Critical thinking or learning to copy information correctly?

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A Thesis

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Critical Thinking or Learning to Copy Information Correctly?

by

Daniel E. Feinberg

Submitted to the Graduate Faculty as partial fulfillment of the requirements for the

Master of Education Degree in Educational Psychology

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Critical thinking has been a major goal of higher education institutions and academic libraries since their formation. Critical thinking is a way of processing and using information. Academic libraries as the traditional storage facilities for preserving resources and places for providing access to information have been considered information centers for academics. Throughout the 20th century, academic librarians have taught bibliographic instruction sessions; the Information Age brought about new formats of information. Information literacy instruction appeared in academic libraries by 2000 guided by the information literacy standards set forth by the Association of College and Research Libraries (ACRL). Librarians therefore try to instill in students information literacy skills and critical thinking skills. One of the developmental models of critical thinking, developed by Kuhn (1999); looks at critical thinking as being made up of metacognitive, metastrategic, and epistemological meta-knowing. Critical thinking is involved in information literacy, but the key is moving beyond just learning how to locate information. Can students enter an academic library and critically evaluate the information resources? Are librarians fulfilling the role of teaching information literacy along with the required critical thinking skills for true information literacy?
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Chapter One

Introduction

Role of Academic Libraries

Critical thinking has been a major goal of higher education institutions and academic libraries since their formation. Critical thinking is a way of processing and using information. Academic libraries as the traditional storage facilities for preserving resources and places for providing access to information have been considered information centers for academics. Finding a way to integrate students into academic life and having them become accustomed to using academic libraries was an undertaking that was recognized by academic librarians and faculty as a foundation for learning and education. Librarians have worked to use every opportunity to impart information seeking skills since libraries have appeared. Their goals have always been to make searching for information resources a logical, systematic, and evaluative process.

Bibliographic instruction (BI) classes were held within academic libraries to teach students the mechanics and processes of using library information resources and developing their research skills. As the nature as well as the processes of collecting and storing information has been revolutionized in the past twenty years, student interactions with academic libraries have changed. By 2000, information literacy (IL), defined by the American Library Association, was considered “...the ability to know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand” (Association of College and Research Libraries, 2000). The process of identifying, locating, evaluating and effectively using information, i.e. the basic framework of research skills, is critical thinking. Developing
critical thinking and strengthening students’ research skills have been the major goals of information literacy courses and sessions in order to strengthen students’ skills for lifelong learning. In general, the idea of facilitating search strategies, obtaining appropriate resources, interpreting materials, and making strong hypotheses leads to becoming information literate and requires critical thinking skills. There has been an academic push towards producing students who are information literate and who understand how to negotiate the technological changes surrounding information usage within the last decade. Having these information skills also provides students with transferable skills so important for lifelong learning. In order for students to acquire information literacy skills they must immerse themselves into the process of critical thinking. The question that remains is have students who have received information literacy instruction, in actuality, not become critical thinkers who learn to locate, collect, and evaluate their information materials? Or, do current information literacy courses merely re-package instruction in how to conduct bibliographic searches? In other words, does information literacy instruction focus on learning how to critically locate, collect, and evaluate information materials, or does it instead simply focus on how to use an academic library and find information from books, journals, and print materials in research databases, and the Internet and copy the information without critical examination?

**History of Academic Libraries**

Historically, academic libraries have changed greatly since their formation with the beginning of American universities and colleges. Colonial college libraries were small, contained narrow collections, and had very limited funding. (Weiner, 2005, p. 2)
In fact, colonial libraries were created more often than not only when colleges were established (Orne, 1980, p. 77) Within the colonial libraries, books were arranged by a variety of criteria such as size, author, subject, as well as donor. By the mid 1800s, the number of items held in libraries increased to such an extent that a more logical and efficient way of organizing and locating items was needed. In 1876, Melvil Dewey, then recently hired at Amherst College’s library to reclassify its collection, proposed a system based on decimal numbers. By the time that Dewey had proposed the classification system, serial publications had increased their importance in libraries (Weiner, 2005, pp. 2-3). Serials are defined as any “…publication...issued in successive parts bearing numeric or chronologic designations and intended to be continued indefinitely” (Chan, 1994, p. 490). For example, magazines, newspapers, journals, yearbooks, etc. are considered serials. “Most library historians take the year 1876 as the point of departure for many aspects of library development in the US” (Orne, 1980, p. 79). Literary societies forming during the 1800s brought new light to the value of college libraries and the number of these libraries began to increase. The end of the nineteenth century brought forth the true value of library materials and the need for accessibility for students and professors. Furthermore, libraries hours were made longer to accommodate for the increased need (Weiner, 2005, pp. 3-4). “In 1887, Melvil Dewey opened the first library school at Columbia University with seventeen female and three male students. Before this event, academic librarians learned their profession by trial and error or by learning from other librarians” (Weiner, 2005, p. 6). By the early 1900s, higher educational institutions began to gradually take shape. Research and scholarly resources came into existence slowly and so too did these resources within the academic library. At this time,
librarians in academic libraries were generally associated with support staff and were rarely associated with faculty, teaching, or educational personnel.

**Library Role in Critical Thinking**

Critical thinking has been one of the objectives of academic librarians who are teaching information literacy sessions or classes. Whether it is a drop in session, where a librarian enters a professor’s class and workshops with students for an hour or two, or a credit-bearing course, the critical thinking goal remains the same. Critically evaluating information is part of the researching process. Professors who work with the academic librarians expect their students to be capable of thinking critically about the resources that they are finding. In effect, librarians are expected to teach critical and evaluative skills during the information literacy sessions.

Currently, on college and university campuses across the United States, information literacy continues to be a major goal of higher education since the advent of library instruction. However, colleges and universities are still struggling to reach this goal. Decisions about who will have responsibility for developing the curriculum, teaching students, and assessing their learning and information literacy skills are challenging aspects of the problem. Academic librarians are key professionals in fully integrating information literacy into college and university curricula. Librarians have played a key role in academia bringing forth information literacy and critical thinking into the college classroom.

**Critical Thinking**

In order to examine how information literacy is being implemented in higher education and to evaluate whether or not information literacy is leading to critical
thinking, it is important to examine research on critical thinking. One of the leading developmental models of critical thinking was developed by Kuhn (1999). Kuhn uses the term, meta-knowing skills, to describe the intellectual skills that are involved with critical thinking. Drawing from Piaget’s work on cognitive development, Kuhn describes meta-knowing attainment as thinking about thinking or dealing with “awareness, understanding, and management of one’s cognition.” Kuhn points out that Piaget’s formal operational stage is aligned with a person’s thinking about thinking (Kuhn, 1999, p. 18). Kuhn’s developmental theory of critical thinking goes on to describe three ways of thinking about thinking: metacognitive knowing, where one recites one’s knowledge “knowing operates on one’s base of declarative knowledge”, metastrategic knowing, thinking about how you know something a “form of knowing that selects and monitors strategies that are applied”, and finally epistemological knowing characterized by placing ones knowledge in the world of what we know “an individual’s broader understanding of knowledge and knowing.” These three: metacognitive, metastrategic, and epistemological mea-knowing, together make up critical thinking (Kuhn, 1999, p. 18). Kuhn’s developmental framework points out for some people and in some areas of knowledge, there can be a lack of mastery of metacognitive, metastrategic, and epistemological skills even by adulthood (Kuhn, 1999, p. 21).

**Link of Critical Thinking and Libraries Today**

Kuhn’s work on the developmental processes of critical thinking can be used as a framework for understanding the role of librarians in developing critical thinking skills in their work with college students in information literacy instruction. A link can be made between Kuhn’s work on the development of critical thinking and the information
The information literacy standards established by the Association of College and Research Libraries (ACRL), a division of the American Library Association (ALA). The information literacy standards that are set out by ACRL are as follows:

1. The information literate student determines the nature and extent of the information needed.
2. The information literate student accesses needed information effectively and efficiently.
3. The information literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system.
4. The information literate student, individually or as a member of a group uses information effectively to accomplish a specific purpose.
5. The information literate student understands many of the economic, legal, and social surrounding the use of information and accesses and uses information ethically and legally. (Association of College and Research Libraries, 2000)

Life-long learning and critical thinking are two of the primary goals of information literacy, but are those goals being met? While information literacy seeks to teach these skills, have they truly been obtained, or are the simple methods of using a library been the driving force of the sessions and classes being taught? Kuhn’s theory of critical thinking development can provide a framework for answering these questions.

For many students, learning how to use information resources is viewed as a basic skills task, but professors most often want students to move beyond the basic skills of using a research database; the goal becomes being capable of not only finding a resource but also critically evaluating the resources that are found. “[Information] Fluency and information literacy are similar in many ways and share a common objective for moving beyond the acquisition of basic computer skills” (Mackey & Jacobson, 2011, p. 66). Instead the student is expected to be critically thinking and reflecting upon the information that they have found. There has been a push to think in a critical and
critically-reflective manner (Buschman, 2009, p. 111). Finding information today is not a problem; but evaluating and critically reflecting on the materials found is the goal for most college classes. It is more than a premise for locating an article, book, or Internet source. However, the critical question for this work is, have information literacy sessions set students up to participate in this critical reflection and critical thinking; or have students simply been given a skill set of how to locate materials?
Chapter Two

Statement of the Problem

How might Kuhn’s model of critical thinking development be used to evaluate how well library information literacy instruction reaches its goal of critical thinking about information resources? It should be noted that “…information literacy is a critical thinking activity focused on research and author practices” (Mackey & Jacobson, 2011, p. 66). Librarians have assumed the role of teaching information literacy; they have been on the forefront of this battle to impart lifelong learning and critical thinking into the college curriculum. Have their goals been achieved? As librarians have striven to go beyond simply teaching students how to find information resources, critical thinking has become a primary skill and goal. Kuhn’s criteria in her developmental model for critical thinking specifically look at an individual’s epistemological meta-knowing relational position to knowledge. Her theory however does provide detailed descriptions of how critical thinking can be assessed in a knowledge domain (Kuhn, 1999, p. 16). The potential for teaching critical thinking skills in conjunction with information literacy skills is possible for academic librarians. However, the critical thinking component of information literacy instruction takes librarians today beyond the librarian’s traditional responsibility of finding and locating information for the library user. Librarians work to help students to find, retrieve, and evaluate resources; this involves critical thinking skills.

