical evaluation of material; norms, values, ethics; honesty, don't mislead; and framework, process, guide. A few themes applied to both: norms, values, ethics; honesty, don't mislead; and framework, process, guide. Prior to the qualitative analyses, I expected that the first question would result in proportionately more references to responsible conduct of research as presented in the research module. However, in reviewing the resulting themes, the responses were split between responsible conduct of research with 24 references and 21 for information literacy. For the second question, I expected a mix of references to the two general categories with more references to responsible conduct of research. The results indicated that more statements on responsible conduct of research occurred (50 references) than for information literacy (38 references), although the frequencies are still quite close.

Information Literacy Module and Learning Goals

A library presentation and active learning workshop has great practical value in any course that includes a research paper, but a typical “show ‘em the databases” demonstration by a librarian does not adequately meet the information literacy competencies demanded of students in a writing-intensive interdisciplinary course. Instructional strategies that address interdisciplinary learning and support student research projects are grounded in information literacy principles. In *Weird Science*, students annotate assigned readings from a range of disciplines, perform a literature review, and write an annotated bibliography and a research paper, all activities that require the ability to research successfully. Assignments in interdisciplinary courses require research instruction and support from a librarian that is distinct from a librarian's demonstration of database searching to students. Simply demonstrating the use

of a few databases is not productive, as commercial database search interfaces change rapidly and libraries continuously develop their collections of electronic resources, rendering search skills obsolete quickly. Since many library databases are oriented toward the literature in one subject, emphasizing search proficiency in just one or a few databases will not benefit students in an interdisciplinary course; they benefit more from an understanding of search strategies and critical information evaluation. The role of information literacy, as well as the role of the librarian in interdisciplinary learning, can be simply to facilitate students' efforts to locate relevant information sources from a range of disciplines. Yet as a framework for exploring a problem from multiple disciplinary perspectives, information literacy can be a means to enhanced interpretation of new information and assimilation into the context of students' lived experiences via a constructivist approach. Information literacy is critical to interdisciplinary learning settings where students encounter information from a range of disciplines, in assigned readings, in class lectures and discussions, and on their own as they develop their literature reviews and research papers. An information literate student – one who is able to identify his or her need for information, use appropriate research tools and evaluate the information found for relevance, expertise of the author, currency, accuracy, and purpose – is better able to assimilate and contextualize information from various sources, and apply basic principles of evaluation to determine the information sources that best meet his or her needs.

The course syllabus lists six course learning goals, including two especially pertinent to information literacy:

- Methods for finding pertinent information
- Critical evaluation of ideas and their sources

These goals guided the development of learning goals for the information literacy session: for students to be able to successfully locate high quality, relevant information resources; to be able to successfully evaluate all information resources (especially internet sources) for important criteria (criteria I introduced, then they refined through discussion and voting); to be able to cite all sources correctly and consistently; and to pick up some transferable knowledge that they could use in other courses with research assignments.

Over several semesters, the role of the librarian as a guest lecturer in Weird Science has evolved, depending on the timing of the presentation with respect to the students' progress on the research paper and literature review assignments. Typically, the one-shot library research skills class starts with a short lecture and demonstration of the use of library research tools to locate high quality peer-reviewed scholarly articles and the use of citation tools to cite and document articles. Time permitting, students participate in some type of active learning exercise to reinforce search skills taught. In Weird Science, the lecture-heavy approach evolved into a discussion on evaluating information, regardless of its source. The introduction of an information evaluating game, in which students competed in teams to find the highest-quality information source on a given topic, brought an active learning exercise to the class. The game afforded the opportunity to better assess students' understanding of the purpose of evaluation and their own evaluation skills.

