Research Proposal

Metadata literacy: An analysis of metadata awareness in college students and academic librarians

1. Introduction .................................................................................................................................. 3
   1.1. Abstract ................................................................................................................................ 3
   1.2. Proposal Structure ................................................................................................................ 3

2. Problem Statement .................................................................................................................. 4
   2.1. General Problem .................................................................................................................. 4
   2.2. Study Rationale .................................................................................................................... 5
   2.3. Study focus and purpose ...................................................................................................... 5
   2.4. Study Importance .................................................................................................................. 6
   2.5. Inquiry Framework .............................................................................................................. 7
   2.6. Research objectives ............................................................................................................. 10
   2.7. Study Boundaries ............................................................................................................... 13
   2.8. Summary ............................................................................................................................ 14

3. Literature Review .................................................................................................................. 15
   3.1. Overview ............................................................................................................................ 15
   3.2. Selection Process ............................................................................................................... 16
   3.3. Literature quality and representative works ....................................................................... 18
1. Introduction

1.1. Abstract

Familiarity with the structure and content of digital documents is of increasing importance given the transition from primarily print to primarily digital information systems. The extent to which a participant is familiar with these systems can be discussed in terms of their “literacy” with this type of content. This research investigates how familiar college students and information literacy instructors are with these structures (referred to in this research as metadata). In order to investigate this phenomenon, the research employs a constructivist grounded framework using self-efficacy based instruments, instructional components, and participant interaction to answer the question “How familiar are participants with the concept of metadata and how is it related to their overall sense of information literacy?”

1.2. Proposal Structure

This research proposal outlines an investigation of the concept of metadata literacy in undergraduate students and information literacy instructors. The proposal has three main sections: an overview of the research problem, a review of literature supporting the concept of metadata literacy, and an in-depth methods section which outlines an approach to investigating this concept.

The problem statement section includes a study rationale, an overview of the research objectives and questions, and a discussion of the assumptions and parameters of the inquiry. The literature review following this overview documents the approach to finding literature on the phenomenon, discusses significant studies in the areas of literacy and metadata, and lays out the gaps and research opportunities in this area. The literature review is a synopsis of the full literature reviews prepared for this research proposal. Finally, the methods statement lays out a detailed plan for studying the phenomenon of metadata literacy.

The structure of this proposal is based on quantitative and mixed methods approaches, particularly the work done by Creswell and Plano Clark (Creswell & Plano Clark, 2007).
2. Problem Statement

2.1. General Problem

We are transitioning from a print based culture to a digital culture. Reflective of this transition is a change in how documents are created, structured, and used. This change in the nature of documents requires redefining the mechanisms for representing and encoding documents and the abilities and conceptual understandings on the part of document authors/users to work with these new or redefined mechanisms. The result is a new area of information and document interaction, which requires study both to determine how the documents use metadata (the elements of contextualized data in the document) and what skills/abilities (i.e. literacies - the abilities, skills, and concepts that surround information awareness and use) those document creators / authors need.

There has been significant research in the metadata field, which investigates how metadata is used in representing and structuring documents and enabling information services in relation to these documents. This research includes seeking metadata models to describe information structures, investigating the perspectives of creators and users of metadata, and creating systems that make innovative use of metadata to serve specific information needs.

Likewise, there has been significant research in the literacy field which investigates the types of skills and concepts that document users must have to work with specific types of electronic resources. The growth of the role in information and technology in economies and personal lives has led to a greater focus on the ability of information consumers to interact with these resources. This focus is often manifested as a specific type of literacy (digital, office, or social) along with specific skills and concepts in a given context to help define the operational parameters of a ‘literate’ individual. Corresponding to this document-type or context-based view of literacy, there is little research that looks at forms of literacy that span multiple skill sets or resource types (such as research literacy or emerging technology literacy).

Further, despite the widespread interest in both of these areas (metadata and literacy), there has been little cross-investigation to discover the roles that metadata play in literacy and, conversely, the nature of literacy required in order to be an information consumer in a metadata-rich environment. The research that does exist in this area tends also to be qualitative in nature and
typically focuses more on research of expert perspectives than information creator/consumer perspectives.

2.2. Study Rationale

The following factors, indicative of the change in our information infrastructure and literacy behaviors are rationales for this study:

- Production of digital information use has increased dramatically across all segments of the population.
- Changes in how documents are structured digitally has transitioned from narrative text to structured metadata.
- An understanding of and ability to work with information objects is key to using information and learning.
- Users of digital resources need to understand the nature of structured metadata and metadata concepts to make effective use of documents.

In order to understand how to best make use of digital documents, this research seeks to understand how participants think about them and what impact they have on their perceived levels of literacy.

2.3. Study focus and purpose

Research which investigates the relationship between metadata and literacy is of particular importance given the growth in the use of metadata in popular information resources and services. This research proposal defines a project, which will identify and investigate forms of metadata-literacy and evaluate both student and instructor awareness of and abilities with respect to these literacies. The study will use a mixed-methods approach to gather both qualitative data about participants’ perceptions and attitudes and quantitative data about the levels of metadata awareness in participants and the impact on their view of literacy of a short introduction to uses of metadata to describe images.

The use of a mixed qualitative and quantitative approach seeks to understand both the extent of awareness and the perceived impact of metadata related tasks on participants in an information...
environment. Data will include librarian and student observations about the scope and relevance of metadata in their information environment, self-efficacy based ratings of their information literacy levels, and interaction with a short learning segment on metadata.

This study focuses on college students and information literacy instructors for multiple reasons. First, college students are perceived to be immersed and natively fluent with ICTs and associated information in the popular literature and media, and in research on ICT use (notably the Pew Internet trust). This study will seek to determine the extent to which that fluency extends to metadata. Second, information literacy instructors are in a position to have a generalized perspective on the role that metadata plays in assisting learning in a way that other teachers may not. By surveying both groups with the same instrument, this study seeks to uncover differences between these two groups with respect to fluency with metadata and perceived utility of metadata skills and concepts.

This project will consist of a multi-part instrument, which includes descriptive survey elements, information interaction elements, and pre/post-interaction efficacy ratings. By employing an online survey tool and examples from real-world environments this study seeks to engage participants in a context with which they should already be familiar.

In order to provide a context for this inquiry, the project will include a review of theoretical foundations of metadata-literacy and metadata-rich learning environments, and current approaches and systems.

### 2.4. Study Importance

Research over the last decade has seen a convergence in the fields of education, computer science and information science. Each of these areas bring a theoretical foundation and approach to information that is based in part on the other two fields but often fails to take advantage of other connections. For example, constructivist learning theory borrows heavily from psychology in investigating how students learn but often fails to capitalize on the relationship that concepts such as scaffolding and categorization have to information organization theory. Likewise, computer and information science focuses on research of social information systems, which are increasingly employed in learning and information management environments without focusing on how metadata both informs the design and use of these systems.
This research will explore issues of metadata use and begin to address the knowledge gap that exists between metadata research focused on investigating technical elements and popular use of metadata. It will use the framework of information literacy to define the investigation parameters and will look at how the different roles of metadata (such as creation, use, and evaluation) can be informed by literacy concepts and skills.

This project will investigate the relationship between these three fields (education, information science, and computer science) by looking at the connections between metadata and information organization informed elements of instruction and the corresponding use by undergraduate students. It will use as a foundation the qualitative studies conducted by the researcher and the research community to identify areas in which information organization/metadata are commonly used by the participant population. The intent of the research is to discover the extent to which the participants generalize this knowledge and the extent to which it is related to their level of information literacy. By identifying these views and comparing the results between the two participant groups, this study will contribute to the research being conducted in education, information and library science, and computer science by defining how metadata informs literacy and if/where the gap exists between students and librarians on this topic.

Further, this research will help to develop a framework for identifying and evaluating literacies and how their concepts and skills may be used in learning environments. This will both inform current literacy models and will identify commonly accepted roles and uses of metadata in information resources. Finally, the study will inform ways in which future collaborative relationships between ‘embedded’ or ‘blended’ librarians, instructors, and students can use library and information science concepts such as metadata to support learning.

2.5. Inquiry Framework

In a recent review of published literature related to e-learning, Shih et.al.(2008) argue that much of the research being completed in the education field focuses on information processing, instruction, manipulation of the learning environment, and metacognition. Their review of research found that few articles used experimental research to evaluate these areas and that work in these areas are in early stages. Studies from the perspective of library and information science have analyzed the impact of various types of skills and expertise levels of users on their use of the web (Tabatabai & Shore, 2005), the impact of information literacy skill teaching (Eisenberg, Erik Mitchell - Research proposal
Lowe, Spitzer, & Spitzer, 2004; Gross & Latham, 2007; Koufagiannakis & Weibe, 2006), and the use of metacognitive skills in research (Anderson & Nashon, 2007; Jaeger, 2007).

In information and library science as well as education, there is extensive use of information literacy and information technology informed approaches to teaching. Popularly used standards include the ACRL information literacy standards (2005), and the Big 6 (2006). Both of these models include specific foci on skills, content areas, and core competencies, but in each case tend to fail to abstract information skills from specific tasks (search, retrieve, evaluate, etc). The concept of meta-literacy looks at common themes across these literacy platforms and identifies elements of literacy that span these action based boundaries. There are a number of meta-literacy models including Hughes-Shapiro model (1996), Sociotechnical (Tuominen, Savolainen, & Talja, 2005), and Sundin’s literacy framework (Sundin, 2008). Each of these meta-literacy focused models looks at literacy from broad themes such as categories of information interaction, roles of the participant, or perspective of the instructor. The Hughes-Shapiro model, for example, creates a taxonomy of literacies including research literacy, tool literacy, critical literacy, and socio-structural literacy. In each of these areas, concepts of identification, categorization, and information management constitute a set of meta-skills that may be utilized to help study literacy. In contrast, the socio-technical model takes the view that literacy is primarily a social/technical set of skills and concepts which is learned outside of formal environments. Tuominen et al.’s (2005) model presents influential factors, including ideology/economics, role of document structure, role of individual contextual skills, and the role of social actions and outcomes.