In the midst of today’s Information Age, librarians help students recognize that all sources are not authoritative, valid, and useful as their information resources simply because they exist. Critical thinking is involved in the complete development of
information literacy skills; but the key is moving beyond teaching simply how to find and locate information. Can students enter an academic library and critically evaluate the information resources that they are finding? Can students reflect on questions and problems and evaluate what is needed and how information addresses the problem or questions they are investigating? Are librarians fulfilling the role of teaching information literacy along with the required critical thinking skills for true information literacy? Or have these sessions actually just repackaged bibliographic instruction sessions that were taught in the twentieth century?

Twenty-first century librarians are considered information experts on college and university campuses. Along with being noted as research experts, they have taken ownership of teaching critical thinking as a goal of information literacy. The problem is how do librarians define critical thinking and demonstrate that critical thinking is one of the major goals of information literacy instruction. This thesis will propose that Kuhn’s developmental model of critical thinking can be used by librarians to build an information literacy curriculum that is designed to teach critical thinking skills and to assess the critical thinking outcome of information literacy instruction.
Chapter Three

Literature Review

Bibliographic Instruction

Looking back at the history of instruction in academic libraries, one finds that by 1938, bibliographic instruction (BI) courses, taught by academic librarians, were being integrated into freshman writing courses (Barclay & Barclay, 1994, p. 214). The question of whether librarians were teachers has been a question asked by academics, but the presence of teaching librarians is not a new one. A push towards getting bibliographic instruction into a college or university curriculum is not new, and the Association of College and Research Libraries (ACRL) started the movement to get a Bibliographic Task Force as early as the 1960s. “…[A]cademic librarians have entered into teaching projects with genuine commitment and a real sense of purpose” (Smalley, 1977, p. 281).

If academic librarians engaged in teaching projects, then would librarians be perceived as professors? Reference librarians are thought of as having teaching experiences every time that they meet with a patron at the reference desk (Smalley, 1977, p. 281). The role of the academic librarian during the time of bibliographic instruction has taken three paths: 1. The development of education of the user by ways of the librarian, 2. An educated library user is able to have stronger reference interactions, and 3. BI has led to the librarian gaining faculty status (Koyama, 1983, pp. 12-13). For a librarian to gain faculty status within a collegiate setting, there had to be a need for the instruction and teaching librarians provided. It was found that it was not enough for a librarian to teach simply at the reference desk; instead this critical instruction and teaching had to move into the classroom.
One of the first developments in librarians assuming faculty roles was embedding librarians into existing college courses. The embedded librarian in a course model was respected and began in many cases in freshman writing courses. Instruction became more than simply a single library orientation lecture; it needed to become something “…with hands-on instruction, active learning, and the teaching of critical thinking” (Barclay & Barclay, 1994, p. 213). Bibliographic instruction (BI) moved from one-time sessions, to an embedded curriculum, to a bibliographic instruction course often co-taught by writing and librarian faculty. Yet, there were still flaws. There was obviously value in BI that had been identified in student work in how to use resources and the library. The aim of BI sessions was to create an environment in which library users would have their questions answered in order to make them more independent as researchers (Rettig, 1995, p. 10). The idea of making library users more self-sufficient continues to be a goal within academic libraries. “Librarians especially those who hold a strong belief in BI, raised the banners of critical thinking and information literacy” (Rettig, 1995, p. 11). With the advent of the computer and Internet, BI sessions began to change drastically. It would seem that these inventions brought forth a new form of resources that academic library users could acquire.

Bibliographic Instruction (BI) is not a new concept in the realm of higher educational institutions; it has been a part of academic libraries for over one hundred years (Ward, 1983, p. 75). By the mid-twentieth century, a Bibliographic Instruction Task Force had been established by Association of College and Research Librarians (ACRL) (Kirk, 1999, p. 236). Critical thinking has been a primary goal for students by educators since the beginning of their schooling. The reason that bibliographic instruction became
a part of academic libraries was due to the fact that college students were not prepared in how to use academic libraries (Ward, 1983, p. 89). However, it should be noted that as Bodi pointed out “what to think” is just as important as “how to think.” BI not only supported information finding needs, but was meant to also encourage students to incorporate the depth of looking at points of view, as well as evaluating resources (Bodi, 1988, p. 150).

Bibliographic instruction was based on the idea of a one-time, prepared, stagnant session. As helpful to some extent these sessions might have been, the challenges and flaws of bibliographic instruction sessions were numerous. Librarians found that when students came to the library, some professors were engaging in the sessions, while others were not actively involved. While bibliographic instruction was seen as important for students, the professors seemed to recognize that they too should be informed but often they were not. Students questioned the value of bibliographic instruction that their professors did not seem to be engaged in (McCarthy, 1985, p. 142). “If expert scholars can do without the scholarly tools we provide, perhaps those tools are less essential than we thought” (McCarthy, 1985, p. 142). Librarians asked to hold bibliographic sessions pulled resources and planned sessions; however, these sessions should have been learning sessions for students and professors. “The students are unlikely to be impressed by ways of gathering information that are evidently not of importance to the professor” (McCarthy, 1985, p. 144). Bibliographic instruction classes were thought to be boring and did not help students who were required to take them since there was a lack of interest (McCarthy, 1985, p. 144).
While being valued by educators, not all librarians place a great emphasis on critical thinking in their library instruction sessions. Today, the focus on information literacy rather than library instruction has led to a further evolution of the instructional role of libraries. In understanding the learning process, it is also important to consider that critical thinking is composed of “self-awareness and self critique” (Herro, 2000, p. 555). One might further add that critical thinking was something that was learned and self-reflection was necessary. Library usage was therefore paired with critical thinking so students were “…encouraged to think critically about the search process in order to (1) refine and narrow a topic, and (2) use the results to develop their own positions on an issue” (Bodi, 1988, p. 150). These skills were further valued by Bodi and Herro, who considered critical thinking to be a large part of being an educated person (Herro, 2000, p. 555). However, even among librarians this evolution of information literacy is not accepted by all. Bibliographic instruction sessions needed a place within academic libraries and needed to be valued by their institutions and professors. While some librarians felt that the transition from being the reference librarians to also being professors was a positive move, others felt the opposite. Simply providing students information was what some librarians felt should be their position within the library, not teaching (Bodi, 1988, p. 151).

By 1999, library instruction became part of many reference library departments. “This led to a fundamental problem in the profession – a shortage of librarians who [were] adequately trained and [had] experience as teachers” (Kirk, 1999, p. 236). Academic libraries must support their institutions. “An equally valid role of the academic library should be to support and reinforce the development of critical thinking among
college students” (Bodi, 1988, p. 151). Many librarians felt that their primary job was to make patrons comfortable with materials and knowledgeable users of what made up the library. Two movements arose, the “back-to-basics” and the “library instruction program that emphasizes critical thinking” (Herro, 2000, p. 556). Back-to-basics supporters were more focused on the linear progression of how to find resources, while the library instruction movement was looking at the gains of finding, evaluating, and using information. One of the plausible reasons that librarians did not want to join the latter camp was that there was more work involved due to the teaching requirement that they were not prepared for. Also, there was not a well developed understanding and theory of critical thinking or disciplinary “place” for library and information instruction. Critical thinking was thought of as interdisciplinary by nature and so nobody wanted to take responsibility for something outside of their traditional area of responsibilities.

Access to electronic resources and the advent of the Internet fundamentally changed the ways in which library research could be conducted. When classes that were once 50 minute lectures or presentations, were supplemented by multimedia incorporation into the classroom in effect, students were able to work on live examples and were encouraged to partake more closely in problem solving skills (Kirk, 1999, p. 238). Some might say that they were more likely to be able to embark in critical thinking. This gave way to new types of lessons with new goals. Rather than executing research with print materials, librarians were beginning to have to develop search strategy lessons with the use of multimedia, and what eventually became known as the Internet.

Instilling in students the appetite for and capacity to find information appropriate to the consideration of an issue or to answer a question has been and remains, part of our central goal, along with critical thinking, communication skills, and understanding of the structure of knowledge. (Kirk, 1999, p. 239)
This brought forth the change in instruction, namely, the movement away from bibliographic instruction, into what is today known as Information Literacy. “The critical thinking skills associated with information literacy do not produce lifelong learning. They are probably a necessary prerequisite, but not a guarantee of this capacity (D. Ward, 2006, p. 399). The question had become, what is the role of an academic librarian in developing information literacy in a college or university?

**Information Literacy**

Paul Zurski was thought to be the first person to use the term “information literacy” in 1974 (Owusu-Ansah, 2003, p. 223). This was the establishing of a new and more diversified form of bibliographic instruction. A definition of information literacy was clearly lacking; but it was truly made evident in 1989 by the American Library Association (ALA) (Owusu-Ansah, 2003, p. 220). Students were then expected to rely on information systems and needed to move beyond individual appointments with librarians and be able to critically think and evaluate their information and information needs (Rettig, 1995, p. 16). By 2011, the Association of College & Research Libraries (ACRL) stated that:

Information literacy forms the basis for lifelong learning. It is common to all disciplines, to all learning environments, and to all levels of education. It enables learners to master content and extend their investigations, become more self-directed, and assume greater control over their own learning. An information literate individual is able to:

- Determine the extent of information needed
- Access the needed information effectively and efficiently
- Evaluate information and its sources critically
- Incorporate selected information into one’s knowledge base
- Use information effectively to accomplish a specific purpose
- Understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally
The goal of information literacy is to work beyond the basic research skills that were taught in bibliographic instruction sessions. As previously mentioned, the question as to whether academic librarians would be able to teach these skills has been brought forth. An additional factor that Owusu-Ansah addressed is that these skills of information literacy are so complex, that there is a question as to whether or not professors of any kind would be able to meet these challenges in instruction (Owusu-Ansah, 2003, p. 226). These standards brought forth outcomes “…and processes like problem solving, decision making, critical thinking, lifelong learning, learning processes and performance of civic and professional duties” (Owusu-Ansah, 2003, pp. 224-225). Higher educational goals are similar so it would seem. Information literacy standards cannot exist in a higher educational institution outside of the mission and goals of the university or college. Information literacy promotes one of the goals of most academic institutions, lifelong learning. Information literacy also promotes one of the basic skills required for successful student learning; this basic skill is one of the goals commonly found in higher education institutions which is critical thinking. “By ensuring that individuals have the intellectual abilities of reasoning and critical thinking, and by helping them construct a framework for learning how to learn, colleges and universities provide the foundation for continued growth throughout their careers….” (Association of College and Research Libraries, 2000, p. 4). In that light, librarians need to join with teaching faculty to give students the opportunity to provide a venue in which students can work with material and to find and evaluate it appropriately (Zabel, 2004, p. 19). One-stop-shop information literacy classes have been prevalent within higher educational institutions. As information literacy
instruction evolves, researchers are examining how best to develop curricula and assess the outcomes of that instruction. Can these limited sessions, whether treated like a workshop or combined with a course meeting, come anywhere near meeting a primary goal of information literacy, developing lifelong learners? Part of being a lifelong learner is being able to critically think. Zabel has proposed the idea “that is it critical to deliver information literacy instruction throughout a student’s academic career” (Zabel, 2004, p. 20). Meeting the goals of IL is said to be measured by some form of assessment. However, assessment is not easily conducted uniformly due to the fact that one is not only assessing the skill of gathering information efficiently, but also assessing the academic ability of using information in a meaningful way.