A component of my work as the coordinator of information literacy at the City Tech library is designing and teaching one-shot library research instruction classes at the request of the classroom instructor; I collaborate with the classroom instructor to teach relevant research concepts and skills that assist students in the early stages of their research assignments. Designing a single 70-90 minute library lecture and workshop to teach all aspects of information

literacy is challenging, and the essential information literacy competencies that are most congruent with the learning goals of the course must be identified and prioritized. Initially I knew I would avoid a traditional lecture in favor of an active learning classroom activity that would give students the opportunity to reinforce their research abilities through guided use of library subscription databases, with the goal of locating a few sources potentially relevant to their research paper topics. My presentation, “The Good Stuff is Out There: Finding and Evaluating your Information Sources,” foregrounds the ability to identify bias and analyze quality of authorship or sponsorship of information found on the internet or through searching library subscription databases. Students addressing the larger issue of interpreting and defining humanity surely encounter dubious, unreliable, and biased information sources, especially when searching “in the wild” online. My brief lecture on information evaluation focused on the application of RECAP criteria: Relevance, Expertise, Currency, Accuracy, and Purpose. This is the City Tech library’s own version of the CRAAP test (Currency, Relevance, Accuracy, Authority, and Purpose) widely used by academic libraries. Instruction librarians at City Tech decided to replace Authority with Expertise, acknowledging that authority can be constructed differently depending on the knowledge community it springs from, and may be more effectively conceptualized as the creator’s expertise on that particular topic for a particular audience in a specific information medium.²² Along with an understanding of purpose, or the reason or motivation for creating a particular information source and its intended audience, students become better prepared to evaluate information based on the appropriateness of its producer and the context of that source in relationship to similar information sources.²³

The Evaluation Game

To develop an active learning activity for my presentation, I consulted the learning goals for the course, which includes the mastery of methods for finding pertinent information and the ability to critically evaluate ideas and their sources. The evaluation game I used has its roots in an information evaluation game, *Quality Counts*, developed by a colleague.²⁴ I adapted this game (which I also use in a semester-long information literacy class I teach) for Weird Science by shortening the gameplay time so teams of students could collectively determine evaluation criteria and play a few rounds within half of a class meeting period. After a brief lecture about the importance of evaluating information, I led a discussion with students in which they determined criteria to evaluate information. They generated this list:

- website not sponsored
- publication date
- copyrighted
- objectivity of website content
- credibility of the web domain
- grammar and syntax (writing mechanics)
- author's credentials
- presence of a references list

Students voted to narrow this list to the top three and selected the credibility of the web domain, the author's credentials, and the presence of a references list.

Working in teams, the students competed to find two information sources that offered an answer to the question “What evidence is there that global climate change influenced the evolution of human beings?” and also met the three criteria. As the facilitator of the workshop and game, I scored the websites they chose, one point for each criterion met. At the end of gameplay, two teams with a tied score competed to see who could find the least credible website. Their selections were evaluated with the three criteria reversed: unreliable web domain, flimsy or ambiguous author credentials, and the absence of reference lists or links to data sources.

Although not every team participated in the tie-breaker, engagement around the classroom was palpable and students instinctively located the humor in poor quality online information sources.

How information literacy competency enhances interdisciplinary learning

From a librarian, students learn about knowledge creation in various disciplines and understand the importance of the literature review as well as the approach of methodologies appropriate for research questions and disciplines. Since students learn about the use of library databases as well as the internet to find potential information sources for the research paper, the task of evaluating information, including understanding context, purpose, and the expertise of the producer, is especially important.²⁵

The ACRL Information Literacy Framework presents six core concepts that once grasped, facilitate students' ability to comprehend disciplinary and interdisciplinary ways of thinking:

1. Authority is constructed and contextual
2. Information creation as a process
3. Information has value
4. Research as inquiry
5. Scholarship as conversation
6. Searching as strategic exploration²⁶

Students' essential knowledge practices that reflect engagement with these concepts would ideally include their understanding of the knowledge creation cycle and appreciation of different research methodologies in different disciplines, understanding how authority, or relative importance of authorship, can shift depending on the venue, the purpose, or the intended audience of the information.²⁷ Students come to view scholarship as a conversation and demonstrate ability to insert themselves into this conversation. Students understand – and practice – research as an iterative process, learning how to develop search strategies and refine keywords through the process of searching and re-searching. Interdisciplinary learning denotes

knowing about knowledge production, consumption, organization, and application from a variety of disciplinary lenses.

Assessing information literacy competency in an interdisciplinary course

The application of the new ACRL Framework's threshold concepts, especially research as a conversation, affords exploration of how academic authors incorporate multiple disciplinary lenses in their published writing. One way to achieve this would be an in-class demonstration of how an author of an assigned reading cites authors of other assigned readings and an activity in which students use research databases to locate an article relevant to their topic, then use a citation database to see who cites and is cited with special attention to cross-disciplinary citing.