These literacy models assess the impact of literacy on learning through the use of Bloom’s taxonomy (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956) and Bloom’s updated taxonomy (Krathwohl, 2002). Literacies have been mapped onto each level of the taxonomy such as knowledge, comprehension, evaluation, and creation as specific skills and concepts. Studies have evaluated these literacies through a number of methods including the method of self-efficacy (Bandura, 1982; Kurbanoglu, Akkoyunlu, & Umay, 2006).

The argument that learning and information management needs to be informed with a set of meta-skills that do not map to traditional information research and use goals is supported by popular learning theories including constructivist and active learning theories. Constructivist based teaching and collaborative learning environments include elements of information
discovery, evaluation, use, management, and reuse and are often made available within a meta-
skill (technical, social, critical, metadata) rich environment (CanCore, 2006; Zeng & Smith, 2003). Despite the connection between information literacy and constructivist learning theory through a body of literature presenting case studies on rich learning environments, there has been little research, which examines how the use of information organization and metadata techniques impacts information literacy. In particular, no research examines the utility of metadata concepts in relation to information literacy.

In order to address this gap, this research will investigate the area of metadata literacy with a specific focus on the use of information organization and metadata skills within the larger meta-
skill set. This investigation will use the framework created in the literature review on information literacy (IL). The framework in Table 1 identifies the relationship between an IL skill/concept, and appropriate pedagogical and theoretical approaches. It also asks, in both directions, what the role of the context of the IL element and the role of the surrounding information environment play in this interaction.

**Table 1 Information literacy framework**

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Pedagogical theory</th>
<th>Information and Learning theory</th>
<th>Environmental role</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participant</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Skills</strong></td>
<td>How are skills taught or conveyed?</td>
<td>What is the underlying theory of the value of specific skills?</td>
<td>What types of specific skills are employed?</td>
</tr>
<tr>
<td><strong>Conceptual knowledge</strong></td>
<td>How does the teacher convey concepts?</td>
<td>What role does the concept play in informing a learning or information theory?</td>
<td>What conceptual or generalized knowledge is required in this environment?</td>
</tr>
<tr>
<td><strong>Skill/concept</strong></td>
<td>What are the</td>
<td>Are the</td>
<td>What role does</td>
</tr>
</tbody>
</table>
The use of this framework will allow this research to identify specific metadata tasks (such as RSS feed use and tag creation) and identify an example of their use in specific technological and social contexts. By looking both at a metadata literacy ML task and at the context of that task, this research will be able to discover the extent to which participants can generalize ML knowledge.

2.6. Research objectives

2.6.1. Research focus

The overarching research question of this project is: How do students and librarians use metadata and what impact does it have on their information experience? This research project will investigate the concept of metadata literacy by examining the familiarity and use of metadata by undergraduate students and instructors. This study will investigate participant’s knowledge of and perceptions about the value of metadata, their use of metadata skills in common contexts, and their ability to generalize those skills. It will employ a multi-part instrument which will include both survey and interaction elements.

2.6.2. Philosophical foundations

A constructivist perspective is useful for grounding this research given that the aim is to identify the perceptions, elements, and roles of a phenomena -- in this case metadata. Constructivism as a worldview encourages definition of a phenomenon from multiple participant perspectives, allows the data gathered from participant interaction to inform the theoretical models being used in the research, and encourages the use of multiple data sources to provide a more holistic view of a phenomenon (Creswell & Plano Clark, 2007, p. 24). While the constructivist perspective is valued in both metadata and literacy research it is not always the dominant world view. For example, Wang and Artero’s study on high school students use of IL concepts is grounded in a
positivist view of ‘correct’ literacy skills, but uses the constructivist approach to discover student perception of training needs (Wang & Artero, 2005). Conversely the sociotechnical perspective of IL emphasizes the concepts of multiple perspectives, participant-created IL practices, and fluid relationships between IL elements (relationships, tasks, inter-personal interactions) (Tuominen, et al., 2005).

A constructivist focused investigation into the concept of metadata literacy will allow this study to both suggest elements of ML and to discover from participants alternative views of the roles of metadata and their importance in information interactions. Specifically, it will ask participants to define their own view of metadata and ask them to evaluate their level of literacy with regards to general skills (Information Problem Solving) and metadata skills.

2.6.3. Theoretical model

The concept of metadata-literacy and the theoretical model supporting it receives in-depth attention in the literature reviews supporting this research. In short, the theoretical model informing this research is based on the connection of popular literacy models and the model of metadata types and uses

The theoretical model uses three broad categories to discuss metadata-literacy

1. Skills - In the intersection between literacy skills (know, access, evaluate, use, ethical, etc) and the roles of metadata (identify, categorize, manage, preserve, discover) there are skills specific to metadata (such as recognize context, harvest, transform, archive) that are descriptive of the tasks that are required to use electronic metadata-rich documents.

2. Concepts - In the world of electronic resources, theoretical concepts such as Extended Mind and Socio-technical interaction describe environments in which metadata serves purposes such as cognition support, community building, and information management. Bloom’s taxonomy tends to align these tasks with higher levels of learning. As generalized knowledge about metadata grows, participants will be able to discuss these strategies for metadata management in more detail.

3. Context - As has been discussed in the literature reviews, the context of information interaction (both participant goals/needs and technological platform) play a role in the use
2.6.4. Research questions

The specific research questions of this study are:

1. To what extent are participants aware of metadata and metadata literacy concepts?
   a. How do participants define metadata?
   b. How/Where do they use metadata?
   c. What role do they see metadata playing in their information environments?
   d. Is there a difference in how the two participant groups view metadata?

2. What impact on participants’ level of literacy does a short instructional element on a metadata have?
   a. Is there a significant difference in literacy levels reported by participants following the instructional component?
   b. Is there any correlation between the awareness of metadata and/or use of it and reported levels of self-efficacy with respect to literacy?
      i. Hypothesis - student’s self-efficacy rating with respect to metadata literacy will increase significantly based on the intervention.

3. How do participants view metadata as fitting into their information environment
   a. What roles do they see it playing in their teaching, learning, everyday, common interest, community, and complex knowledge?
   b. Do they exhibit any ML practices in their own personal information environment?

2.6.5. Intervention

This study will employ a multi-part, mixed methods approach in order to identify and evaluate participant perspectives on metadata-literacy. Two participant groups will be included (students and librarians). Both participants will receive the same instrument. The instrument will include a background information and knowledge section, a pre-intervention evaluation, an intervention
section, which will include showing participants a short instructional piece on metadata, and some participant interaction and a post-intervention evaluation section, which will seek to identify the impact of the intervention on their literacy rating and their perceptions and reactions. The only difference in questions between the two participant groups will be slightly different questions in the background section. The difference is needed to elicit specific information regarding their current roles. By using a single instrument with appropriate branching (on primary academic role (librarian or student)) to evaluate current levels of metadata-literacy and perceptions about the role of metadata, this study will be able to identify how these groups align/differ with regards to the research question.

2.6.6. Study variables/factors

This study includes both quantitative variables and qualitative factors. For both quantitative and qualitative aspects of this study the participant’s knowledge about metadata is either an independent variable (quantitative) or orienting factor. This independent variable will be controlled through a short learning object and metadata interaction whose purpose is to inform the participant about metadata, help them generalize specific skills, and work with identifying and creating metadata first hand.

The dependent variable for the quantitative study is the participant’s degree of metadata literacy. This variable will be a measure of how ‘literate’ a participant is. The variable will be measured using a self-efficacy instrument created within the context of Bloom’s Taxonomy.

The qualitative aspect of this research will gather input from participants on how they view/use metadata in their own information environments, the roles that participants view metadata playing in information interactions, and the overall perceived value of ML as a part of the IL framework.

2.7. Study Boundaries

2.7.1. Assumptions

While this research employs a constructivist approach in investigating the role that metadata literacy plays in information interactions, it does have a number of base assumptions that drive
the research. First, the study assumes that metadata is a valuable element in information environments. Second, the instructional element is designed to evaluate participant responses and view of ML when informed about the role of metadata in a specific application. As such it does not seek to evaluate metadata at a particularly specific level (for example which elements participants find useful). Finally, this research proceeds on the basis of the assumption that metadata is a generally available tool and concept for participants. While participants may not have an in-depth understanding of the various roles and types of metadata or its terminology, it is assumed that there is a base level of understanding that will allow them to understand common examples.

2.7.2. Limitations

While this study has been designed to identify the role of metadata literacy and its impact on participants, it must do so in a limited environment. While focusing on participants engaged in the academic process and familiar with the electronic documents allows the research to proceed without having to question the basic literacy knowledge of participants, it does limit the generalizability of findings. For example, college students and faculty most likely will impose a different value on metadata and literacy than people from different social and economic backgrounds. Likewise, focusing on librarians as experts in the IL arena limits a wider audience of other literacy perspectives (education, business, medicine).

Related to the compromises discussed above, this study is investigating only a limited set of metadata related interactions and behaviors. While the literature review and conceptual model will identify and discuss a wider range of metadata related IL concepts, in order to ask specific questions of participants and keep the interaction to a manageable state, this study will only investigate metadata skills and concepts at a high level (definition, enumeration, recognition). Second, this study investigates the impact of metadata literacy through relatively subjective measures (participant observation and self-efficacy evaluation).

2.8. Summary

Metadata is key to information organization, access, and use in the current digital information environment. Students and instructors working with digital technologies rely on metadata for
many of their daily information-related activities. It is important to understand both the role and impact of metadata in these information environments so that information systems and instruction can better serve the information need of the user.