For the past ten years, researchers in the area of information literacy have been defining and evaluating the area. There is general agreement on what information literacy is as summarized in a recent article by Johnson. “Information literacy is often defined as the ability to recognize the need for information, to retrieve material from a variety of resources, evaluate this information in terms of task specific standards, and to translate this ability into new environments beyond the classroom ” (W. Johnson, 2009, p. 212). Being information literate means that an individual must not only be able to locate materials, but also that they should be able to evaluate them. Critical thinking plays a large role in the task of actually finding materials. However, creative and meaningful thinking also play roles in the finding of information as well. Self-reflection and knowledge are as much a part of the roles of critical thinking, as is information literacy. Information literacy is not an isolated skill. Although librarians have spent decades trying to master the skill of teaching this, it is far from simple. It should be recognized that
teaching how to critically think about information is a major component of information literacy (Ward, 2006, pp. 396-397). Being information literate in the information Age is far from simple.

With new resources, technologies, media, and modes of communication, being information literate is not static and moves to put a student at a new level of literacy. With the Information Age comes a new form of understanding of information. (D. Ward, 2006, p. 398) When thinking back to the times of teaching bibliographic instruction, it was thought of in the dimensions of mainly print materials, or rather materials that were easily accessible. However, information literate individuals have to utilize, evaluate, and work through a plethora of material types. The advent of the Internet and the World-Wide-Web has given new breadth to information seekers. For librarians, this changes where and what is taught within a library instruction session. No longer is it necessary for a librarian to collect periodical indexes, take a class to a microform/microfiche and periodical section, or locate the various book collections. In effect, the teaching has to be restructured and planned out with new techniques and in new “spaces”. Exponential growth in information technology has left the what and where of information in a continuing state of flux. The last decade of the 20th century called for mediated classrooms that contained an instructor’s station equipped with computer/video/Internet projection capabilities and individual student computers. As the 21st century arrived, the transition of instructional and research materials becoming wirelessly delivered to laptops, tablets, and even cell phones has once again changed the instruction. Teaching challenges range from dealing with students with more “native” digital fluency than instructors, to dealing with older returning students with little or no experience with email.
or digital files. The move to an online catalog, along with online periodical research databases with full text capabilities, became the new reality. For those who had taught traditional bibliographic sessions, it would mean a complete revamping of their lessons and teaching methods.

Promoting lifelong learning is a goal of all librarians; information literacy therefore encourages this learning philosophy. It should be noted that the goal of higher education institutions goes beyond having graduates who are educated in their major or field of study, but also that of being capable of both being critical thinkers and are life-long learners (Heuer, 2005/2006, p. 73).

Information literacy skills need to be integrated into courses and curricula. Yet, while some colleges and universities have been doing this, others have shied away from being fully committed. Instead, there had been a push towards having an information literacy session for a class, and students were expected to becoming information literate after a few sessions. “Usually, however, a standalone session offered apart from an academic assignment fails to introduce information literacy successfully to the student” (Johnson, 2009, p. 214). It is difficult to expect students to retain all of the search strategy skills and information literacy skills after only a 50-minute session. While researching locating skills can be obtained in a one-stop-shop lesson, the actual premise of being information literate was more of a dream in the eyes’ of librarians and those focused on instruction costs, rather than an actual learning occurrence. “Nevertheless, despite an increasing recognition of the importance of IL, there has been little concrete discussion of the educational underpinnings involved in implementing an integrated IL program” (Graftstein, 2002, p. 197). The Information Age has brought upon new
challenges within the realm of colleges, but also within the world of work. Being information literate and being a critical thinker goes beyond the basic skills within the classroom and both are now incorporated within the world. “And librarians have a key role to play” (Ward, 2006, p. 400).

When thinking of libraries today, one acknowledges that they have definitely changed since their predecessors due to many factors. Libraries today have changed in the formats of their collection moving towards electronic and digital collections. Journals that once filled libraries have evolved into online collections. Microfiche and microform are slowly transitioning away. There is a movement to the virtual library with information commons being developed in libraries. In effect, floors of libraries are being converted into computer labs or information commons. The technology behind the hardware and software is changing at exponential rates making any design for a “computer center” or information commons obsolete before budget approval can be obtained. Books have also taken electronic formats. Students moved into the NOW generation in which they wanted the materials for their research the moment that they come into the academic library. Reference librarians have had to acclimate to this new shifting environment. The question has become has the view of information literacy been evolving? “Typically, [librarians] have provided vast resources for the curriculum, but our foray into instruction has focused in a more limited manner on finding and evaluating information—more of the instrumental and technical approach” (Ward, 2006, p. 401). It is crucial that if lifelong learning, information literacy, and critical thinking are all goals of higher education institutions, then professors, librarians and students, must all work together to achieve this goal.
Critical Thinking Defined and Explored

As the changes of the Information Age have raised new questions and generated research into what information literacy means, so too have questions and research been raised about what cognition and critical thinking means in the Information Age. Critical thinking has been defined many different ways by psychologists and educators. While it is the goal of higher educational institutions, many argue over the clear and concise definition of it. “Critical thinking has been assigned at least three distinct meanings: (a) critical thinking as problem solving, (b) critical thinking as evaluation or judgment, and (c) critical thinking as a combination of evaluation and problem solving” (Lewis & Smith, 1993, p. 134). Critical thinking is often thought of in terms of higher order thinking. Many also believe that critical thinking could also be known as problem solving, yet this is truly a debate. “Defining critical thinking as both evaluation of statements and problem solving is becoming increasingly common” (Lewis & Smith, 1993, p. 134). The definition of critical thinking can vary depending on the age group. Adults critically think about topics by recognizing and researching their “assumptions.” However, they also take for granted the beliefs that they have about the world, and therefore their previous thoughts effect the information resources that they are using (Brookfield, 2003, p. 144). Critical thinking is a process, which causes adults often use to start researching about assumptions that they have. This allows adults to look for relevant “evidence and experience” so that they can further understand the world (Brookfield, 2003, p. 144).

Over the past 25 years, the examination of critical thinking has taken several forms. Like information literacy, definitions of critical thinking have evolved. “While as
noted earlier, ‘critical thinking’ is coming into common usage, the use of the term to encompass the thinking skills of critical thought and problem solving would not be acceptable to at least some psychologists” (Lewis & Smith, 1993, p. 135). Yet, if critical thinking has been so hard for experts in cognition to come to agreement on a definition, it is interesting that so many educators are so willing to use it in their goals for higher education. One definition of critical thinking often cited by higher education professionals is the following by Norris and Ennis, “Critical thinking is reasonable and reflective thinking that is focused upon deciding what to believe or do” (Norris & Ennis, 1989, p. 1). In defining critical thinking, Brookfield notes that it is also important for critical thinking to be assessed and evaluated by educators. Assessment of critical thinking as a skill is increasingly important simply due to the fact that it develops with experiences and is not a totally transferable skill especially in its early development. Even though people are capable of critical thinking within one situation, it does not follow that they are capable of critical thinking within another situations.

The same person can be highly critical in one situation, or with regard to one set of ideas, but completely closed to critically reappraising another situation or idea. Neither is critical thought and action necessarily developmental. There is plenty of evidence to show that after a critical effort people can quite easily revert to an earlier, more naïve, way of thinking and being. So critical thinking can only be understood, and its development gauged, within a specific context. (Brookfield, 2003, p. 157)

In effect, critical thinking is a goal which students strive for in order to accomplish the higher order thought processes, which theoretically frame the college classroom.

Brookfield also identifies learning and critical thinking as social processes and suggests that critical thinking can be accomplished more easily and effectively when groups of people are learning together (Brookfield, 2003, p. 157). Critical thinking involves the
evaluation of different perspectives and points of view. If nothing else, the brainstorming that a group can do far supersedes that of an individual person. This technique which collaborative learning is based on supports Brookfield’s hypothesis of learning and critical thinking as a social process. Similarly, Lipman said “When we think critically, we are required to orchestrate a variety of cognitive skills grouped in families such as reasoning skills, concept-formation skills, inquiry skills, and translation skills” (Lipman, 1988, p. 43) These actions work together so that as humans we can think, process, and carry on everyday activities.