Another means to assess students' abilities to assimilate information from many disciplines is the use of visualizations to show relationships among important concepts. Dilevko and Solgasnova described the use of knowledge map creation in identifying emerging areas of knowledge.²⁸ Knowledge maps of the knowledge domains of recent dissertations demonstrate emerging areas of knowledge and foster a mindset of interdisciplinarity. They document how librarians' creation of knowledge maps of academic fields and subfields present in recent dissertations as a way that librarians can guide emerging scholars (doctoral students) in identifying relevant and recent literature in their subfields and areas. Similarly, Weird Science students developed concept maps to develop clear thesis statements for their research papers. Their concept maps visualized relationships between prominent concepts from class discussion and the themes of shared readings. By visualizing relationships between concepts and the readings that emphasize them, the concept maps illustrate important questions that researchers have addressed across disciplines and can help students narrow down a broad topic into

something both manageable and relevant. Students' ability to identify important concepts and relationships between them is evident, making the concept map straightforward to assess.

A simple rubric to assess the References lists of students' literature reviews was used to evaluate students' ability to locate information sources appropriate for the assignment that are produced by credible authors, reasonably free of bias, current, and accurate:

References List Assessment Rubric: Quality and Appropriateness of Information Sources			
1 point	2 points	3 points	4 points
All or almost all sources used are not appropriate for the assignment, and contain inaccurate, biased, or outdated information from inexperienced authors.	Most sources used are not appropriate for the assignment, and contain inaccurate, biased, or outdated information from inexperienced authors.	Some sources used are not appropriate for the assignment, and contain inaccurate, biased, or outdated information from inexperienced authors.	All sources used are appropriate for the assignment. They are credible sources, and are accurate, expert, objective, and current.

For the most recent Weird Science class, most students' References lists scored between three and four out of a possible four points; out of twenty References lists evaluated, five scored 4 points (equivalent to an A grade), five scored 3.5 points (A-/B+), eight scored 3 points (B grade), one scored 2.5 points (C grade) and one scored one point (failing grade). The information resources that students incorporated into their literature reviews generally indicated greater than average competence with finding scholarly articles and books via internet searching and library database use. Quite a few References lists contained citations to non-scholarly sources for which an expert author could not be established; those that included less reliable sources tended to refer to more than one such source, which resulted in a lower score. The References lists that scored the highest included one or fewer low-quality, less reliable sources. The average score was 3.25 out of four points, equivalent to 81%, or a B-.

In another assessment near the end of the semester, students responded to these questions about their understanding of research ethics and information literacy:

1. In a few sentences... "What does research ethics mean to you?"
2. What are the five most important ethical issues that students, scholars/researchers need to know about as they conduct their research?
3. In a few sentences... "What does information literacy mean to you?"

The responses were analyzed from an information literacy perspective for this module. A visualization of word frequency in their responses revealed some patterns. Suppressing the words “research” and “information” and accounting for duplicated word forms such as “issues” and “issue” led to clearer results. The words ethics, literacy, and important appeared most frequently; this indicates a connection between the concepts of research ethics and information literacy and the weight or importance they assign those concepts. At the next tier were words that suggested an understanding of ethical research conduct with humans: human, being, and students. The latter suggests that students connect the concept of ethical research conduct to specific issues or examples, which they learned about in the Responsible Conduct of Research guest lecture. A qualitative perspective on student responses to the question “what does information literacy mean to you?” shows thematic patterns and commonalities. Most student responses addressing definitions of information literacy can be grouped by a few dominant themes:

- Ability to identify one’s own need for information
- Ability to evaluate the quality and relevance of information in any medium or from any source
- Awareness of academic integrity and the consequences of plagiarism