This proposal overview presents an approach for investigating the phenomenon of metadata literacy, which uses a constructivist foundation to investigate the gap that exists between information organization research and educational research. In exploring this gap, this study seeks to identify levels of ML in participants and to compare perceived value and knowledge levels through a brief interaction. By using the IL framework to discuss metadata activities with participants this research will help explore the ways in which participants use metadata structures and concepts to create knowledge. The study will evaluate the level of knowledge and impact on a participant’s ML via a self-efficacy measure. The self-efficacy measure is based on Bloom’s taxonomy, which will help ground the cognitive impact on the participant of claimed levels of literacy.

Because of the wide scope of this topic it is necessary to limit this investigation to both a specific participant group (students and instructors) and a specific interaction (participant viewing of instructional piece). This study compares initial participant self-efficacy ratings on IL to their post-interaction rating and evaluates their responses on a matrix based on Bloom’s taxonomy, which will indicate their level of ML. By using these two metrics the study will identify perceived impact of ML on a participant’s level of IL and will identify their level of ML.

The remainder of this proposal investigates how ML and IL have been investigated in previous studies, addresses the issues related to mixed-methods research, and lays out a research plan.

3. Literature Review

3.1. Overview

This literature review documents the research surrounding the concepts of IL, metadata and ML including theoretical concepts, and research approaches. The emphasis on this review is identifying relevant studies and defining methods that are commonly used to research this area. This literature review concludes with a summary of the gaps in the literature surrounding this concept.
3.2. Selection Process

3.2.1. Literature review approach

Because ML is an emerging concept in the literature, a single approach to identifying relevant articles was not possible. As research into the concepts of ML and IL continued, the researcher added new terms, concepts, word roots and databases. While very few resources were discovered that discussed metadata and literacy, a much wider range of resources discussed these concepts independently. In order to ensure that a good cross-section of literature was reviewed these peripheral resources were selected and reviewed based on title, topical headings, abstract, citation references, and relevant authors.

Likewise, because this research involves concepts from the fields of education and information science, literature which bridged these two fields was selected to ensure an appropriate foundation.

3.2.2. Databases consulted

Table 2 documents the search terms and databases consulted along with the initial number of results retrieved. A number of search terms and combinations were used with varying success in seven different databases. The databases selected span library and information science, education, and computer science disciplines.

Table 2 Literature search result

<table>
<thead>
<tr>
<th>Search Terms</th>
<th>ERIC</th>
<th>Academic Search Premier</th>
<th>ACM Digital library</th>
<th>Library Literature</th>
<th>Wiley Inter science</th>
<th>Science Direct</th>
</tr>
</thead>
<tbody>
<tr>
<td>meta-literacy or metalinguistic</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>metadata and literacy</td>
<td>14</td>
<td>7</td>
<td>103</td>
<td>1</td>
<td>4</td>
<td>165</td>
</tr>
<tr>
<td>information skills</td>
<td>532</td>
<td>336</td>
<td>19</td>
<td>298</td>
<td>46</td>
<td>589</td>
</tr>
<tr>
<td>information problem solving (IPL)</td>
<td>83</td>
<td>4</td>
<td>0</td>
<td>6</td>
<td>131</td>
<td></td>
</tr>
<tr>
<td>information skills and (organization or metadata)</td>
<td>59</td>
<td>9</td>
<td>2</td>
<td>12</td>
<td>2</td>
<td>395</td>
</tr>
<tr>
<td>information skills as a subject heading</td>
<td>536</td>
<td>14</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>589</td>
</tr>
<tr>
<td>information literacy as a subject heading</td>
<td>1274</td>
<td>1132</td>
<td>4</td>
<td>31</td>
<td>23</td>
<td>65</td>
</tr>
<tr>
<td>metadata and (educ* or teach* or learn* or literac*)</td>
<td>204</td>
<td>386</td>
<td>1864</td>
<td>141</td>
<td>79</td>
<td>4095</td>
</tr>
<tr>
<td>(multiliteracy or multiliteracies)</td>
<td>84</td>
<td>87</td>
<td>5</td>
<td>2</td>
<td>16</td>
<td>123</td>
</tr>
<tr>
<td>multiliterac* and metadata</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Literacy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>957</td>
</tr>
</tbody>
</table>

Erik Mitchell - Research proposal
As the search results demonstrate, there is considerable interest in the concepts related to literacy but significantly fewer articles combining concepts of metadata and organization practices. Of the searches that returned manageable result lists, article metadata was reviewed for relevance and appropriate articles were selected. Articles selected for review were categorized into various topics (information literacy, metadata, education/instruction, methodology). In some cases, the databases included relevant subject headings (Literacy was most popularly turned into a heading). The organization of articles relevant to this research under topical headings varied from resource to resource. For instance, articles under the heading Literacy were most relevant, while in the ERIC database, the subject multiliteracies included articles most relevant to the concept of ML. Another term (New Literacies) appeared to be gaining in popularity due to its use in key research resources. In many databases, term occurrence outside of subject headings led to non-relevant results. For example, in the ACM digital library although 103 occurrences of the two terms metadata and literacy were in the database, the results contained no articles centrally relevant to this research. Of the 103 articles, only two had the concepts of metadata and literacy coded in the concepts section (an overview of the Innovation Curriculum Online network ICON and an abstract about statistical digital libraries).

3.2.3. Review criteria and process

Resources were reviewed to determine relevance to the three primary areas of interest (literacy models, embedded teaching models, and metadata/information organization). Articles that were either of particular conceptual, methodological, or practical relevance were selected and reviewed. Because this study attempts to pull together two otherwise divergent topics, methodological literature both from the education/learning interaction arena and the information seeking/interaction arena were gathered. Likewise, research on metadata creation and use was studied in order to get a sense of how these research projects approached metadata task design.
3.3. Literature quality and representative works

As stated above, a majority of the literature reviewed centered on one of three themes, literacy, education, and metadata. It proved difficult to find literature, which included both a focus on metadata research and on literacy/education research techniques. Theoretical literature showed a tendency to present a specific literacy/education model. With regard to information literacy research, very little of the literature attempts to pull in perspectives from other disciplines. For example, the similar concepts of multi-literacies (Education) and meta-literacy (Information Science) were not discussed interchangeably. Likewise IL models tended to focus on a specific context (office, business, technology) and resource type that appeared to be driven by the discipline. In contrast, educational models (constructivism, for example) were discussed across the literature as an approach for teaching IL practices.

3.3.1. Literacy

Many IL studies focus on general principles of the impact of literacy on learning (Mitchell, 2007; Pan, Gay, Saylor, & Hembrooke, 2006; Smith, Mitchell, & Numbers, 2007a; Tabatabai & Shore, 2005). Many of these studies are qualitative case studies and focus on a specific example through interviews, surveys, and ethnographies.

Methodological resources tended to be either case studies or qualitative experiments. Few studies employed quantitative approaches in attempting to evaluate IL theories. The resources that did employ quantitative techniques tended to do so using a mixed methods approach that either gathered qualitative data in parallel or used qualitative methods to enhance and refine quantitative results. One particularly relevant quantitative study compared the IPS behavior of experts vs. novice users (Brand-Gruwel, Wopereis, & Vermetten, 2005). This study used an the A modified Big 6 model, designed an authentic task that included research with the purpose of a short essay, used both qualitative elements such as talk aloud, elements of model employed and quantitative elements including time on task, frequency of skills used. This sort of mixed methods approach demonstrates how effective multiple data collection methods can be in helping to compare behavior to a specific information interaction model.

A brief discussion of Bloom’s taxonomy is included here not because it is a specific information literacy model but because it has been used as an analytical framework to relate IL skills and

Erik Mitchell - Research proposal
concepts with states of knowledge and understanding. Bloom’s taxonomy was initially generated from the work of a group in the 1950’s and resulted in a pyramid shaped model which demonstrated the role of different states of knowledge and understanding in the learning process. This pyramid places knowledge at the base level, and progressively moves through the states of comprehension, application, analysis, synthesis, and evaluation (Bloom, et al., 1956). This model has been widely used in education to identify student achievement and define learning objectives. In 2002 Anderson and Krathwhol revised Bloom’s taxonomy to reflect the changes over time and to re-define the sub-components of each level. For example in the original taxonomy, knowledge was discussed in terms of specifics (facts), means (methods, conventions, classifications), and abstractions (theories, principles, generalizations). In the revised model these areas are re-grouped into factual, conceptual, and procedural categories and a new category of metacognitive structures is added (strategic, analytic, self-knowledge) (Krathwohl, 2002, p. 214).

Further, the updated model changed the basic categories to remembering, understanding, applying, analyzing, evaluating, and creating (Churches, 2008b). Some of the key points that have received attention are the switch from noun based descriptors to verb based descriptors (Churches, 2008a) the definition of four knowledge dimensions including factual, conceptual, procedural, and metacognitive knowledge (Cochran & Conklin, 2007) and the addition of the creating category at the top of the pyramid (Kash, 2008).

Anderson and Krathwhol’s matrix maps the learning states of remember, understand, apply, analyze, evaluate, and create with the four dimensions of factual, conceptual, procedural, and metacognitive knowledge. This matrix provides a consistent way of representing observations about a participant’s interaction with a task. These noted shifts are consistent with the evolution of information and literacy models in education, information, and library science fields. While these taxonomies are more often used as evaluative and guiding structures to help teachers frame questions and assess student learning, they are also descriptive of the emerging literacies discussed in this review including the ability to assemble and create knowledge, collaboration, ethical use of information.
3.3.2. Metadata

In the area of metadata research, few articles focused on how participants used metadata and what impact it had on their learning, knowledge level, or experience. Much of the literature on metadata focuses on its impact on certain information tasks such as retrieval (Hawking & Zobel, 2007), personal information management (Barreau & Nardi, 1995; Jones, 2007), and use in complex information environments (Campbell, 2005; Dongwon, Peter Hoh, Fran, Young-Gab, & Doo-Kwon, 2005). In contrast, work done by Greenberg (Greenberg, Pattuelli, Parsia, & Robertson, 2001) studied the impact of author created metadata, while Guy (Guy & Tonkin, 2006) and MacGregor (Macgregor & McCulloch, 2006) both included participant-perspectives when discussing the role that folksonomies play in information environments.