Reasonable thinking, reflective thinking, focused thinking, a decision about what to believe or do, and a process of thinking are all parts that make up critical thinking (Norris & Ennis, 1989, pp. 3-5). “Also most educators prefer to think of critical thinking as serving both practical and academic needs” (Norris & Ennis, 1989, p. 21). The question that arises takes place within the classroom. How can academics take their adult students and incorporate critical thinking into their content curriculum? Piaget approached critical thinking that emerges as children interact with and in the physical world. Different life experiences with the physical world shape and develop critical thinking skills in Piaget’s model and a similar critical thinking process can be applied to the abstractions of the information world and the social world. Just as Piaget’s theory of cognitive development emphasizes the qualitative differences in thought at different stages of cognitive development, similarly it is thought that there are developmental stages or levels of critical thinking. Some researchers have suggested that not all people will develop to the same extent in critical thinking (Halonen, 1995, p. 76). Kuhn looks at cognitive skills as being relevant to critical thinking and uses the idea of qualitatively
different stages, levels, or orders of critical thinking. The action of moving past first-order cognitive skills enables individuals to know about the world around them and to transition into second order or what she terms meta-knowing skills. With first order or first level cognitive skills thinking is limited to processing information that can be physically experienced in the world. Kuhn proposing that this meta-knowing allows one to know about knowing. “Thinking about one’s thought—in contrast to simply engaging in it—opens up a whole new plane of cognitive operations that do not exist at a simple first-order level of cognition” (Kuhn, 1999, p. 18). Kuhn’s meta-knowing, which makes up critical thinking, is broken down further into three levels or categories: metacognitive, metastrategic, and epistemological. These three levels of meta-knowing, build upon one another from metacognitive to metastrategic to epistemological. Kuhn’s developmental theory points to metastrategic knowing “form of knowing that selects and monitors strategies that are applied”, metacognitive knowing “knowing operates on one’s base of declarative knowledge”, and epistemological knowing “an individual’s broader understanding of knowledge and knowing” that together make up critical thinking (Kuhn, 1999, p. 18).

Case Studies of Information Literacy

Recent work in critical thinking and information literacy has been made more salient in higher education by its transition to the Information Age. However, an examination of different information literacy instructional models over the past thirty years, demonstrate an understanding that successful higher education, critical thinking, and information literacy are linked. An examination of library instruction in information demonstrates this understanding. 1970 marked Eastern Michigan University’s growth of
a library outreach instructional program, which was devised so that the librarians would be able to be more active as educators. Both faculty and students were able to be reached through the work of this program. The program, funded by a grant from the Council of Library Resources and the National Endowment for the Humanities, gave rise to goals for the librarians. These goals were: become flexible when working with faculty and students, strengthen their teaching methods, create useful tools for teaching, devise ways for evaluation of their teaching, and determine how to become integrated into the university’s curriculum (Rader, 1999, p. 219). Librarians at Eastern Michigan University created an environment in which lectures on information were paired with assistance on the actual use of library materials such as reference books, audiovisual materials, and slides. The faculty often requested library tours and basic introduction to the library and what it could offer students. These were designed as “stand alone” library experiences outside of regularly scheduled class meetings or assignments much within the model of bibliographic instruction. Eastern Michigan University received a grant for resources to deliver bibliographic instruction, but unfortunately the librarians later realized that the collections were not being used as frequently as the librarians would have liked. Eastern Michigan University found that the integration of library instruction into a specific course was needed. It was decided that library instruction was best suited to be integrated into the freshman English composition course curricula (Rader, 1999, p. 220). This model seemed to “force” students to actively use the materials they learned about in lecture.

In the 1990s, higher educational institutions realizing that many entering students did not have the skills and experiences to successfully make the transition from high school to college began to concern themselves with retention of students. In 1991, San
Diego State University began its “Freshman Success Program”. Librarians had volunteered to teach sections of this course by 1998 in order to move away from the one-stop-shot bibliographic instruction sessions that they had been teaching. Critical thinking and the library were two parts of this Freshman Success course that they believed could be strengthened. “Critical thinking is one of the suggested syllabus topics and the library is one of the campus resource visits” (Harley, 2001, p. 301). In effect, the goal became to incorporate information literacy and critical thinking into freshmen’s everyday lives. Weekly readings and in-class assignments were assigned for evaluation of students and with questions that encouraged critical thinking and information literacy were incorporated (Harley, 2001, p. 302).

It was suggested to students that valuing information literacy and critical thinking, being in the habit of using valid criteria to make informed decisions, and taking the time to distinguish between genuine and bogus information sources are all aspects of developing a healthy skepticism and the ability to ask the right questions when evaluating claims to knowledge. (Harley, 2001, p. 304)

The assignments that were given throughout the course proved to effectively demonstrate to students the importance of being information literate and of thinking critically in the context of their work and their lives. “They learned to make connections among information literacy, critical thinking, and values” (Harley, 2001, p. 305).

Professors at Oregon State University (OSU) were frustrated by the seemingly unwillingness of students to participate in critical thinking and critical reflection. The lack of critical thinking and reflection identified by OSU librarians and writing instructors was becoming a national refrain for higher education faculty. 2001 marked the year in which Oregon State University began first year experience courses in which librarians and writing faculty taught classes together (Deitering & Jameson, 2008, p. 58).
Each of the 25 sections had two sessions that were taught by OSU librarians in which information literacy research papers were assigned (Deitering & Jameson, 2008, p. 61). The assignments and texts were used to get students to critically think more while writing and researching. In effect, this would later produce students who write more reflectively and using critical thinking for their future college careers. (Deitering & Jameson, 2008, p. 58). Deitering and Jameson state that in order for students to be critical thinkers they must be able to not only evaluate and come to conclusions, but also recognize that there are not always answers. They continue by stating that students’ belief structures often were called on to change, which was not necessarily easy for students. This often occurs when students came upon information that challenged their existing belief structures (Deitering & Jameson, 2008, p. 59). The students were expected to participate within the research process in these classes; however, the realization that the research process does not produce a definitive answer was the challenge where critical thinking truly took shape (Deitering & Jameson, 2008, p. 60). By 2004, the courses had been restructured to have more than two sessions and have more than two assignments incorporated into the curriculum. An information literacy portfolio assignment was added to the class in order to create more assignments that would fit their curriculum. Classes which once differed greatly in content had to become more uniform in content. The OSU program led to the realization that success came when “Students who can create meaning for themselves out of new information must be able to engage in cognitive processes of critical thinking: evaluating sources, drawing conclusions, and finding patterns” (Deitering & Jameson, 2008, p. 64). The information literacy component that was added into the class did improve, even though while there was still a needed to make improvements in the
library/writing program. It was acknowledged that the information literacy portfolio gave a good amount of feedback and a look as to what students were thinking not only about their topics that they were researching, but also about the research process (Deitering & Jameson, 2008, p. 72). “In other words, the successful student researcher has the critical thinking skills to integrate new ideas and new information, and to integrate them into their own belief system, making new meaning out of the old and the new” (Deitering & Jameson, 2008, p. 75).

At Washington State University, 2006-2007 marked participation by 11,000 students, staff, and faculty in library instruction. Information literacy was put at the forefront of one of the six learning goals during a baccalaureate degree program at the university. “As important for discussions of the impact librarians may have on student learning, information literacy instruction joins critical thinking and writing as learning outcomes that must be regularly assessed among [their] students” (C. M. Johnson, Lindsay, & Walter, 2008). The freshman seminar program was used in order to assess critical thinking and information literacy (C. M. Johnson et al., 2008, p. 235). The rubric called the Guide to Rating Integrative and Critical Thinking was used to decide which of the students were “‘emerging’, ‘developing’, or ‘mastering’ critical thinking” during the course. The rubric was a 7 point scale that looked at the students’ abilities to summarize, consider context, communicate, hypothesize, analyze data, and assess conclusions (C. M. Johnson et al., 2008, pp. 239-240). “Both the rubric and the freshman seminar program have evolved since both were first launched, but both have demonstrated how information literacy instruction can become integrated (and assessed) as part of campus-wide instructional initiatives” (C. M. Johnson et al., 2008, p. 241). The program proved
to be successful in that it integrated information literacy and critical thinking into the baccalaureate curriculum.

In 2006, 180 undergraduate students enrolled in one of six sessions of spring semester elective courses called “Library and Internet Research Skills” at a state university in the southeastern USA. The purpose of the study was to look at the research skills of identifying, selecting, and evaluating of print and online resources (Kwon, 2008, p. 118). Kwon was looking “…to explain how critical thinking and library anxiety interact with each other, and ultimately, assist with developing useful directions for information literacy programs” (Kwon, 2008, p. 118). The study was both quantitative and qualitative utilizing the California Critical Thinking Disposition Inventory (CCTDI) and Library Anxiety Scale (LAS). The CCTDI measures critical thinking with “…the following seven dimensions: (a) truth-seeking; (b) open-mindedness; (c) analyticity; (d) systematicity; (e) critical thinking self-confidence; (f) inquisitiveness; and (g) maturity” (Kwon, 2008, p. 119). The LAS’s scale is based on “…(a) barriers with staff; (b) affective barriers; (c) comfort with the library; (d) knowledge of the library; and (e) mechanical barriers” (Kwon, 2008, p. 119). It was determined that library anxiety did negatively affect critical thinking skills and the abilities to search for information. Some students reported that library anxiety affected their experiences within academic libraries, but when establishing an understanding of the academic library, their emotional state and capabilities were reestablished (Kwon, 2008, pp. 123-124). “Information seeking often involves critical thinking in identifying and evaluating relevant resources from a myriad of information sources and databases” (Kwon, 2008, p. 127) This study “…revealed not only a reciprocal relationship between critical thinking and library anxiety throughout but
also the dynamic interactions between cognitive and affective aspects of critical thinking in the information search process” (Kwon, 2008, p. 128). Teaching critical thinking and information literacy is a challenge due to many students’ library anxiety. The improvement of this instruction would not only strengthen students’ use of information, but also reduce the negative emotions that many students have about academic libraries. “In addition, the librarians could create a learning environment that encourages intellectual curiosity and emphasizes the value of learning so that students could build the habit of being persistent when facing intellectual challenges” (Kwon, 2008, p. 129).