These themes demonstrate a complex understanding of information literacy applied to research, first recognizing that a researcher must identify his or her own need for information before

attempting research. Students show awareness that the researcher's responsibility to evaluate information for quality and appropriateness regardless of the source, a key ability for lifelong learning beyond the undergraduate classroom. Awareness of academic integrity reflects discussion of this topic throughout the course, and is surely reinforced in other courses with significant research and writing components. Their awareness of the importance of information literacy competency as a means to better academic production is clearly shown through comments such as "[information literacy is] the ability to adequately discern important information... and apply it to your focus of interest." Students' perception of the value of information evaluation is evident in comments like "understanding what references or sources are right for your research. For example using the *New York Times* versus a blog." One student identified information literacy as an essential life skill: "[information literacy] is imperative for students to become independent lifelong learners. Information literacy provides the opportunity to equip us with critical thinking skills..." A few responses contrasted true learning with mere fact memorization; understanding the theory and application of facts. One response defined information literacy as the ability to do a close reading for comprehension of any content, any media – a research article, novel, or video.

A few students appear to have turned to the internet to inform their definitions of information literacy and provided the "official meaning [of information literacy] is the ability to know when there is a need for information, to be able to identify, locate, and effectively use that information...that meaning is the very essence of what it means to me also," one student wrote.

When verbs in students' responses to the question, "What does information literacy mean to you?" are grouped and counted, four information-using actions critical to successful research and evaluation of sources stand out: evaluate; identify need for information; use ethically; and

find. They identify these tasks as the essential components of information literacy. Using varied assessment methods, including surveying students on their knowledge of research ethics and information literacy and evaluating student artifacts, allows for a more complete picture of students' abilities to assimilate ethical aspects of research than a single assessment method.

Looking ahead to future semesters and information literacy guest lectures in this course, more rigorous assessment of students' information literacy competencies would be valuable and best achieved through consultation with the classroom instructor. Means to assess students' understanding of information literacy concepts and practices could include a pre-test or an in-class activity in advance of my lecture, a method shown to be effective by Natalie and Crowe.²⁹ Such a pre-test could be a simple questionnaire asking students to self-assess their ability to identify high-quality information sources appropriate for a research paper, or completion of an online tutorial and quiz in which students apply evaluation criteria to a variety of scholarly and popular sources. Another means would be a more exhaustive evaluation of students' research papers and literature reviews for ethical use of all information sources and correct, complete documentation of their sources. Use of a rubric to evaluate student learning artifacts is a flexible and effective means to determine the effectiveness of information literacy instruction.³⁰ Evaluation of students' References lists is achieved through application of a rubric to student literature reviews to evaluate for quality of sources selected and integrated into the research assignment. Another, more complex evaluation technique that would offer some insights into how students located and evaluated research sources would involve the librarian and classroom instructor co-grading the students' annotated bibliographies with a rubric that evaluates students' perception of the relevance and value of a particular article or book chapter to their research question, perhaps accompanied by a short free-writing reflection exercise.

Conclusion

In this chapter, we used the lens of constructivism and its variants to explore and interpret how students strive to become more information literate while engaging in responsible conduct of research in an interdisciplinary course. We reviewed how the modules were constructed and delivered, and analyzed how students approached the intersection of research ethics and information literacy by reviewing written work, class discussions, and student feedback. Both information literacy and responsible conduct of research are topics in service to four of the six learning goals of the Weird Science course: cultural factors that affect these disciplines; philosophical, historical, and ethical perspectives; methods for finding pertinent information; and critical evaluation of ideas and their sources. In working through this chapter, it becomes clear that both topics interface on a number of structural and conceptual elements and even share a course learning goal – the critical evaluation of ideas and their sources. This conclusion is supported when examining students’ responses to the three questions posed at the end of the semester. A cluster analysis using NVIVO showed two dominant clusters – one cluster included traditional information literacy concepts such as information quality and finding relevant information. The second cluster was comprised of elements from both information literacy and responsible conduct of research and included concepts such as informed consent, giving credit where credit is due, and do no harm.

Both modules emphasize frameworks or skill sets to help students not only complete their assignments successfully, but also help to facilitate generalization to other contexts. Given that one of the goals of interdisciplinary teaching and learning is to encourage students to bring a variety of perspectives to bear on a problem that cannot be solved within a single discipline, generalization to other contexts is key. Teaching skill sets or frameworks, for example, how to

find quality information, what questions to ask when conducting animal or human subjects research, or where to go for more information, support a goal of generalization. We take students on ethical journeys informed by our respective disciplines and find that not only do our perspectives correspond with the course goals, they enhance interdisciplinary habits of mind through their generalization to contexts beyond the classroom.