In researching the role that metadata plays in supporting learning, this research focuses on models, which look specifically at that relationship. The Extended Mind Model for example (Clark, 2001) discusses the role that external information structures play in supporting cognition and learning. The Technology Acceptance Model (TAM) (Venkatesh & Davis, 2000) explores the role that the participant perspective on the usability of a technology plays in their use, and models such as Knowledge Building (Scardamalia, 2002) and Communities of Practice (Wenger, 2006) consider how community based information environments support traditional activities in new ways.

3.3.3. Metadata Literacy

Research on the role of metadata in learning contexts included Hert (2007), who investigated metadata knowledge which facilitated use in statistics heavy information environments, Pinto and Doucet (Pinto, Fernández-Ramos, & Doucet, 2008), who used a metadata task (abstracting) to teach and evaluate IL skills, and Walczak and Jackson (Walczak & Jackson, 2007), who included metadata literacy skills into a chemistry class. Other examples of research on the role of metadata in supporting learning include work completed by the researcher (Mitchell, 2007; Mitchell & Smith, 2008; Smith, Mitchell, & Numbers, 2007b).

There are studies, which evaluate the impact of information organization on learning. In particular, a report by Stadtler and Bromme details a system, which uses information organization approaches to enable metacognitive tasks (2007) and Wen et. al. conducted a
student impressions survey, which investigated student perceptions of metacognitive rich environments (Wen, Tsai, Lin, & Chuang, 2004). Finally, there are studies, which examine metadata from the participant perspective. For example, Melenhorst et al. (Melenhorst, Grootveld, Setten, & Veenstra, 2008) investigate the use of tags in enabling retrieval of video content and tangentially discuss the concept of tag literacy (Mejias, 2005). Walraven et al. investigated student use of web resources to solve an information problem using a mix of quantitative techniques (skills used during task, time spent on task/skill, patterns of search) and qualitative techniques (focus group following experiment) (Walraven, Brand-Gruwel, & Boshuizen, 2009). While each of these studies look at the use of information organization, none of them used student-created metadata as part of the learning environment.

In evaluating how metadata literacy impacts learning, this research chose to focus on two broad concepts. First, it evaluates metadata literacy using the revised Bloom’s Taxonomy (Krathwohl, 2002). This taxonomy allows an evaluative matrix to be used, which facilitates the determination of learning levels. Second, the research seeks to evaluate affective impact through the use of self-efficacy tools (Kurbanoglu, et al., 2006). As noted in the research, self-efficacy has been shown to be a good indicator of knowledge levels (Marcolin, Compeau, Munro, & Huff, 2000; Tella, Tella, Ayeni, & Omoba, 2007).

3.4. Substantive findings

Research in the areas of literacy and metadata continue to expand on themes. One interesting facet of many reviewed research articles was their use of multiple theories. For example Alshare et al. used the Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB), and Computer Literacy theories (CL) to develop a more elaborate theoretical model (Alshare, Grandon, & Miller, 2004). Likewise, much of the qualitative research in this area takes as its foundation a constructivist worldview. Many studies emphasized completing research in authentic information environments (MaKinster, Beghetto, & Plucker, 2002; Nokelainen, Miettinen, Kurhila, Floreen, & Tirri, 2004; Ullrich, et al., 2008). In contrast, quantitative studies focused on creating valid and reliable information problems (Brand-Gruwel, et al., 2005; Walraven, Brand-gruwel, & Boshuizen, 2008). These studies argue that information problems must be created equitably and with the research participants in mind to ensure that statistical results are valid.
Metadata research continues to focus on identifying new document models and metadata standards, investigating the utility of metadata (Hawking & Zobel, 2007), and investigating the role that social and participant centered metadata plays in information spaces (Brendan, Meral, & zsoyoglu, 2008).

What this research shows us is a convergence between the research into metadata structures and uses and concepts of literacy (knowledge required to make effective use of information systems). For example, there is a growing area of research, which examines the impact of ‘web 2.0’ style technologies on teaching and learning environments. Much of the case study research focused on the impact/role of the classroom use of a specific technology tool. The growing use of ICT is exemplified by Churches work in mapping ICT tasks with Bloom’s Taxonomy (Churches, 2008b). This body of research also demonstrates a corresponding growth in use of metadata structures and tasks in common learning environments along with the growth in ICT tools but a lack of focus on the role that metadata and information organization tasks in particular play in influencing these environments.

3.4.1. Deficiencies in the studies

While many of the studies identify interesting examples and conduct qualitative comparisons, only a few of the studies take a quantitative approach in identifying which elements of these interactions (use of digital libraries, use of information management techniques, use of technical skills) are contributing to the success of the student experience. Further, few studies investigate specific interactions between metadata centric tasks (such as categorizing, managing, and evaluating ) and how these tasks are enabled/enhanced through the use of these techniques. Finally, most research related to this topic focus on traditional information creation and learning models (student as information consumer, librarian as facilitator) and tend to focus on librarian perspectives.

In addition to the lack of focus on metadata tasks in this research and focus on qualitative research there is also a marked lack of uniformity in research and evaluative models. Much of the critical work in the IL field observes the lack of a unified model or approach for investigating IL concepts (Koufagiannakis & Weibe, 2006). One goal of this research is to begin connecting the research in these areas by asking how the growing role of metadata in web-based information systems changes our notions of the literacy skills and concepts. In doing this, it will use a
combination of evaluative models (Blooms Taxonomy and Self-efficacy) to investigate an information structure (metadata) from the context the impact on participant learning (Literacy).

3.5. Methodological findings

As the literature reviewed showed, there is a wide range of qualitative work in the area of literacy. Likewise, there are substantial mixed-methods approaches in the Information Problem Solving (IPS) area. The issues surrounding literacy, learning, and information use are difficult to quantify. Further, attempting to use quantitative data exclusively fails to get to detailed answers about the intervention being tested (how information resources are used for example) and only documents the extent to which certain activities are engaged in.

In contrast, the mixed methods approaches reviewed may provide a more generalizable knowledge base by tracking specific interactions, while possibly expanding on that knowledge using qualitative analysis. Both simultaneous (gathering qualitative and quantitative data together) and emergent methods (gathering qualitative following quantitative data) have been employed in the literature and are appropriate for different purposes. For example, Walraven et al. employed qualitative survey data, quantitative survey and task data, and qualitative focus group data in their research (Walraven, et al., 2009). Walraven et al. discuss techniques for creating an authentic information task including making the task open-ended (not a yes/no or fact finding question), wording the question in such a way that does not prompt the student to find a preferred site, making the problem significant enough (Walraven, et al., 2009, p. 236).

Walraven et al. employed Mosenthal’s approach (Mosenthal, 1998) which defines types of tasks and recommends a method for assuring validity through inter-rater checking. The aim of this study is to identify ways in which metadata are used by participants in IPS situations and to compare the two perspectives commonly seen in literacy studies (faculty and students). For this reason, a simultaneous triangulation-mixed-methods approach can be used to provide data from these two groups.

3.5.1. Collecting data to evaluate information literacy levels

The literature reviewed included a wide range of methodologies from surveys to focus groups to talk-aloud protocols and interviews. In each of these cases the research goal influenced the
methodological choice. In this study, the use of Bloom’s Taxonomy and Self-Efficacy models to assess participant learning guides the methodology towards electronic platforms.

The use of an electronic survey/interaction will allow the study to include a larger set of participants from both pools (students and librarians) and will allow electronic tabulation of self-efficacy ratings.

The use of Bloom’s Taxonomy to evaluate learning levels will be facilitated by the use of suggested actionable verbs in questions. There is substantial documentation of how to ask questions to assess the level of learning in participants (Bloom's Taxonomy Wheel, 2003). This research will use questions developed from these models to help guide participant responses.

### 3.5.2. Implications

As the review of literature has shown, IL research is forming a fragmented but adequate foundation for investigating the role of information structures in participant learning. While there is a lack of commonly accepted evaluative models in the IL community, the education field has well established models, which help in forming survey questions.

This review of research also demonstrated a growing interest in the role that metadata tasks play in learning environments. This interest is fueled in part by the growth of ICT tools and in part by a growing connection to education for the library and information science profession. Despite this growing connection, there was a substantially larger body of research, which tended to focus on technical research (standards and models) and possible participant uses (new systems, new interaction methods). These research methods tended to not take a participant-centric approach in investigating how metadata supports participants.

### 3.6. Contributions and summary

This research contributes to the existing literature in three ways. First, it bridges the fields of education and information science by using research from both fields to investigate a common area of interest. In doing so, it takes models commonly used in primary and secondary education (Bloom’s Taxonomy) and extends them to higher education. Second, it uses a mixed-methods approach to build the foundation of knowledge in this area and extend prior case-study research. Finally, this research will extend the work done in the metadata arena which focuses on the...
impact of metadata on participants. The following section will discuss the research approach, methods, and plan.

4. Methods Statement

4.1. Research approach and study design

The research question of this project requires a study, which both identifies student and librarian perspectives on metadata-literacy and examines their use of metadata and the impact that familiarity with metadata has on their perceived level of IL. This research will employ a mixed methods approach, which will answer quantitative questions (does metadata awareness have a significant impact on perception of IL level) and qualitative questions (roles of metadata use in everyday information environments). The study population will be pulled from students and instructors in higher education. The study will be conducted in an electronic context environment to allow a sufficiently large pool of participants.