Miami University in Ohio has developed a “faculty learning community (FLC)”, in order to have teaching faculty and librarians work together to look at issues faced in the classroom. For six years the focus has been looking more closely at information literacy and bringing it into the curriculum. The FLC is looking to research experiences in the courses the institution offers (Resnis, Gibson, Hartsell-Gundy, & Misco, 2010, p. 288). “In the 2008/2009 academic year the participants wanted to determine how students perceived their own searching skills, how they looked for information, and where they searched” (Resnis et al., 2010, p. 288). A survey was created for the 300 students to take that was both voluntary and anonymous. They received a 95% response rate. The results explained that the students preferred online resources like Google or the EbscoHOST research databases (Resnis et al., 2010, pp. 288-289). The faculty were surprised about the concept of the research process described by students in the survey. “…[M]ost students did not see research as a process and instead listed resources they used when asked to describe their search strategy” (Resnis et al., 2010, p. 290). Students remarked about being technology-savvy, yet the fact was that many of the students were not aware
of what resources were at their disposal. In effect, this affected their research strategy and research skills. The students were able to recognize the importance of course-related research assignments as well as the direct relationship to future work at their occupations. 55% agreed and 40% strongly agreed that the researching skills would aid them in their future endeavors in higher education. Information literacy was recognized as lifelong learning to these students (Resnis et al., 2010, pp. 290-291). After the surveys were completed, professors tried to make practical use of the information that they had discovered. A philosophy professor incorporated both information literacy sessions as well as critical thinking components into class. Despite the attempt to strengthen the students’ work, the incorporation of library instruction in the philosophy course had “limited success” (Resnis et al., 2010, pp. 292-293). Another example at Miami University is of a theatre professor who tried to incorporate library instruction into a graduate theatre research course; which, after the survey was completed, led the professor to realize that those students did not truly understand the research process (Resnis et al., 2010, p. 293). The FLC program has strengthened the courses at Miami University. “Both faculty and librarians are concerned that students understand how to find and evaluate information properly and that they can transfer these skills to all aspects of their lives” (Resnis et al., 2010, p. 296).

**Librarians Teaching Critical Thinking**

In 1992, Sonia Bodi questioned if information literacy and critical thinking differed. Furthermore, if they were not the same did this mean that critical thinking was a cognitive process, while information literacy was simply data and a technical way of looking through resources to find research materials? While the information technology
skills of the new “Information Age” students were recognized as more technologically proficient, it became apparent that instruction or guidance was needed within the world of libraries. (Bodi, 1992, p. 69). “The combination of a new generation of computer-literate undergraduates and the vast amount of information available by way of computers and electronic resources has increased the necessity for evaluating the sources has increased the necessity for critical thinking skills” (Whitmire, 1998, p. 267). Even in the early 1990s when bibliographic instruction was seen more in libraries than information literacy, critical thinking was still being made relevant. Sonia Bodi, one of the frontrunners of bibliographic instruction, intended to include the teaching of critical thinking skills in her bibliographic instruction lessons. However, while the instruction encouraged critical thinking, there were still predominant traditional bibliographic instruction sessions (Atton, 1994, p. 310). “While students have the opportunity to discuss the information presented to them, learning still centers on the teacher” (Atton, 1994, p. 310). For many librarians before and after Bodi, critical thinking was one of the main aims that the librarians tried to accomplish (Whitmire, 1998, p. 267). The goal of these instruction sessions was to go beyond the typical research topic choosing or research article finding. Instead, the sessions that were led, asked students to think of multiple viewpoints, biases, and perspectives; this in turn was creating a forum for critical thinking. A point worth noting is that while librarians are considered experts in bibliographic instruction or information literacy today, subject experts are considered those of the subject specific professors. Many times it is the librarian who goes along with that assumption. Collaboration from content specific professors and librarians, assures that a stronger library instruction session will occur (Bodi, 1992, pp. 70-72).
“Given that education at all levels is now striving to develop the independent learner though student-centered styles of learning, it can be argued that critical thinking should precede a knowledge of information sources and retrieval techniques” (Atton, 1994, p. 310). It seems that the challenges of teaching how to use technology, researching skills, and critical thinking could have proven to be too much. “Empirical research on academic library experiences and the development of critical thinking have provided mixed results” (Whitmire, 1998, p. 267). Bodi concludes saying that “Librarians can and do play an important role in the development of students’ critical thinking abilities” (Bodi, 1992, p. 75). Students need to be able to work with both librarians and faculty in order to work to become information literate and critical thinkers. If this combination would occur, a true collaboration, then it would mesh the goals of education, library, and student centered learning.

It is clear that once the Internet came into existence that the researching efforts had changed. No longer would a student be limited by time constraints from using thinking skills to evaluate the information due to the ease and large amount of information that was at the student’s fingertips. This proved to be quite frustrating to professors. “No discussion about information literacy would be complete without addressing the rise in popularity of the Internet; the ubiquitous information tool that while seemingly easy to use in actuality requires a high degree of critical thinking and evaluative skills” (McAskill, 2008, p. 2). Both professors and librarians have had to highly recommend library research and more in-depth critical thinking in order to move students move beyond copying-often unread or unevaluated information-doing the basic Google searching (Mahaffy, 2006, p. 324). “Recognizing that creating analytical users is
a primary goal of higher education in general, and academic libraries specifically, librarians have striven to define the information literate individual, or one who interacts critically and effectively with the information society” (Mahaffy, 2006, p. 324).

Some librarians feel that critical thinking is quite important during the research process. Academics do ask if librarians are capable of teaching critical thinking skills. The advent of the computer escalated the need for critical thinking in online researching (Cody, 2006, p. 403). “ACRL [Association of College and Research Libraries] dances around the issue of defining critical thinking; however, it recognizes its importance” (Cody, 2006, p. 404). It should be noted that critical thinking is valued; yet is difficult to teach critical thinking in an hour-long session. The ideas in the past have been to move students in the direction of becoming information literate and thinking critically, but the question remains if both of these can truly be taught by librarians (Cody, 2006, p. 404).

As online resources increased their presence in libraries, academic librarians had to defend their integral position in the learning process and research activity of universities and colleges. If everyone was able to simply get online materials for free, then what was the necessity of staffing the libraries with faculty librarians? In fact, until the mid 2000s, information technology or information literacy librarians did not have much support for their place as information literacy professionals (McAskill, 2008, p. 2). Mardi Mahaffy, a professor from New Mexico State University, stated when discussing the national information literacy standards in higher education that an information literate student will “…be able to apply critical thinking to revise his strategy as he goes along. In short, the information user who has mastered this standard has not only the skills to locate information, but the appreciation for research as a process in and of itself” (Mahaffy,
The information literacy standard that looks at “censorship, copyright, and equitable access” of information in fact should get more attention than is paid. Critical thinking in fact is playing a role in this type of evaluation and understanding (Mahaffy, 2006, p. 326).

The problem that many librarians recognize is that there is not a universally excepted definition of critical thinking. This can be very discouraging to librarians who are expected to teach critical thinking skills, yet they may be unsure of what that completely means. It should not be discounted that in library instruction incorporating critical thinking is the goal, but may not be met. Teaching how to use a database or a catalog does not provide a way for librarians to truly evaluate if the critical thinking skill is being accomplished (Cody, 2006, p. 405). The goal of some librarians and professors has been to incorporate critical thinking into writing and speech assignment in order to enhance information literacy skills during courses. In this way a curriculum would be established in which both professors and librarians could work on the common goal of both getting students to critically think and demonstrating skills of information literacy (Alfino, Pajer, Pierce, & Jenks, 2008, p. 82). “Developing information literacy skills helps the students see where their own ideas fit into the world of larger ideas and the arguments that relate to them” (Alfino et al., 2008, p. 86). There is an obvious change in the way in which librarians have been instructing students in universities and colleges.

For several decades, library instruction, or bibliographic instruction as it was once known, has followed a standard way to teach library research skills to students. In most cases, librarians would show students subject encyclopedias or other general works that enable students to get the background necessary to evaluate and understand the journal articles and books, which are then identified in the library research. (Alfino et al., 2008, p. 88)
The reality that librarians have to move beyond that once bibliographic instruction, to information literacy with the addition of teaching critical thinking skills is a large move. These critical thinking skills are being taught, but are now geared to learning how to apply information literacy skills towards virtual resources on the Internet. Wikipedia, for example, has been a resource that has caused great debate in libraries and across college and university campuses. Showing the strengths and weaknesses within resources such as this one is an example how complex the Internet has made librarians jobs (Alfino et al., 2008, p. 88).

The 21st Century and The Information Age

Today, there seems to be a movement away from using traditional print resources to teach information literacy and critical thinking. The movement is towards teaching information literacy and critical thinking within a virtual environment in which online resources preferred by academics are accessible 24/7. In some cases a collaboration of librarians and professors of specific disciplines has become a reality. However, this team teaching does not necessarily occur in a physical classroom; instead information literacy and critical thinking are often taught in addition to content in an online course (Buchanan, Luck, & Jones, 2002, pp. 144-145). “Integrating information literacy (IL) into online courses will help students become more aware of the issues surrounding information and its use” (Buchanan et al., 2002, p. 145). It is clear that “Generation Y,” those born 1980-1994, may be processing and cognitively evaluating information differently. These students are not critically evaluating information the same way as previous generations due to the increase in advancing technologies. “…[It] may also be that academe, and indeed the entire world is currently in the middle of a massive and
wide-ranging shift in the way knowledge is disseminated and learned” (Weiler, 2004, p. 46). Students in the 21st century no longer have to enter a library, or even use a library’s homepage to get information. When they do enter the library’s homepage, it can simply be to access full-text article databases or even electronic books. Furthermore, accessibility is available anywhere in the world, leaving a student free to search at his or her own convenience. Live virtual chat has even been set up for assistance from the librarians (Buchanan et al., 2002, p. 146) “Information and technology affects every person in every possible setting—education, public service, and business. Education is fundamentally information-based. That is every aspect of learning and teaching requires the gathering, processing, and communication of information” (Eisenberg, 2008, p. 39). The virtual courses that incorporate information literacy into their curricula may be at a disadvantage by not being as familiar with library resources. In effect, librarians must work that much harder to make the lessons and instruction more tangible (Buchanan et al., 2002, p. 148). “The purpose of any library or information organization is to meet the information needs of its users, IL [information literacy], by insuring that users are effective in seeking and using information, is an important part of fulfilling this purpose” (Eisenberg, 2008, p. 40). Librarians and professors in the 21st century are still aware that critical thinking and information needs are still crucial in colleges and universities. The evaluation of information resources is still closely associated with critical thinking and even for the technological savvy information seekers that Generation Y are, it can still be a challenge (Weiler, 2004, p. 47). While it is somewhat expected that Generation Y will reach out to use the Internet first for information resources; this includes information that includes the “personal, academic, or professional” type (Weiler, 2004, p. 50) “IL
[information literacy] skills are the necessary tools that help us successfully navigate the present and future landscape of information” (Eisenberg, 2008, p. 40). It should be noted that Generation Y wants more than just information literacy skills. The instruction has to be geared to all aspects of their lives (Eisenberg, 2008, p. 44). The question goes back to what are librarians able to do within this new academic environment. Today, it is even more important for educators to be knowledgeable about what librarians can do for student learning. It is crucial that they go beyond simply finding and evaluating information and also discuss proper use (Buchanan et al., 2002, p. 162).