Bibliography

ACRL Board. "Framework for Information Literacy for Higher Education." Framework for Information Literacy for Higher Education. February 2, 2015. Accessed June 03, 2015. <http://www.ala.org/acrl/standards/ilframework>.

Applefield, James M., Richard Huber, and Mahnaz Moallem. "Constructivism in Theory and Practice: Towards a Better Understanding." *High School Journal* 84, no. 2 (December/January 2000/2001): 35-53.

Banuazizi, Ali, and Siamak Movahedi. "Interpersonal Dynamics in a Simulated Prison: A Methodological Analysis." *American Psychologist* 30, no. 2 (1975): 152-60. doi:10.1037/h0076835.

Bolling, Ruben. "Human Morality Made Simple." Tom the Dancing Bug. Go Comics, 1991. <http://gocomics.typepad.com/tomthedancingbugblog/2014/11/human-morality-made-simple.html>

Brooks, Jacqueline Grennon. "Constructivism as a Paradigm for Teaching and Learning." Constructivism as a Paradigm for Teaching and Learning. 2004. Accessed July 15, 2015. <http://www.thirteen.org/edonline/concept2class/constructivism/index.html>.

- Burger, Jerry M. "Replicating Milgram: Would People Still Obey Today?" *American Psychologist* 64, no. 1 (2009): 1-11. doi:10.1037/a0010932.
- Derry, Sharon J. "A Fish Called Peer Learning: Searching for Common Themes." In *Cognitive Perspectives on Peer Learning*, edited by Angela M. O'Donnell and Alison King. Mahwah, NJ: L. Erlbaum, 1999.
- Detlor, Brian, Lorne Booker, Alexander Serenko, and Heidi Julien. "Student perceptions of information literacy instruction: The importance of active learning." *Education for Information* 29, no. 2 (2012): 147-161.
- <http://citytech.ezproxy.cuny.edu:2048/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=80731478&site=ehost-live&scope=site>.
- Dilevko, Juris, and Lana Soglasnova. "Knowledge Maps and the Work of Academic Librarians in an Interdisciplinary Environment." *The Reference Librarian* 54, no. 2 (2013): 143-56. Accessed June 5, 2015. Education Source.
- Dold, Claudia J. "Critical Information Literacy: A Model for Transdisciplinary Research in Behavioral Sciences." *The Journal of Academic Librarianship* 40, no. 2 (2014): 179-84. doi:10.1016/j.acalib.2014.03.002.
- Gibson, Craig. "Teaching Research Across Disciplines: Interdisciplinarity and Information Literacy." In *Interdisciplinarity and Academic Libraries*, by Daniel C. Mack, 167-81. Chicago: Association of College & Research Libraries, 2012.

- Gluck, John P. "Harry F. Harlow and Animal Research: Reflection on the Ethical Paradox." *Ethics & Behavior* 7, no. 2 (1997): 149-61. Accessed July 21, 2015.
doi:10.1207/s15327019eb0702_6.
- Godlee, F., J. Smith, and H. Marcovitch. "Wakefield's Article Linking MMR Vaccine and Autism Was Fraudulent." *BMJ* 342 (January 06, 2011): 7452. Accessed July 21, 2015.
doi:10.1136/bmj.c7452.
- Gomes, Antony, Archita Saha, Poulami Datta, and Aparna Gomes. "Research Ethics for Young Researchers." *Indian Journal of Pharmacology* 45, no. 5 (September/October 2013): 540-41. doi:10.4103/0253-7613.117775.
- Haney, Craig, Curtis Banks, and Philip Zimbardo. "Interpersonal Dynamics in a Simulated Prison." *International Journal of Criminology and Penology* 1 (1973): 69-97. Accessed July 25, 2015.
- Harlow, Harry F. "The Nature of Love." *American Psychologist* 13, no. 12 (1958): 673-85.
- Harlow, Harry F. and Margaret Kuenne Harlow. "Learning to Love." *American Scientist* 54 (1966): 244-72.
- Harris, David E., and Robert Schaible. "Writing Across the Curriculum Can Work." *The NEA Higher Education Journal*. 2011. Accessed July 28, 2015.
http://www.nea.org/assets/img/PubThoughtAndAction/TAA_97Spr_03.pdf.
- Jones, James H. *Bad Blood: The Tuskegee Syphilis Experiment*. New York: Free Press, 1993.