The study will include four elements, an evaluation of current perspectives on metadata and information literacy levels, a pre-intervention assessment of IL, an intervention which will include instructional and interaction components, and finally a post-interaction personal evaluation of literacy and metadata impressions. In the pre-intervention survey participants will discuss their educational background, role in the study (student or instructor), and current level of IL (self-efficacy rating). The intervention will include participant viewing of two short instructional pieces on web 2.0 technologies and a specific metadata task/skill. The intervention will inform the skills introduced during the pre-intervention questions. The post intervention survey will include participant assessment of their ML levels, discussion of their view of metadata, and questions about how they use metadata. Both participant groups will receive a largely identical interaction with the two differences being the use of a metadata example which will be familiar to them and survey questions tuned specifically for their role (student vs. librarian).

Participant responses will be analyzed to determine differences in participant self-efficacy ratings and difference and in pre/post intervention efficacy ratings. Qualitative responses will be used to provide contextualizing perspectives on participant information use.
The following sections discuss each of the research steps including the beginning survey, intervention process, and post-intervention evaluation. The main research question in this study is “How do students and Information Literacy instructors view the role of metadata in information literacy and what impact does it have on their level of information literacy?” Specific questions include:

1. To what extent are participants aware of metadata and metadata literacy concepts?
2. What impact on participants’ level of ML does the intervention have?
3. How do participants view metadata as fitting into their information environment?

4.2. Overview of basic procedures

4.2.1. Setting characteristics

This research will be conducted entirely online. Participants will be solicited via email and will respond in a web-based environment based on the Qualtrics platform. The platform is largely survey based but includes sufficient interaction elements to create a simple view/respond test in which participants can view instructional content.

4.2.2. Participants

4.2.2.1 Student participants

Students will be recruited from the student population at Wake Forest University. Five hundred undergraduate students will be randomly selected from the Wake Forest University population and will be emailed invitations. The invitations will be anonymous but will be managed by Qualtrics so that appropriate automated reminders can be sent. One thousand students will be randomly selected for participation. The first fifty students to respond will be included in the study. Only undergraduate students will be surveyed and the first fifty respondents will be allowed to participate in the study. All participants must be over 18 years of age but there are no other excluding criteria.
4.2.2.2 Librarian participants

Librarian participants will be surveyed from known populations of information literacy instructors. This population will include Wake Forest University IL instructors and members of Information Literacy listservs. Information Literacy and other listservs will be used including ili-l, AUTOCAT, Libref-l, MDL (Metadata librarians listserv), and COLLIB-L. Due to the open nature of this selection process participants may also be solicited using snowball sampling techniques. While this study will not be limited to Information Literacy instructors this will be a contextualizing piece of information on the survey. The population of librarians solicited will be limited to those subscribe to the listservs mentioned above and those invited through other means. The first fifty librarians to respond will be allowed to participate in the study. The primary selection criteria for librarians is that they must serve some role in instruction.

4.2.3. Use of Controls or comparisons

Because this study is exploratory in nature, no control group will be used. Both students and librarians will be asked some identical questions so that the perspectives of these two groups can be compared.

4.2.4. Interventions

The participant intervention will include three components: a metadata perceptions and literacy assessment, an informational and interactional element discussing the uses of metadata, and a post-intervention metadata literacy assessment and perceptions survey.

4.2.5. Debriefing

Debriefing will occur as part of the post-intervention evaluation. During this evaluation participants will again rate their self-efficacy with regard to IL and be asked to reflect on the role of metadata in their information environment.

4.2.6. Elimination of alternative explanations

Studies, which analyze the difference in perspective between widely divergent groups, are particularly susceptible to inaccurate observations. One of the difficulties of this study is researching a concept, which is mostly likely not widely understood by most of the participants,
thereby exasperating this problem. In order to address this issue, this study will focus on creating a common understanding of the phenomenon through the use of familiar examples, and use of a short instructional piece. Participants will be largely aware of the research agenda (the role of metadata in their experience and its impact on their perception of literacy). As a result, it is unlikely that this research will examine phenomena outside of its focus.

4.2.7. Interventions / Treatments (Initial assessment)

Participants will complete a metadata literacy assessment as the initial part of this research. This assessment includes three components a background questionnaire, a self-efficacy assessment, and a metadata-literacy assessment. The initial assessment as outlined below will gather contextualizing data (student/librarian, education level, education background), and assess their current level of IL(self-efficacy) as well as their current level of metadata literacy (Bloom’s Taxonomy).

4.2.7.1 Related research questions

1. To what extent are participants aware of metadata and metadata literacy concepts?
   a. How do participants define metadata?
   b. How/Where do they use metadata?
   c. What role do they see metadata playing in their information environments?
   d. Is there a difference in how the two participant groups view metadata?

4.2.7.2 Dependent and Independent Variables

The dependent variable being evaluated in this portion of the study is the self-efficacy rating of Metadata Literacy. This variable will be evaluated again following the interaction in the second part of this study. The independent variable being manipulated in this study is the participant’s awareness of metadata literacy concepts. An additional variable, the participant’s overall view of their self-efficacy with regards to information literacy is being gathered to provide contextualizing information.
4.2.7.3 Design

The survey questions have been grouped into three sections - Demographics, Information Literacy, and Metadata Literacy. The questions in this survey are intended to provide baseline IL and ML ratings and to contextualize participant responses.

- Demographics
  - Educational background (class level)
  - Student / instructor
  - Major
  - Have you taken an IL class?
  - School

- Self-Efficacy IL assessment
  - Participants will use the self-efficacy tool developed by Kurbanoglu et al. (Kurbanoglu, et al., 2006)

- Metadata Literacy questionnaire and self-efficacy evaluation
  - Participants will complete questions about their ability to define metadata and discuss ways in which they use metadata. This evaluation is based on Bloom’s taxonomy and modeled after the self-efficacy study by Kurbanoglu et al.

4.2.8. Interventions / Treatments (Interaction)

The intervention portion of this research involves having the participants view two short informational pieces about metadata and its role in current web environments. Following the videos, participants will interact with some metadata by identifying certain types of metadata and creating their own tags for an image. The pre/post intervention assessments provide the participant with opportunities to comment on their knowledge in relation to this instructional piece.
4.2.8.1 Related Research Questions

2. What impact on participants’ level of literacy does the intervention have?

4.2.8.2 Dependent and Independent Variables

The dependent variables in this section continue to be the participant’s levels of ML but these variables are not assessed in this section. The independent variable (awareness of metadata) is assessed and manipulated in this section.

4.2.8.3 Design

This portion of the research includes an instructional element (short videos) during which participants will learn about metadata and an interaction in which they experiment with their metadata skills. The two videos are about web 2.0 technologies and metadata types. The interaction involves user interaction with some static web-page elements to identify which elements on the page are specific types of metadata (descriptive and social). In the third exercise, participants come up with their own descriptive metadata tags to describe a picture. In all three examples pictures about the Barack Obama election and inauguration were chosen in part given the recency of the event. This should make it easier for the participant to identify with and create metadata on the topic.

4.2.9. Interventions / Treatments (Post-Interaction assessment)

In the post-intervention assessment, participants will be asked to identify the roles of metadata that they would use (based on the instruction), again rate their self-efficacy, and complete a metadata literacy questionnaire.

4.2.9.1 Related Research Questions

2. What impact on participants’ level of literacy does the intervention have?
   c. Is there a significant difference in literacy levels reported by participants following the instructional component?
   d. Is there any correlation between the awareness of metadata and/or use of it in specific environments and reported levels of self-efficacy with respect to literacy?
i. Hypothesis - student’s self-efficacy rating with respect to metadata literacy will increase significantly based on the intervention.

3. How do participants view metadata as fitting into their information environment
   e. What roles do they see it playing in their teaching, learning, everyday, common interest, community, and complex knowledge?
   f. Do they exhibit any ML practices in their own personal information environment?

4.2.9.2 Dependent and Independent Variables

The dependent variable, ML self-efficacy rating is again assessed in this portion of the interaction. Having manipulated the independent variable (participant awareness of metadata) in the previous section, it is expected that participants will report different levels of ML and IL here.

4.2.9.3 Design

This section will again use the metadata literacy self-efficacy rating developed by the researcher. In addition, it will ask several qualitative questions about participant view of metadata particularly with regard to the skills discussed in the intervention. The fully developed instrument is located in Error! Reference source not found.

4.2.10. Testing and Validation

The elements of this instrument will be validated in two ways. First, experts will be selected via snowball sampling and will be asked to evaluate the extent to which the questions gather the appropriate contextualizing information and assesses IL and ML. Second, the survey will be administered to a small sample of participants (less than 10) to check for survey flow and logic and to discover any unexpected issues. Participants will be asked to complete the survey and in addition provide their impressions. The IL self-efficacy instrument developed by Kurbanoglu et al. (Kurbanoglu, et al., 2006) has already undergone significant validation and reports internal reliability at .82 for the 17 item instrument. This instrument will be used to assess IL levels in both the pre and post intervention parts of the interaction.
4.3. **Data Collection (observations & measures)**

4.3.1. Data collection procedure

Data will be collected using a single online survey created on the Qualtrics platform. This platform will offer a sufficient level of branching and interaction to conduct both the survey and instruction, and interaction elements of the research.

4.3.1.1 Study population

The purpose of this study is to compare the difference in attitudes about metadata literacy concepts between students and information literacy instructors. Students will be solicited electronically from the populations of Wake Forest University. The information literacy instructor population consists of anyone who holds an instructional role in an information literacy context. This will be defined in the solicitation as anyone with reference or educational responsibilities. One method for identifying this type of participant is to invite them through listserv distribution. As such, the target population will be anyone who is subscribed to one of a number of listservs identified by the researcher as being topically relevant to this study (listservs identified below). Two issues with this approach are a lack of a holistic view of the study population and a lack of random sampling of the target population.