Today, librarians are finding new roles within the academic library as its resources become electronic and its physical space is transformed into classrooms, student workspace, computer labs, as well as communal areas that may include coffee shops and student services. There is a movement away from the one-shot experience and embedding librarians in courses (Ulmer & Fawley, 2009, pp. 415-416). “The success of this faculty-librarian collaboration reveals that the foundation of an effective approach to embedding library instruction requires a mutual understanding of the relationship between instructional goals and information literacy” (Ulmer & Fawley, 2009, pp. 415-416). It is clear that students’ researching abilities are competent and they have more knowledge of computers, they are still not necessarily information literate. Librarians still need to create assignments that work to stimulate critical thinking abilities in order to be most effective (Daugherty & Russo, 2010, p. 26). There are many librarians who believe that professors fail to truly comprehend how to cultivate an information literate student (Ulmer & Fawley, 2009, p. 417). “Recent evidence suggests that not only faculty but also
students perceive librarians as service workers rather than trained experts who work within an established discipline” (Ulmer & Fawley, 2009, p. 417).

Information literacy is valued by the Association of College and Research Libraries (ACRL), beginning in the K-12 school setting and continuing throughout higher education degree programs.

Critical thinking comes into play when getting students on the path to looking at information and using it judiciously in light of their topic. Library information instruction sessions have been following a trend which seeks to blend these two together, getting students to look at websites, articles, media items, and other online content with a critical eye toward evaluating these sources for credibility. (Davis, 2010, p. 3)

Today, students are expected to move beyond simply finding and using resources. They instead they are expected to utilize critical thinking, use reasoning, and determine when information should be used (Davis, 2010, p. 3). If in fact librarians want to be effective, then they must correlate their assignments with the standards proposed by ACRL in information literacy, which engages students in the college classroom. Librarians continue their struggle on being incorporated and embedded into university courses (Ulmer & Fawley, 2009, p. 418). Information literacy that is part of the curriculum and part of course rubrics will strengthen critical thinking. “However, critical thinking is rooted in developing a thought process that occurs around a variety of life skills related to interacting and engaging with information. Information literacy has a marked departure from critical thinking” (Davis, 2010, p. 5). Without information literacy, students would be overwhelmed with information resources. On that same note, without critical thinking, large amounts of information would never be filtered or synthesized within a student’s mind.
Chapter Four

Methods and Analysis

While bibliographic instruction provided students with ways of finding resources and using academic libraries’ information resources, information literacy stepped beyond simple instructional goal to affect all of a college student’s education. It is evident that the role of librarians who were often untrained or nondegree staff and now have to obtain a masters degree from an American Library Association (ALA) accredited degree program, evolved with the development of academic libraries and continues to evolve today. “Since the 1980s, increased economic pressures on university administrators has caused some to question the role and function of the traditional library” (Weiner, 2005, p. 10). Obviously since the 1980s, major changes have occurred in the collections of academic libraries. The advent of the Internet in the 1990s has revolutionized the speed in which materials are acquired and the format in which information can be found. What were once books and print materials, have now gone digital. Computers that once slowly entered libraries have now taken front seat in not only in colleges and universities classrooms, but also in their libraries. Librarians as the information experts must be on the forefront of change.

The evolution of the role of academic librarians is clearly represented by the work of their professional organizations in defining and describing the work of academic librarians. “Information literacy...is an intellectual framework for understanding, finding, evaluating, and using information...through critical discernment and reasoning” (Association of College and Research Libraries, 2000, p. 3). Librarians strive to teach students researching techniques so that they can find, retrieve, and use information in a
critical and ethical manner. Over the last century, librarians have taken on the mission of developing skills of working with print, microform, online resources, and any other form of information. Moving beyond simply finding resources to having students critically evaluate the resources that are found is an important goal. The issue was that finding the resource prior to the Internet could be difficult and time consuming, which led to students rarely going beyond the actual finding of materials. The search process was made easier because of the Internet and therefore librarians are able to move beyond teaching basic searching skills to teaching critical thinking.

The identifying, locating, and evaluating information by an information literate student also displays a sense of critical thinking. The expectation that critical thinking is part of information literacy is a reality in higher education. This incorporation of information literacy into the collegiate curriculum is now even seen in online classes, proving that it is not only important in the eyes of librarians, but also professors. The Association of College and Research Libraries (ACRL) recognizes that students have the abilities for reasoning and critical thinking and these skills need to be fostered further by higher educational institutions (Association of College and Research Libraries, 2000, p. 4). Information literacy is the frontrunner of working towards accomplishing this goal. The critical question for this work is how do academic libraries design, implement, and evaluate information literacy instruction which accomplishes the goal of producing graduates who can think critically about information and who have the information literacy skills needed for lifelong learning. The goal of this work is to develop a model from which a method for examining and answering this question based on Kuhn’s developmental model of critical thinking can be formed.
Librarians and professors have maintained that creating opportunities for students inside the classroom is critical for student growth both academically and cognitively. Kuhn, professor of psychology and education at Columbia University, developed a developmental model of critical thinking. Kuhn said it would be hard pressed to find an educator who does not want his or her students to think both critically and rigorously in the classroom (Kuhn, 1999, p. 16). Critical thinking is not easily defined, but this is most likely because it is not easily measured (Kuhn, 1999, p. 16). When one looks at information literacy’s past and present, one discovers that it too is not easily measured. In some respects pertaining to both the literature on information literacy previously mentioned, there is some assessment, but as a whole, people still question the final product of one-shot information literacy sessions, embedded courses, or even credit bearing classes. What is clear is that there is merit today, even more so than in the past, to uphold the goal of information literacy. Activities such as, finding research materials, learning how to look for information, and critically evaluating the resources that are found, establish that there are cognitive processes that go into becoming information literate. Both professors and librarians work to motivate students to work using the traditional content areas and “…embrace thinking skills as educational goals in a serious and committed way, [they] must aid them to envision these skills in a way that would make them concrete realities rather than vague abstractions” (Kuhn, 1999, p. 17). The need that students typically have in an information literacy course might seem immediate, utilizing their first order cognitive skills. In effect, their focus is about the world or topics that they know. However, Kuhn points out that critical thinking must be applicable
beyond the immediately known world. It is at this point that the use of higher level meta-knowing skills becomes imperative (Kuhn, 1999, p. 17).

Kuhn’s theory of critical thinking development provides a model for addressing the question of how do academic libraries design, implement, and evaluate information literacy instruction which accomplishes the goal of producing graduates who can critically thinking about information and who have the information literacy skills needed for lifelong learning. Successful information literacy instruction leads to critical thinking about information itself. Furthermore, the student is able to “…think about thinking as a human activity that they and others engage in” (Kuhn, 1999, p. 19).

In Kuhn’s view critical thinking develops through three stages of meta-knowing or thinking about thinking; metacognition, metastrategy, and epistemology. Metacognition moving from the first order level of thinking is remembering and identifying the knowledge that one has, and being able to articulate that knowledge to others or what Kuhn calls declarative knowledge. Metacognitive knowing works with declarative knowledge “what do I know” and moves to how do I effectively communicate that knowledge to others? Children begin reaching metacognitive meta-knowing around age 3-5 (Kuhn, 1999, pp. 18-19). This is a “…critical marker in the development of meta-knowing and lays an essential foundation for critical thinking” (Kuhn, 1999, p. 19). It is also a fundamental part of the educational process, expanding declarative or objective knowledge. Students who have progressed through metacognitive meta-knowing are able to self reflect on what they have learned. Therefore, the student would be capable of reasoning on the topic that they have chosen to study.
The next step in meta-knowing is the second order thinking skill of metastrategic thinking. This level of thinking is focused on selecting and monitoring different information strategies or thinking processes. Students or learners at this stage can plan ways of gathering new knowledge about something they know nothing about and picking ways that have worked best for them in the past. The monitoring aspect of metastrategic meta-knowing, and includes monitoring of knowledge and information processing procedure. The skill allows one to look for contradiction between bits of knowledge and also evaluate information for relevancy to the problem or issue being thought about.

Metacognitive skills and metastrategic skills are not always seen as completely mastered in adulthood. In effect, second-order cognition “…knowing what one knows and how one knows it and effectively managing and deploying one’s cognitive resources—are the foundation of the critical thinking skills that we hope to impart to students….” (Kuhn, 1999, p. 21). Metastrategic knowing differs in that there is a reflection on the “external world.” Here one finds that the students are driven by beliefs or past experiences about which strategy is utilized in order to interpret information or topics (Kuhn, 1999, p. 21). Therefore a student at this metastrategic stage of critical thinking would be able to reflect not only on the topics that he or she is studying, but also internal consistencies within those topics and upon their relevance to the external world.

In Kuhn’s theory, the highest level of meta-knowing is epistemological meta-knowing deals with an understanding of one’s own position, or the framework she brings to her thinking. Kuhn following the work of others investigating cognitive development, describes epistemological meta-knowing as understanding one’s shifting relational position to knowledge. One understands his realist, absolutist, multiplist, and evaluative
stances to knowledge. The realist stance looks directly at assertions being copies of reality; assertions are accepted as facts, which are directly known, and critical thinking is not needed. The absolutist looks at assertions as possible facts, reality is directly known, knowledge is certain, and critical thinking is present to see fact or falsehood. The multiplist stance looks at assertions as opinions, views reality as not directly knowable, and views critical thinking as irrelevant because knowledge is not certain. Finally, the evaluative stance views assertions as judgments; reality is not directly knowable, and knowledge is uncertain. But one can evaluate, critically examine knowledge, and make decisions, even in a group deciding what information is preferred. The epistemological understanding is crucial in order to be successful in critical thinking. If a person is an absolutist, then there is an absence of critical thinking until the person develops through a later epistemological state (Kuhn, 1999, pp. 22-23). Finally at this epistemological level of critical thinking, one understands that different types of knowledge and information require different stances.