Kuglitsch, Rebecca Z. "Teaching for Transfer: Reconciling the Framework with Disciplinary Information Literacy." *Portal: Libraries and the Academy Portal* 15, no. 3 (2015): 457-70. Accessed July 21, 2015. doi:10.1353/pla.2015.0040.

Kukla, André. *Social Constructivism and the Philosophy of Science*. London: Routledge, 2000.

Majumder, Maimuna S., Emily L. Cohn, Sumiko R. Mekar, Jane E. Huston, and John S. Brownstein. "Substandard Vaccination Compliance and the 2015 Measles Outbreak." *JAMA Pediatrics* 169, no. 5 (2015): 494-95. Accessed July 21, 2015. doi:10.1001/jamapediatrics.2015.0384.

Milgram, Stanley. "Behavioral Study of Obedience." *The Journal of Abnormal and Social Psychology* 67, no. 4 (1963): 371-78. doi:10.1037/h0040525.

Milgram, Stanley. "Issues in the Study of Obedience: A Reply to Baumrind." *American Psychologist* 19, no. 11 (1964): 848-52. doi:10.1037/h0044954.

Milgram, Stanley. *Obedience to Authority: An Experimental View*. New York: Harper & Row, 1974.

Natalle, Elizabeth J., and Kathryn M. Crowe. "Information Literacy and Communication Research: A Case Study on Interdisciplinary Assessment." *Communication Education* 62, no. 1 (2013): 97-104. Accessed June 6, 2015.
<http://citytech.ezproxy.cuny.edu:2048/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=ufh&AN=84918581&site=ehost-live&scope=site>.

National Academy of Sciences. *On Being a Scientist: A Guide to Responsible Conduct in Research*. Washington, D.C.: National Academies Press, 2009.

O'Connor, Lisa, and Jill Newby. "Entering Unfamiliar Territory: Building an Information Literacy Course for Graduate Students in Interdisciplinary Areas." *Reference & User Services Quarterly* 50, no. 3 (2011): 224-29. Accessed June 5, 2015.
doi:10.5860/rusq.50n3.224.

Phillips, Noah. "University of Wisconsin to Reprise Controversial Monkey Studies." Wisconsinwatch.org. July 31, 2014. Accessed July 22, 2015.
<http://wisconsinwatch.org/2014/07/university-of-wisconsin-to-reprise-controversial-monkey-studies/>.

Piaget., Jean. *The Construction of Reality in the Child*. New York: Basic Books, 1954.

Poland, Gregory A., and Ray Spier. "Fear, Misinformation, and Innumerates: How the Wakefield Paper, the Press, and Advocacy Groups Damaged the Public Health." *Vaccine* 28, no. 12 (2010): 2361-362. Accessed July 21, 2015. doi:10.1016/j.vaccine.2010.02.052.

Poland, Gregory A. "MMR Vaccine and Autism: Vaccine Nihilism and Postmodern Science." *Mayo Clinic Proceedings* 86, no. 9 (2011): 869-71. Accessed July 21, 2015.
doi:10.4016/33261.01.

Pritchard, Alan, and John Woollard. *Psychology for the Classroom: Constructivism and Social Learning*. London: Routledge, 2010.

Slater, Mel, Angus Antley, Adam Davison, David Swapp, Christoph Guger, Chris Barker, Nancy Pistrang, and Maria V. Sanchez-Vives. "A Virtual Reprise of the Stanley Milgram Obedience Experiments." *PLoS ONE* 1, no. 1 (December 20, 2006). Accessed July 22, 2015. doi:10.1371/journal.pone.0000039.

Smale, Maura A. "Get in the Game: Developing an Information Literacy Classroom Game." *Journal of Library Innovation* 3, no. 1 (2012): 126-47. Accessed July 9, 2015. <http://www.libraryinnovation.org/article/view/182/319>.