4.3.1.2 Sampling procedures

The literature reviewed suggested fairly large pools of participants for survey-style research. Creswell for example (Creswell, 2008, p. 156) suggests, sample size for accurate survey results should include approx 350 responses. Based on Creswell’s method of estimating sample size, if this study assumes a p = .05, and power of .8, and effect size of .5 (lacking other substantiating results). Using the chart in Creswell adapted from Lipsey (Creswell, 2008, p. 632) an appropriate response size would be approximately 65 responses per group (students and instructors) to have confidence that our research questions will be accurately tested. While this number of participants is outside the budgetary resources of this proposed research, up to 50 participants from each group (students and instructors) will be sought.

Assuming a response rate between 15% and 30% (Sheehan, 2001), between 216 (30% rate) and 433 participants should be selected to participate. To allow for below average response rate and
bounced emails, 500 WFU students will be randomly selected from a database of all undergraduate students. Random selection will be accomplished using a randomly seeded program and will extract email addresses for these students. These email addresses will be loaded into the Qualtrics software.

While it will be possible to randomly select WFU students from an existing database, no database exists of information literacy instructors. In order to solicit information literacy instructors, a listserv broadcast method will be used. Information Literacy and other listservs will be used including ili-l, AUTOCAT, Libref-l, MDL (Metadata librarians listserv), and COLLIB-L. Other listservs may be solicited if the response rate is not sufficient. Sampling will be via broadcast emails to selected listservs. If needed, reminders for these listservs will be sent after two weeks and again after three weeks.

4.3.1.3 Data collection activities

The survey will be web-based (Qualtrics software). Survey responses will be collected using the Qualtrics system.

4.3.1.4 Timelines

<table>
<thead>
<tr>
<th>Month</th>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>April</td>
<td>2009</td>
<td>Initial IRB submitted to WFU and UNC</td>
</tr>
<tr>
<td>April</td>
<td>2009</td>
<td>Instruments administered to pilot participants for validation</td>
</tr>
<tr>
<td>April</td>
<td>2009</td>
<td>Instrument updated based on feedback</td>
</tr>
<tr>
<td>April</td>
<td>2009</td>
<td>IRB updates (if required) submitted</td>
</tr>
<tr>
<td>May</td>
<td>2009</td>
<td>Instrument launched to participant groups</td>
</tr>
<tr>
<td>May</td>
<td>2009</td>
<td>Data collection period closes</td>
</tr>
<tr>
<td>June</td>
<td>2009</td>
<td>Data analysis</td>
</tr>
</tbody>
</table>

4.3.1.5 Data storage

Raw data will be downloaded from Qualtrics for analysis. All data will be kept on a hard-drive in the researcher’s possession. The survey will not include any personally identifying data.
4.3.1.6 Quality Control

As noted above, initial content and validity testing will be done via selected experts prior to survey release. In addition, the self-efficacy instrument has already undergone reliability and validity testing.

4.4. Instrumentation

The instrument for this research will consist of an online (web-based) survey with interactive and instructional elements. This survey will include three general sections (Initial assessment, Interaction, Post-Interaction assessment). The instrument will be developed using the Qualtrics platform and will include standard survey questions, interaction with screen-shots from selected web-pages, interaction with a short instructional video, and follow-up survey questions.

The instrument will include two evaluative instruments to inform the quantitative and qualitative research questions (what impact does an individual’s change in metadata literacy have on their overall view of their information literacy). Both instruments will be used twice in the research (pre and post interaction).

4.4.1. Background / informational instrument

The demographics and informational instrument is designed to simply provide participants with a means of communicating their participant role (student/librarian), and educational background. The instrument was developed by selecting sufficient questions to place the participant responses in context (student/librarian), educational background (major, years in school/teaching, previous exposure to IL concepts), provide brief background on their use of sites which employ metadata (types of use - read/create), and their definition of metadata.

The full instrument can be found in Appendix A

4.4.2. Metadata use instrument

In addition to assessing self-efficacy for both information literacy and metadata literacy, this research will include quantitative and qualitative questions designed to get contextual information about the participant’s view and use of metadata.
The primary intent of this instrument is to provide the participant an opportunity to talk at some depth about how often and to what extent they use metadata. The qualitative instrument will be included at the end of the two quantitative instruments.

The full instrument can be found in Appendix C

4.4.3. Self-efficacy evaluation

The first instrument measures a participant’s information literacy using the self-efficacy approach. As was discussed in the literature review, self-efficacy is a valid indicator of overall expertise in an area. The use of this instrument for this study will merely be to get a baseline indication of a participant’s level of information literacy. A similar instrument will be used to assess their levels of metadata literacy both before and after the intervention. This study selected a self-efficacy instrument developed specifically for information literacy by Kurbanoglu et al. (Kurbanoglu, et al., 2006). This instrument (as documented in the cited article) has undergone significant revision and testing and has been refined to a 17 item questionnaire. Further, the instrument was developed using Bloom’s Taxonomy, which will facilitate mapping participant responses onto the questions in the rest of the instrument.

Because this instrument is only part of the overall research, the shortest iteration was selected (17 questions). Despite its short length, this instrument still showed high reliability (.82) (Kurbanoglu, et al., 2006, p. 734).

The full instrument can be found in Appendix B.

4.4.4. Metadata-Literacy evaluation

The metadata literacy evaluation instrument was developed to answer specific questions about the how the participant views metadata and to assess their level of metadata literacy. The instrument follows the revised Bloom’s taxonomy, and was developed to mirror the self-efficacy instrument in length and design both to facilitate completion by the participant and to allow a comparison between the two instruments to be accomplished.

The instrument will be piloted prior to the full study using participants representing both groups (students and instructors) and will be updated if required.

The full instrument can be found in Appendix C

Erik Mitchell - Research proposal
4.4.5. Instructional element

The instructional element will consist of two instructional videos and three metadata interactions. The first instructional video is called “The Web is Us/ing Us (Wesch, 2007).” This resource was selected because it has a relatively short length (4:34), it covers many of the important elements of metadata and web 2.0 applications (how metadata help streamline web use, what different encodings of metadata looks like, some ways of using metadata-rich documents).

The intent of using an instructional element is to encourage participants to think about their metadata use outside of the context of the video. This research will ask generalized questions about metadata use in the pre-instructional element and as such hopes to find that the video will position participants to think generally when completing the metadata literacy self-efficacy instrument.

The second instructional video is a short description of what metadata is and a discussion of different types of metadata (descriptive, social, technical). An example image along with its metadata are used from flickr (zyrcster, 2008).

4.4.6. Interaction element

Following the two videos, three interactive questions are used to elicit from the participant their familiarity with metadata concepts. The interaction serves to both reinforce the content of the videos and to provide the study with some interactive data about how participants view metadata. The interaction includes two sample images from flickr. The first image is of a bird with tagging about Barack Obama on the campaign trail and includes descriptive, social, and technical metadata arranged in a similar manner to the instructional video (Obama-Biden-2, 2008). In the two questions involving this image, participants are asked first to identify descriptive metadata and then social metadata by clicking on the metadata elements. The interaction the participants are asked to engage in has been demonstrated to them in the instructional video.

The final interactive element involves an image of Barack Obama being inaugurated. The image was pulled from the open collection of USAToday on flickr (Usa Today, 2008) and is a readily recognizable image to the population. The participant is asked to create up to five descriptive metadata elements for this image.
4.5. Protocols

4.5.1. Consent forms

A single consent form is sufficient for both participants. The consent form will be part of the online survey (the first page). Main headings and key words will be emphasized for participants to facilitate use of the document. When a participant clicks the “I agree” button on the survey, they will have granted consent and will proceed with the survey.

The text of the consent form can be found in

4.5.2. Instruments

This research consists of four instruments which can all be found in the appendices. The order of the instruments are:

1. Background / Informational Appendix A
2. Metadata Use Appendix A
3. Information Literacy Self-efficacy Appendix B
4. Metadata Literacy Self-efficacy Appendix C

4.5.3. Sample directions / instructions

Sample directions are included as part of each instrument. Please see the instruments for directions.

4.6. Data Analysis

Data analysis in this research will follow two lines. First, quantitative data will be gathered, tabulated and compared to answer the primary research questions. Second, qualitative responses will be analyzed to identify themes, which inform the quantitative results. It is expected (as stated in the hypotheses) that the quantitative data will point to a lack of generalized knowledge as evidenced by low metadata-literacy self-efficacy ratings. While specific metadata tasks as identified in the metadata use instrument will be represented quite highly.

In general, primary comparisons will be made between participant groups and their levels of metadata literacy, within the groups and their change in metadata literacy between the pre/post
intervention evaluations, and within the groups in the overall difference between self-efficacy levels of Information Literacy as compared to Metadata Literacy. In the sub-sections below, specific analysis plans are discussed

### 4.6.1.1 Quantitative Analysis

Quantitative analysis forms the bulk of analysis in this proposed research. The data will be analyzed along three axes which are listed below and represented in tabular form in Table 3.

1. Is there an overall significant difference between information and metadata literacy self-efficacy ratings between librarians and students?
2. Within each group, is there a significant change in reported levels of metadata literacy based on the interaction?
3. Within each group, is there a significant difference between their reported levels of information literacy versus metadata literacy?

Analysis will be accomplished through the analysis of descriptive statistics. Analyses will examine for statistical differences among the following groups.