Teaching critical thinking is quite complex, due in part that it is not easily measured, and because there is not a universally accepted definition of it. One thing that many educational psychologists agree with is the fact that it is thought to be more easily taught within a content course or subject course (Kuhn, 1999, pp. 16-17). Critical thinking is a skill that is more easily applied when there is a tangible subject area.

When looking at information literacy, a student is learning how to critically think about a topic. This is more tangible than teaching a student how to critically think about how to research a topic. While information literacy has been taught mainly in one-stop-shop sessions, it should be noted that IL credit bearing courses continue to exist within
higher educational institutions. In Kuhn’s view the cognitive competences that deal with critical thinking are in fact metacognitive. In effect they go beyond first order thinking, understanding the world, and move into second order thing which deals with effectively communicating your knowledge, meta-knowing skills that contributes to “knowing about one’s own (and others’) knowing” (Kuhn, 1999, p. 17). Along with metacognition, there is a push for inquiry and a motion to have individuals to be reflective thinkers. However, this complexity is further broken down into levels of meta-knowing. Metacognitive (declarative knowledge), metastrategic (strategic monitoring of knowledge), and epistemological (knowing about knowing) are the three categories that further makeup critical thinking. Meta-knowing can in fact be considered first order thinking if it is unreflective and only procedural (Kuhn, 1999, p. 18). For students who are at the first order level of meta-knowing, thoughts are brought on by beliefs while the beliefs are not necessarily explored. Therefore, a student would research a topic based on their belief systems but not analyze it beyond its initial meaning (Kuhn, 1999, p. 21). These three parts of meta-knowing must be integrated and move to second order thinking where there is reflection and thinking about the processes of knowledge discovery and communication to support critical thinking. This second order meta knowing would enable the strengthening of an individual’s critical thinking skills and these skills can be cultivated within a classroom.

“Each of the three kinds of meta-knowing that have been examined here—the metacognitive, metastrategic, and epistemological—is central to critical thinking” (Kuhn, 1999, p. 23). For students, metacognitive meta-knowing proves to be central in the way that students reflect upon both what is known and the knowledge that they are analyzing.
In information literacy this would be reflecting on the topic that they are working with both as what they perceive and what they know and do not know about the topic and what knowledge they need to communicate about the topic or question. There is a sense of justification of what they are knowing as well as a “conscious coordination” of their theories (Kuhn, 1999, p. 23). Metastrategic meta-knowing plays the role of developing the students’ use of consistent standards of evaluation. In effect, the students would learn to evaluate the information that they are learning consistently with the same standards (Kuhn, 1999, p. 23). Regarding information literacy, this would mean that a student is consciously evaluating his or her information resources in a methodical way and understands that procedures used are related to specific discipline areas and topics. Students who consistently use information literacy standards to further critically evaluate and understand their resources should be more successful in achieving the goal of increased understanding and in accomplishing stronger work. Epistemological meta-knowing continues to be proven to be crucial in critical thinking. The students must go beyond trying to understand the face value of the information that they are using and progress to the point of understanding why they are using it (Kuhn, 1999, p. 23) and how their knowledge fits with others knowledge of the topic. It is the melding of these three aspects of meta-knowing that together create a stronger critical thinking student. For information literate students, melding of the three aspects of meta-knowing provides the means by which they will not only better understand information resources, but also their own self reflections that will work to bring critical thinking into their projects, papers, or assignments.
One problem that librarians face in information literacy classes is that students often want to look for the quickest way to get their assignments done, that is finding resources; rather than learn how to evaluate the resources that they are finding. Often students do not even take the time to really think about and understand what the assignment is, or what they need to do to accomplish the task at hand successfully. This type of first order cognition assessing what is needed to know about the topic or the assignment is often demonstrated by student questions such as, what do I need to do, what do you (the instructor) want? how many words/pages do I need to write, how many citations do I need? Second order, critical thinking meta-knowing, which requires reflection, understanding, and evaluating knowledge, is sometimes skipped by the students. They are sometimes focused on trying to just complete a sometimes marginally understood task by collecting any possibly related information materials to use for their projects, papers, and assignments. Not thinking through the problems carefully, often does not accomplish successful completion of the assignment or learning. In effect, the student is collecting pieces or chunks of information with the hope of copying information correctly so that they can turn these pieces into something to turn in as a completed assignment with little if any thought of how these copied pieces of information are related to the topic, to each other, or a position or argument the student wants to support and communicate to another. Students are particularly reluctant to discard chunks of information they have collected even if the pieces or chunks are only tangentially related to the topic or even when the pieces contradict each other. Cognitive competencies and metacognitive skills are lacking. Some discipline professors who see librarians as only service providers compound this first order meta-knowing in students;
librarians are seen as simply teaching students how to use a library online catalog, how to search research databases for online articles, and finally how to search for credible web resources. In information literacy instruction focused on developing critical thinking, librarians are teaching how to use resources; they also are attempting to teach a critical thinking viewpoint. The goal is to have students move beyond first-order thinking and progress into higher-order thinking.

Previously discussed was the Norris and Ennis’s definition of critical thinking that “Critical thinking is reasonable and reflective thinking that is focused upon deciding what to believe or do” (Norris & Ennis, 1989, p. 1). Apart from Norris and Ennis, Kuhn states that “The evaluation of thinking by appeal to criteria implicates metacognition: Thinking necessarily becomes an object of cognition (just as it does in Ennis’ definition, in which one is reflecting on what one should believe)” (Kuhn, 1999, p. 18). What is actually occurring with information literacy is more complex than simply pulling up resources. Looking back to the Association of College and Research libraries 2000 definition, one finds that “Information literacy…is an intellectual framework for understanding, finding, evaluating, and using information…through critical discernment and reasoning” (Association of College and Research Libraries, 2000, p. 3). This intellectual framework is aligned with Deanna Kuhn’s developmental framework of critical thinking.

As state previously, meta-knowing is broken down by Kuhn into three distinct categories of knowing: metacognitive, metastrategic, and epistemological (Kuhn, 1999, p. 18). “Procedural or strategic knowing entails the exercise of strategies to achieve goals, thus invoking the potential for a second order metastrategic form of knowing that selects
and monitors the strategies that are applied—one becomes the manager of the repertory of available strategies” (Kuhn, 1999, p. 18). If one looks at meta-knowing at the metastrategic level, one could relate this to the actual second order skills that are procedural for example, researching a topic. Thinking about one’s immediate world and how it relates to a topic is quite relevant. Students are often faced in information literacy courses, with doing research on topics that they have some knowledge about. However, the students often do not know the processes or strategies needed to move beyond the common knowledge or opinions that they have. Furthermore, students often jump to strategies for completing an assignment before they take the time to understand exactly what the assignment is so that they can clearly interpret the assignment correctly. Second order metacognition, thinking about a problem or assignment, thinking about what they understand as the main point of the assignment and what they know about that subject or topic is the first step to critical thinking. This leads students to try to work to strategize, categorize, and gain more knowledge that they can begin to evaluate. Kuhn points out that if mental representations are understood as reflecting only the external world more than the mental activity of the representor, this mental activity does not assume great significance in its own right and is unlikely to be the object of the person’s attention (Kuhn, 1999, p. 20) Following Kuhn’s point, as long as one’s thinking is assumed to reflect the external world, for example what a professor wants, then one’s thinking does not assume any great significance for the person nor does it command much attention (Kuhn, 1999, p. 20). At the college level, the goal is for students to develop and present their own thinking so that the cognitive skills become significant for students and command their attention. Looking at the college-aged students, mastery of this skill is not
guaranteed. Students need to be able to reach the point in which they can find information and have a basic developed understanding of meta-knowing. “Metastrategic skill is also essential to critical thinking, Those who have developed strong metastrategic skills apply consistent standards of evaluation across time and situations” (Kuhn, 1999, p. 23).

Metacognitive knowing at the first order level of thinking begins to show up in children between 3-5 years old. Again, this is when “knowing operates on one’s base of declarative knowledge, which also stands to benefit from executive management” (Kuhn, 1999, p. 18). If college students’ previous educational experiences led them to have reached this developmental state appropriately, they should be capable of utilizing their “mental-state concepts”, meaning that they should be able to hold their mental beliefs (Kuhn, 1999, p. 19). This is crucial for the information literate individuals who are bound to hold their ideas firmly and base their evaluation of the materials on those metacognitive assertions.

The question becomes, how can librarians get students to care about the topics that they are researching? Kuhn says that “More problematic, it turns out is maintenance of firm differentiation between evidence bearing on an assertion and the assertion itself” (Kuhn, 1999, p. 19). When one considers the college student this becomes relevant. If a student’s assertion on a topic is the focus of his or her research, and the evidence that is found in research articles does not support and focus on the assertions, will this prevent the information literate student from being successful? In effect, will their information literacy skills be unsupported because of the fact that the evidence strays from their assumptions? Metacognition according to Kuhn’s developmental model happens at such a young age in life and continues to develop throughout one’s educational experiences.
Therefore, ideally, college and university students should be capable of using this skill even when dealing with new areas of knowledge. However, it should be noted that this is a goal rather than a reality since students are not epistemologically all at the same levels.

“Research involving older children, adolescents, and adults suggests that metaknowing competencies that developmental psychologists study—remain incompletely developed” (Kuhn, 1999, p. 21). When thinking of a research paper, a student has ideas about what the topic that the paper they are researching is about. Yet, the evidence that they are writing about does not support or conversely opens their mind to a completely different approach on the topic. “Like young children in the theory-of-mind research described earlier, older participants in our studies are likely to deny that they ever held a belief different from the one they are now professing” (Kuhn, 1999, p. 21). Librarians often encounter students in college or university classes who first approach the topic by trying to find research based on their predetermined beliefs. The information that the college students then find contradicts what they initially thought about their topic and then they claim that their new opinion was what they had originally been expressing. This demonstrates the actual loss of their initial beliefs, or at least it displays the “theory-of-mind” research that was spoken of by Kuhn. Some students differ in that they do not have clear predetermined beliefs on their topics and therefore they have a hard time critically evaluating their information resources. The first step to critical thinking for these students would be to understand the topic that they have so that they can evaluate the information. This would allow the students to find the answer for which they have predetermined beliefs, leading to the approach to be taken with the research topic. From that process
would come the understanding that one can actually evaluate and make a case that one theory or approach to the research topic would be able to be supported.