United States. Department of Health, Education, and Welfare. The National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. *Ethical Principles and Guidelines for the Protection of Human Subjects of Research*. 1978. Accessed July 22, 2015. <http://www.hhs.gov/ohrp/humansubjects/guidance/belmont.html>.

United States. Nuremberg Military Tribunals. *Trials of War Criminals Before the Nuernberg Military Tribunals Under Control Council Law No. 10*. Vol. 2. Washington DC: US Government Printing Office, 1946-1949.

Vygotskiĭ, Lev Seminovich and Michael Cole. *Mind in Society: The Development of Higher Psychological Processes*. Cambridge: Harvard University Press, 1978.

¹ James M. Applefield, Richard Huber, and Mahnaz Moallem. "Constructivism in Theory and Practice: Towards a Better Understanding." *High School Journal* 84, no. 2 (December/January 2000/2001): 35-53.

² Jean Piaget. *The Construction of Reality in the Child*. New York: Basic Books, 1954.

³ Jacqueline Grennon Brooks. "Constructivism as a Paradigm for Teaching and Learning." *Constructivism as a Paradigm for Teaching and Learning*. 2004. Accessed July 15, 2015. <http://www.thirteen.org/edonline/concept2class/constructivism/index.html>.

⁴ See Sharon J. Derry. "A Fish Called Peer Learning: Searching for Common Themes." In *Cognitive Perspectives on Peer Learning*, edited by Angela M. O'Donnell and Alison King. Mahwah, NJ: L. Erlbaum, 1999; Kukla, André. *Social Constructivism and the Philosophy of Science*. London: Routledge, 2000.

⁵ Lev Semenovich Vygotskiĭ and Michael Cole. *Mind in Society: The Development of Higher Psychological Processes*. Cambridge: Harvard University Press, 1978.

⁶ National Academy of Sciences. *On Being a Scientist: A Guide to Responsible Conduct in Research*. Washington, D.C.: National Academies Press, 2009; Antony Gomes, Archita Saha, Poulami Datta, and Aparna Gomes. "Research Ethics for Young Researchers." *Indian Journal of Pharmacology* 45, no. 5 (September/October 2013): 540-41. doi:10.4103/0253-7613.117775.

⁷ Fiona Godlee, Jane Smith, and Harvey Marcovitch. "Wakefield's Article Linking MMR Vaccine and Autism Was Fraudulent." *BMJ* 342 (January 06, 2011): 7452. Accessed July 21, 2015. doi:10.1136/bmj.c7452; Gregory A. Poland and Ray Spier. "Fear, Misinformation, and Innumerates: How the Wakefield Paper, the Press, and Advocacy Groups Damaged the Public Health." *Vaccine* 28, no. 12 (2010): 2361-362. Accessed July 21, 2015. doi:10.1016/j.vaccine.2010.02.052; Gregory A. Poland, "MMR Vaccine and Autism: Vaccine

Nihilism and Postmodern Science." *Mayo Clinic Proceedings* 86, no. 9 (2011): 869-71.

Accessed July 21, 2015. doi:10.4016/33261.01.

⁸ Maimuna S. Majumder, Emily L. Cohn, Sumiko R. Mekar, Jane E. Huston, and John S. Brownstein. "Substandard Vaccination Compliance and the 2015 Measles Outbreak." *JAMA Pediatrics* 169, no. 5 (2015): 494-95. Accessed July 21, 2015.

doi:10.1001/jamapediatrics.2015.0384.

⁹ Ruben Bolling. "Human Morality Made Simple." Tom the Dancing Bug. Go Comics, 1991.
<http://gocomics.typepad.com/tomthedancingbugblog/2014/11/human-morality-made-simple.html>.

¹⁰ Harlow, Harry F. "The Nature of Love." *American Psychologist* 13, no. 12 (1958): 673-85.;
Harlow, Harry F. and Margaret Kuenne Harlow. "Learning to Love." *American Scientist* 54
(1966): 244-72.

¹¹ Gluck, John P. "Harry F. Harlow and Animal Research: Reflection on the Ethical Paradox." *Ethics & Behavior* 7, no. 2 (1997): 149-61. Accessed July 21, 2015.
doi:10.1207/s15327019eb0702_6.