**Table 3 Variable analysis**

<table>
<thead>
<tr>
<th>Categorical independent variable</th>
<th>Dependent variable</th>
<th>Statistical test</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduates vs. Librarians</td>
<td>Pre-test Metadata literacy score (averaged overall score)</td>
<td>Two-sample t test</td>
<td>To determine whether average baseline scores differ between these groups. This will indicate whether professional experience has an effect on metadata literacy</td>
</tr>
<tr>
<td>Undergraduates vs. Librarians</td>
<td>Information literacy score (averaged overall score)</td>
<td>Two-sample t test</td>
<td>To determine whether average scores differ between these groups. This will indicate whether professional experience has an effect on information literacy</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------------------------------------------------</td>
<td>------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Undergraduates and librarians</td>
<td>Compare average pre-test to post-test scores</td>
<td>Two sample t test</td>
<td>To determine whether average score differences differ between these groups. This will indicate whether there is a change in metadata literacy among these two groups based on a brief intervention</td>
</tr>
</tbody>
</table>

This study will also look at the correlation between information literacy baseline scores with metadata literacy baseline scores. Another correlation to be examined is baseline information literacy scores to the change in metadata literacy scores. This test is conducted to determine if information literacy is related to changes in metadata scores. In order to do both of these, this study will use the Pearson correlation test.
4.6.1.2 Qualitative Analysis

The qualitative analysis in this proposed research is limited to participant observations surrounding their metadata use. Both of the background / informational instrument and the metadata use instrument contain questions designed to elicit information about how participants think of metadata, what types of metadata services they use, and what they feel are important elements of metadata use. These three themes will be analyzed to provide contextual information for discussion purposes. The following thematic areas will be explored using an open coding approach:

1. How do participants define metadata? Are there generally accepted definitions?
2. When discussing metadata-use and usefulness, what tasks/purposes do they mention?
3. When discussing metadata-use and usefulness, what outcomes do the participants mention?

4.6.2. Analysis software

Quantitative analysis will be completed using SPSS.

Qualitative analysis will be done using Microsoft Access

4.6.3. Nature of expected results

The results of this research are expected to:

- Identify how participants (students and librarians) think about metadata in their information environments
- Identify the extent to which participants (students and librarians) differ in their metadata and literacy levels
- Identify the extent to which an introduction to metadata impacts a participant view of their literacy levels

4.7. Work plan (procedure)

A brief timetable for conducting the research is presented in 4.3.1.4. In general, data analysis will follow the close of the survey in April or May of 2009 and will take approximately six
weeks. Following the production of descriptive statistics and quantitative analysis, qualitative analysis and theme building will occur. The primary investigator will be responsible for all data analysis.

4.8. Resources

In order to conduct this research, the researcher needs several resources including time, software, and financial support. Each of the areas of need are addressed below with possible issues.

1. Financial support
   a. In order to entice participants they will be offered $15 through PayPal. This will be available to the first 50 participants from each group. In order to address this need, the researcher is going to pursue funding from a number of sources. The Metadata Research Center has offered financial support and the researcher will also apply for funding from the SILS Carnegie grant.

2. Instrument platform / Computer Technology
   a. Because this instrument will be completed online, a robust online survey platform is required. This will be provided by Qualtrics, which is openly available to UNC students at http://uncodum.qualtrics.com.

3. Permissions
   a. In order to conduct research at both Wake Forest University and UNC, permission must be obtained via IRB approval. It is hoped that with full IRB approval from one institution, the other institution will be willing to grant oversight approval. Since the research is being conducted primarily as a UNC student, the researcher will be obtaining permission from the UNC IRB board.

4. Expertise
   a. Expertise in data analysis is one of the major required skills for this proposed research. The researcher has completed an overview course of SPSS in addition to statistics courses.

5. Time
   a. Time is a significant issue in analyzing the data from potentially hundreds of participants.

4.9. Pilot studies

This research will be piloted among a few participants in order to validate instrument structure, assess accuracy of questions, and get an initial sense of participant response.
4.9.1. Participant pilot study

In the participant pilot, the survey will be administered to students who will be asked to complete the survey as a participant. The pilot study will use snowball sampling techniques to invite participants for the pilot portion of the study. The pilot study will be capped at ten participants. In addition to completing the instrument, participants will also be asked to provide feedback on the length, structure, and ease of comprehension of the instrument. Based on participant feedback, the instrument will be refined. Participants in the pilot portion of the study will receive the same compensation as participants in the full study but will not be eligible to participate in the full study.

4.9.2. Expert evaluation

Prior to the pilot study, selected librarians, metadata experts, and other librarians individuals will be asked to review the instrument with a specific eye on the research questions. They will be asked to provide feedback on the ability of the instrument to address the research questions, any issues with length or flow they see, and accuracy of the examples used.

4.10. Limitations

4.10.1. Summary of study method

This research uses a mixed-methods approach to examine the question “How to students and librarians use metadata and what impact does it have on their view of their information literacy?” In doing this, it allows the research to take a quantitative look at the difference between librarians and students on the issue of metadata and to examine the ability for instruction on a specific technology to help participants generalize their knowledge of metadata.

This research also uses qualitative means to provide contextual responses regarding participant definitions, views, and attitudes on metadata. It employs simple descriptive statistics to provide a picture of how participants use metadata in common information environments and asks them to reflect on these uses.

This research also takes a constructivist approach in gathering data in that it encourages participants to ground their responses in their own experience and perceptions. By using self-efficacy based instruments to allow participants to rate their levels of information and metadata
literacy, this research remains grounded in participant perspective as opposed to system functionality.

4.10.2. Limitations

One major limitation with this research is that it fails to directly investigate abilities of the participants. In relying on participant self-rating of their literacy level, it avoids issues with investigating an area which may be poorly understood by many. Further, this research is largely exploratory in nature. While it is investigating relationships and gaps between students and librarians, it is not addressing to a great depth, how this gap could be filled.

4.10.3. Alternatives considered

A number of alternative approaches were considered during the design of this research. For example, objective analysis of participant work by experts was considered to provide an objective evaluation of skill. Likewise, a separation of participants into multiple instruments and uses was considered including an iterative survey design which would have asked librarians to comment on the views of the students. In the end, a single instrument approach was selected to allow the best chance to compare the two participant groups and to compare the change in metadata and information literacy through the interaction.

5. Appendices
Appendix A. Background / Informational

1. Please indicate your primary academic role - Student Librarian
   a. For students
      i. How many years have you been enrolled in college (1,2,3,4,5+)
      ii. What is your academic major? (will use list from common majors)
      iii. Have you ever taken any of the following classes on Information Literacy?
          1. Library Tours
          2. Single-session library instruction
          3. Multiple-session instruction
          4. Semester long course on information literacy (e.g. lib100)
          5. Other
   b. For Librarians
      i. What is your job title?
      ii. Please enter the approximate number of years you have been teaching information literacy
      iii. What types of IL classes do you teach?
          1. Single session instruction classes
          2. Multi-session instruction
          3. Semester long courses
          4. Other
      iv. In your classes do you discus any of the following metadata issues?
          1. Using metadata to support research (ie. RSS feeds, Bibliographic management software)
          2. Metadata and privacy issues
          3. Metadata creation on the web (ie. facebook, tagging)
          4. Metadata aggregation and manipulation (ie. Yahoo Pipes)
          5. Metadata and search/retrieval
   c. For both groups

Erik Mitchell - Research proposal
i. In what ways do you use the following types of websites (matrix 5 item 1) don’t use 2) view information 3) tag information elsewhere 4) upload/add information 5) create new resources based on information on site)

1. Social networking sites (ie. facebook)
2. Video sites (ie. youtube)
3. Image/Picture sites (ie. flickr, picassa)
4. Search engines (ie. google, yahoo)
5. Blogs

ii. Rate the extent of your use of the following web-site functions (1-6 Don’t know, never, several times per year, several times per month, several times per week, daily)

a. Blogging (ie. wall, personal updates)
b. RSS feeds (ie. news feeds, tatus updates)
c. Photo Tagging
d. Profile Management (ie. privacy info, status info)
e. Manage complex information (links, contacts, relationships)
f. Use browsing features of site (menus, lists, categories)
g. Use RSS feeds from site
h. Add comments on stories
i. Aggregate RSS feeds
j. Filter RSS feeds
k. Create RSS feeds
l. Harvest RSS feed data
m. Manage bookmarks, feeds

Notes: This scale was developed to rate the extent of use of these services. It is a five point scale. 1) Never 2) Seldom 3) Regularly 4) Often 5) Frequently

iii. Are you familiar with the concept of metadata (yes/no)

1. If you know what metadata means, please define it in your own words, otherwise leave this space blank.
2. In your opinion, what purposes does metadata serve?
Appendix B. Information Literacy self-efficacy

In this part of the survey, you should indicate your level of confidence completing each of the tasks. For each element, rate your level of comfort 1 meaning almost never true and 7 meaning almost always true:

I feel confident and competent to

**Intermediate information literacy skills**

1. Define the information I need
2. Select information most appropriate to the information need
3. Interpret the visual information (i.e. graphs, tables, diagrams)
4. Write a research paper
5. Prepare a bibliography
6. Create bibliographic records for different kinds of materials (i.e. books, articles, thesis, web pages)
7. Make citations and use quotations within the text
8. Learn from my information problem solving experience and improve my information literacy skill

**Basic information literacy skills**

9. Use different kinds of print sources (i.e. books, periodicals, encyclopedias, chronologies, etc.)
10. Use electronic information sources
11. Locate information sources in the library
12. Use library catalogue
13. Locate resources in the library using the library catalogue

**Advanced information literacy skills**

14. Synthesize newly gathered information with previous information
15. Determine the content and form the parts (i.e. introduction, conclusion) of a presentation (written, oral)

16. Create bibliographic records and organize the bibliography

17. Criticize the quality of my information seeking process and its products

Notes: This scale has been prepared to determine your level of efficacy on issues related with the information (to find, use and communicate information) Here the notations shall be referred to as 7 ) almost always true, 6 ) usually true, 5 ) often true, 4 ) occasionally true, 3 ) sometimes but infrequently true, 2 ) usually not true, 1 ) almost never true. Please mark the most suitable choice for you. Thanks for your cooperation. A ) Defining the need for information B ) Initiating the search strategy C ) Locating and accessing the resources D ) Assessing and comprehending information E ) Interpreting, synthesizing, and using information F ) Communicating Information G ) Evaluating the product and process
Appendix C. Metadata literacy self-efficacy

In this part of the survey, you should indicate your level of confidence completing each of the tasks. For each element, rate your level of comfort 1 meaning almost never true and 7 meaning almost always true:

I feel confident and competent to

1. Identify an appropriate website, search engine, or database to meet an information need
2. Find elements in a document (i.e. title, author, subject) that helps answer your information need
3. Select electronic documents to meet an information need
4. Interpret the structure of an electronic document (i.e. identify navigation, text, contextual elements)
5. Create documents that use links, tags, or other types of contextual information
6. Export data from a document to use in different software or applications (e.g. saving a citation into Endnote or RefWorks, using RSS feeds on your profile page)
7. Tag, describe, comment on, or otherwise annotate an electronic resource
8. Reference or cite electronic documents via links or citations (e.g. bookmarking, linking)
9. Use metadata to help me understand digital documents that are new to me
10. Interpret document 'code' such as HTML tags
11. Use the same document on different devices (e.g. computer, mobile device, phone, paper)
12. Identify the creator(s) of a document (e.g. user-contributed, author-created)
13. Determine the purpose of elements of a document (such as user comments, descriptive tags, system tags)
14. Create an electronic document using a specific format (e.g. a Podcast, RSS feed, or webpage)
15. Use electronic systems to enhance your learning and memory (e.g. online diary, digital notebooks)
16. Add tags, comments, or other contextual information to a site (e.g. bookmarks, tagging, annotating)
17. Evaluate the quality of content on a website
Notes: This scale has been prepared to determine your level of efficacy on issues related with the information (to find, use and communicate information) Here the notations shall be referred to as 7 ) almost always true, 6 ) usually true, 5 ) often true, 4 ) occasionally true, 3 ) sometimes but infrequently true, 2 ) usually not true, 1 ) almost never true 0) Don’t know what this is. Please mark the most suitable choice for you. Thanks for your cooperation
Appendix D. Metadata reflections

1. Based on what you have seen in this study, what do you think about the role of metadata in your non-academic information use?

2. Based on what you have seen in this study, what do you think about the role of metadata in your academic information use?
Appendix E. Consent Form

University of North Carolina-Chapel Hill

Consent to Participate in a Research Study

Adult Participants Adults

Social Behavioral Form

IRB Study #____________________ (Leave blank if new submission.)

Consent Form Version Date: ___03/17/09___________

Title of Study: Metadata literacy: An analysis of metadata awareness in college students and academic librarians

Principal Investigator: Erik Mitchell

UNC-Chapel Hill Department: School of Information and Library Science

UNC-Chapel Hill Phone number: (336) 655-5290

Email Address: mitcheet@email.unc.edu

Faculty Advisor: Jane Greenberg

Funding Source and/or Sponsor:

Study Contact telephone number: (336) 655-5290

Study Contact email: mitcheet@email.unc.edu
What are some general things you should know about research studies?

You are being asked to take part in a research study. To join the study is voluntary.

You may refuse to join, or you may withdraw your consent to be in the study, for any reason, without penalty.

Research studies are designed to obtain new knowledge. This new information may help people in the future. You may not receive any direct benefit from being in the research study. There also may be risks to being in research studies.

Details about this study are discussed below. It is important that you understand this information so that you can make an informed choice about being in this research study.

You will be given a copy of this consent form. You should ask the researchers named above, or staff members who may assist them, any questions you have about this study at any time.

What is the purpose of this study?

You are invited to participate in a research study conducted by Erik Mitchell, Assistant Head for Technology Services from Wake Forest University. In this study I hope to learn more about how you use electronic information called metadata and what impact it has on your confidence in working in electronic environments. You were selected as a possible participant because you are a student or librarian in higher education.

Who is eligible?

Any undergraduate student 18 years of age or older currently enrolled in a four year college or librarian with information literacy instruction responsibilities (e.g. reference and educational services librarians) is eligible to participate in this study.

How many people will take part in this study?
If you decide to be in this study, you will be one of approximately 100 people in this research study.

How long will your part in this study last?

If you decide to participate, you will complete a study online which will take approximately 20 to 30 minutes. The study asks a variety of questions about how you access and manage information in an electronic environment and asks you to critique your experience. As part of the study you will view a short video and comment on what you learned. You may cease participation at any time with no negative consequences.

What will happen if you take part in the study?

During this study you will be asked to view two short videos on an information skill and to engage in an information task. Both before and after this interaction you will be asked questions about your perceived level of knowledge regarding this information task.

What are the possible benefits from being in this study?

Research is designed to benefit society by gaining new knowledge. You may not benefit personally from being in this research study.

What are the possible risks or discomforts involved from being in this study?

There are no risks to participating in this study. While you will not benefit directly, the knowledge gained in this study will inform teaching and research on how people use a specific type of information known as metadata. If you agree to participate in the study you may discontinue your participation at any time by simply closing the web-browser window. This study does not collect any identifying information about you but does collect your institutional affiliation, your educational background and your current educational status.

There may be uncommon or previously unknown risks. You should report any problems to the researcher.

Erik Mitchell - Research proposal
**How will your privacy be protected?**

While you will be required to provide your email address for this, your email address will be kept separate from the study data. In addition, your email address will not be shared or released to any other organization.

Your participation is voluntary. Your decision whether or not to participate will not affect your relationship with your school in any way. If you decide to participate, you are free to withdraw your consent and discontinue participation at any time without penalty.

**Will you receive anything for being in this study?**

You will be receiving $15 for taking part in this study.

Within two weeks of completing this study, you will be sent US $15 via PayPal.

PayPal is an online company that allows money transfers and payments to be made through the Internet.

Here’s what will happen:

1. You receive an email from PayPal saying you’ve gotten a payment
2. You sign up for a PayPal account or just log in to see the money added to your PayPal balance
3. You can transfer the funds to a checking account, request a check, or send the funds to someone else.

Please note: There may be service charges for withdrawing or using the PayPal funds, which depend on your account details. The fees are outlined at http://tinyurl.com/fees-paypal

(The above instructions are based on http://tinyurl.com/paypal-instructions)

**Will it cost you anything to be in this study?**

There will be no costs for being in the study

**What if you are a UNC employee?**

Erik Mitchell - Research proposal
Taking part in this research is not a part of your University duties, and refusing will not affect your job. You will not be offered or receive any special job-related consideration if you take part in this research.

**What if you have questions about this study?**

You have the right to ask, and have answered, any questions you may have about this research. If you have questions, or concerns, you should contact the researchers listed on the first page of this form.

**What if you have questions about your rights as a research participant?**

All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject you may contact, anonymously if you wish, the Institutional Review Board at 919-966-3113 or by email to IRB_subjects@unc.edu.

---

**Title of Study:** Metadata literacy: An analysis of metadata awareness in college students and academic librarians

**Principal Investigator:** Erik Mitchell

---

**Participant’s Agreement:**

By proceeding with this survey and clicking the "I agree" below, you indicate that you have read and understand the information provided above, that you willingly agree to participate, that you may withdraw your consent at any time and discontinue participation without penalty.

- I agree. I am eligible because I am (1) an undergraduate student or (2) a librarian with information literacy instruction experience
- I do not wish to participate
Appendix F. Solicitation Email

Subject: Digital information use study - financial compensation for participation

You are invited to participate in a research study conducted by Erik Mitchell from University of North Carolina at Chapel Hill. In this study I hope to learn more about how you use electronic information called metadata and what impact it has on your feeling of effectiveness in working in electronic environments. You were selected as a possible participant in this study because you are a student or librarian with teaching or reference responsibility in higher education. This study is open to the first 50 undergraduate students and first 50 librarians who respond.

Who is eligible?

Any undergraduate student in a four year college or librarian with information literacy instruction responsibilities (e.g. reference and educational services librarians) is eligible to participate in this study.

What will happen in this study?

The study will last approximately 20 to 30 minutes, includes a short instructional component, and asks a variety of questions about how you access and manage information in a digital environment.

Compensation

In compensation you will receive $15 via PayPal. While this study will gather your email address in order to send you this gift certificate it will not be matched with the content of your answers in any way.

Confidentiality and Participant Rights

Your participation is voluntary. Your decision whether or not to participate will not affect your relationship with your school in any way. If you decide to participate, you are free to withdraw your consent and discontinue participation at any time without penalty. There are no significant risks to your participating in this study and no direct benefit to you.
While your email address is required for compensation purposes, it will not be used for any other purpose and will be destroyed once compensation has been sent you to and receipt confirmed.

This study has been approved by the Institutional Review Board of the University of North Carolina Chapel Hill and Wake Forest University for compliance with ethical principles and regulatory requirements (IRB # xxxxx). If you have any concerns or questions you can reach the UNC IRB board at (919) 966-3113 or the WFU IRB board at (336) 758-5888.

**If you would like to participate**

If you are willing to take the study follow the link below, read the consent form which explains the research in detail and proceed.
References


Erik Mitchell - Research proposal


*Computers & Education, 52*(1), 234-246.


Wesch, M. (2007, March, 7 2007). The Machine is Us/ing Us (Final Version), from [http://www.youtube.com/watch?v=NLIGopyXT_g](http://www.youtube.com/watch?v=NLIGopyXT_g)