¹² Phillips, Noah. "University of Wisconsin to Reprise Controversial Monkey Studies." *Wisconsinwatch.org*. July 31, 2014. Accessed July 22, 2015.
<http://wisconsinwatch.org/2014/07/university-of-wisconsin-to-reprise-controversial-monkey-studies/>.

¹³ Jones, James H. *Bad Blood: The Tuskegee Syphilis Experiment*. New York: Free Press, 1993.

¹⁴ United States. Nuremberg Military Tribunals. *Trials of War Criminals Before the Nuernberg Military Tribunals Under Control Council Law No. 10*. Vol. 2. Washington DC: US Government Printing Office, 1946-1949.

¹⁵ Stanley Milgram. "Behavioral Study of Obedience." *The Journal of Abnormal and Social Psychology* 67, no. 4 (1963): 371-78. doi:10.1037/h0040525; Milgram, Stanley. *Obedience to Authority: An Experimental View*. New York: Harper & Row, 1974.

¹⁶ Stanley Milgram, "Behavioral Study of Obedience," p. 374.

¹⁷ Milgram, Stanley. "Issues in the Study of Obedience: A Reply to Baumrind." *American Psychologist* 19, no. 11 (1964): 848-52. doi:10.1037/h0044954.

¹⁸ Jerry M. Burger. "Replicating Milgram: Would People Still Obey Today?" *American Psychologist* 64, no. 1 (2009): 1-11. doi:10.1037/a0010932; Mel Slater, Angus Antley, Adam Davison, David Swapp, Christoph Guger, Chris Barker, Nancy Pistrang, and Maria V. Sanchez-Vives. "A Virtual Reprise of the Stanley Milgram Obedience Experiments." *PLoS ONE* 1, no. 1 (December 20, 2006). Accessed July 22, 2015. doi:10.1371/journal.pone.0000039.

¹⁹ Craig Haney, Curtis Banks, and Philip Zimbardo. "Interpersonal Dynamics in a Simulated Prison." *International Journal of Criminology and Penology* 1 (1973): 69-97. Accessed July 25, 2015.

²⁰ Craig Haney, Curtis Banks, and Philip Zimbardo. "Interpersonal Dynamics in a Simulated Prison," 72.

²¹ Harris, David E., and Robert Schaible. "Writing Across the Curriculum Can Work." *The NEA Higher Education Journal*. 2011. Accessed July 28, 2015.

http://www.nea.org/assets/img/PubThoughtAndAction/TAA_97Spr_03.pdf.

²² City Tech librarians anticipated that the ACRL Information Literacy Framework would present a more nuanced view of the concept of authority, authorship, and expertise of creator.

²³ ACRL Board. "Framework for Information Literacy for Higher Education." *Framework for Information Literacy for Higher Education*. February 2, 2015. Accessed June 03, 2015.

<http://www.ala.org/acrl/standards/ilframework>.

²⁴ Maura A. Smale. "Get in the Game: Developing an Information Literacy Classroom Game." *Journal of Library Innovation* 3, no. 1 (2012): 126-47. Accessed July 9, 2015.

<http://www.libraryinnovation.org/article/view/182/319>.

²⁵ Claudia J. Dold. "Critical Information Literacy: A Model for Transdisciplinary Research in Behavioral Sciences." *The Journal of Academic Librarianship* 40, no. 2 (2014): 179-84.

doi:10.1016/j.acalib.2014.03.002.

²⁶ ACRL Board, "Framework for Information Literacy for Higher Education."

²⁷ Ibid.

²⁸ Juris Dilevko and Lana Soglasnova. "Knowledge Maps and the Work of Academic Librarians in an Interdisciplinary Environment." *The Reference Librarian* 54, no. 2 (2013): 143-56.

Accessed June 5, 2015. Education Source.

²⁹Elizabeth J. Natalie, and Kathryn M. Crowe. "Information Literacy and Communication Research: A Case Study on Interdisciplinary Assessment." *Communication Education* 62, no. 1 (2013): 97-104. Accessed June 6, 2015.

<http://citytech.ezproxy.cuny.edu:2048/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=ufh&AN=84918581&site=ehost-live&scope=site>.

³⁰ Ibid.