Epistemological meta-knowing, in Kuhn’s developmental framework of critical thinking, in some ways mirrors work done by Perry’s on the ethical and intellectual development of college students, which was also developmental in nature. While the metastrategic and metacognitive theory-of-mind research focused on children, Perry’s work was primarily studied in adolescents and young adults. While one might question how this relates to information literate individuals, it looks at the aspects of critical thinking, a goal of information literacy. “With understanding of assertions as belief states, assertions are recognized as emanating from—and therefore connected to—human activity of knowing” (Kuhn, 1999, p. 22).

Understanding Kuhn’s work on epistemological meta-knowing provides a working model for information literacy instruction. As students learn the skills to become information literate and develop into stronger critical thinkers, a progression of students’ meta-knowing through epistemological stances occurs. This remains one of the challenges that librarians face when teaching college students. Students have varying levels of information literacy skills and critical thinking skills. However, the librarian must work to help all students reach a new understanding of their skills in order to further the development of their skills.

There are four levels of epistemological understanding: realist, absolutist, multiplist, and evaluative. Kuhn incorporates Perry’s epistemological stages into her developmental framework of critical thinking because each of these stages relate to meta-knowing. Realists believe that assertions are copies of “external reality”, reality is
“directly knowable”, knowledge is certain, and critical thinking is not applicable. Absolutists, which are prevalent in adolescents and adulthood see assertions as facts, reality is “directly knowable”, knowledge is from an outside source, and critical thinking is used (Kuhn, 1999, pp. 22-23). One might look at many incoming college freshman as most likely being realists or absolutists. This is not to say that they do not enter classrooms with ideas, direction, and the ability to critically think. “Most salient in the present context is the fact that the absolutist stance allows the acquisition of elementary critical thinking skills that serve as a foundation for more advanced forms of critical thinking that may develop later” (Kuhn, 1999, p. 22). It is important to note that critical thinking can be hindered when information is not found and assertions are not clearly answered (Kuhn, 1999, p. 22). This would pose a problem for students who do not find the information that they are looking for in an information literacy session. However for many freshmen today, it is not finding information that is the problem, but rather the evaluation of the information that they do find. Instead, of evaluating the resources that they find, they report back summaries of the information rather than a well thought out critically evaluated analysis of their resources. Potentially, their critical thinking skills could be baffled. How many students are actually aware of their epistemological meta-knowing state, or rather how many librarians or professors discuss these ideas and make students aware what a stance towards information might be? If one considers a typical college aged individual, the reality will most likely be that they are either unaware of their epistemological stance or how they can and do change this stance depending on the situation. Students regularly adopt a multiplist or evaluative stance in areas of their lives that they have interest in such as relationships, music styles, or other areas like their
“majors” that they are studying. The problem is getting students to adopt a similar
cognitive stance to areas where they do not have much foundational knowledge and do
not have the interest to build that foundation.

Kuhn suggests that critical thinking in the academic environment develops across
student interests. “A critical event leading to the first step down the slope toward
multiplism is likely to be exposure to the fact that experts disagree on important issues”
(Kuhn, 1999, p. 22). Often students in information literacy classes are working on
researching a topic that is controversial or that can be thought of through many
perspectives. Leaving the absolutist stage, the student who is a multiplist will think of the
arguments and assertions as opinions. Knowledge becomes uncertain; and in the case of
the information literate student, critical thinking becomes irrelevant. Opinions are seen as
equal to each other, and with support this would permit the multiplist student to form an
argument in which her paper is based on her own opinions. Multiplists are often found in
library instruction and other college classes. It is the job of the instructor to model
evaluative approaches for students and support their critical thinking development. A
student might say “well that is that researcher’s opinion” or “it is all relevant, but that
information supports my ideas.” Such a statement leaves the librarian and professor in a
difficult position. Although the instructors respect the basic equality of all people, if a
student cannot separate personal beliefs from who they are as a person, then any
evaluation and criticism of their views is interpreted or dismissed as a personal criticism.
If the students take the stance that in fact all information is only an opinion and all
opinions are equal, then where does the critical, evaluative, thinking begin? Many people
do not develop past the multiplist epistemological meta-knowing level. For librarians
teaching information literacy, the ability to work with a student in any of these stages is crucial. It is important for librarians to be able to adapt their instruction in order to support the information needs of each student individually depending on the student’s developmental level of critical thinking. Students in an information literacy session are going to come across a plethora of information resources. While it is the teaching of critical thinking and information literacy skills that will guide the students to finding useful information resources, there is the reality that students have to decipher which resources best suit their needs. However, just as students differ in learning, so too do they differ in information literacy and critical thinking skills. For those students who have reached the evaluative epistemological level, opinions are not seen as being equal. It is at the evaluativist level of meta-knowing in which “…knowing is understood as a process that entails judgment, evaluation, and argument” (Kuhn, 1999, p. 22). While the absolutist and multiplist separate knowing by what is knowable and objective versus a subjective perspective, an evaluativist is able to meld the two (Kuhn, 1999, pp. 22-23). This evaluative type of student would be the ideal or a model college student, which we are all striving to develop. Librarians strive to get students not only to be capable of finding resources, but also to be able to reach the point in which they are able to critically think and evaluate the resources. With an evaluativist student the information literacy goals of an “…intellectual framework for understanding, finding, evaluating, and using information…through critical discernment and reasoning” (Association of College and Research Libraries, 2000), will be more successful.

Critical thinking is related to these three forms of meta-knowing: metacognitive, metastrategic, and epistemological. Kuhn states that being in control of one’s own
thinking maintains taking charge over one’s life. Kuhn’s statement that “People must see the point of thinking if they are to engage in it” (Kuhn, 1999, p. 23) applies to any research conducted using library resources. Professors bring their students to the library for information literacy sessions in order to learn how to find resources and develop the research skills needed for their assignments, papers, and projects. While it would seem obvious to the professor and the librarian that students should “see the point” of the visit, oftentimes the students do not “see the point.” Information literacy has become a skill which higher educational institutions have made it part of their curriculum. The 20th century has brought librarians into managing the role of teaching this skill set so that students are more prepared for the rest of their college classes. Conversely, librarians are asked to teach information literacy courses to students who do not yet know why they are coming to the library. When students have not been given a classroom assignment prior the visit, or the assignment is so broad and general that it does not scaffold students to a critical, evaluative, or epistemological level, they feel that the visit is a fieldtrip away from and separated from their college class. In effect, the students feel that they do not have to participate and engage in the information literacy session. Either way, having students participate in information literacy sessions using critical thinking skills can be compromised by the fact that the students are disengaged. The development of students’ critical thinking and information literacy skills is plausible within an information literacy session. If a librarian and a professor set up situations in which information literacy and critical thinking skills are practiced, then they have more of a chance of reaching a successful outcome. “Regular practice of the skills we would like to see develop is essential, we know, but practice does not make perfect in the absence of understanding”
(Kuhn, 1999, p. 24). Educating students to become information literate and critical thinkers takes time that involves practicing towards reaching the goals of being information literate and being a critical thinker.

Librarians are trained to find resources, to impart a wealth of knowledge about information literacy, and to address many other information goals. But are they truly educated to understand students’ metacognitive thought processes? Professors are not trained to teach critical thinking skills either, but are there differences between the teaching skill sets of the librarian and the discipline specific professor? Looking at the literature, it would seem that the response of many would be yes. Librarians are instructing how to use a database, how to use a catalog, or search the Internet, while professors are teaching content that is premised on critical thinking. However, others have argued that critical thinking is a way of processing information that is critical to the work of both librarians and discipline professors. “Critical thinkers must be reflective in that they examine the reasonableness of their own and others’ thought….Critical thinkers must consciously seek and use good reasons” (Norris & Ennis, 1989, p. 4). In effect, students must go beyond simply using a research database or the Internet and tap into what their professor and librarian are encouraging. They must examine and reflect upon the information that they are finding so that they are able to truly demonstrate information literacy and critical thinking skills. In doing so students are learning to become more effective researchers. While the debate began in the 1930s, one cannot truly say that the struggle for librarians to be thought of as teachers/faculty is really over. It is interesting to think though, how so many freshmen are told to go to academic libraries in order to learn how to research. “Thinking critically is an activity which requires sustained
effort and, therefore, certain commitments. One of the most important of these is a commitment to open-mindedness” (Norris & Ennis, 1989, p. 9). When going to an academic library for an information literacy instruction session, the following may occur. If a student is close-minded or is not interested in being an active participant in the class, then as Norris and Ennis point out, their learning and critical thinking will be unsuccessful. Professors, who send their students to librarians, show an admittance of professors’ recognition that the skills learned in the library do in fact promote critical thinking and strengthen the thinking abilities of their students.
Chapter Five

Conclusion

Information literacy requires critical thinking about information. Librarians teach critical thinking and information literacy skills apart from individual disciplines just as composition professors teach writing skills. Librarians learn to impart critical thinking and information literacy as one skill set because of the fact they themselves have been taught to incorporate information literacy and critical thinking. Information literacy courses and seminars are offered in library science graduate programs, which work to educate graduate students for job duties that they may later hold in an academic library. Librarians are constantly looking for new ways of accessing and learning information so as to keep abreast in their careers. As the diversity of ways of providing and accessing information continued, it became apparent that librarians adapted with the changes of the Information Age and adjusted just like any professor of any discipline. Knowing where and how to locate information and the skills to evaluate it made this adjustment more attainable.

Initially, academic libraries were not set up with instruction departments; librarians were there to support the broad mission of their institutions and college and university curricula. As librarians worked to become reference and instruction librarians, there was a large period of adjustment. Until the information literacy standards were established, teaching information literacy was more like bibliographic instruction. However, this is not to say that critical thinking was not made to be part of the mission of some librarians. Librarians, professors, and academic administrators alike identified information literacy and critical thinking as important for lifelong learning. Along with
that fact is the realization that these skills are critical for students who would later enter the workforce.

Kuhn’s (1999) work has identified that critical thinking is a developmental process that occurs during the maturation of a person beginning at an early age and continuing through the lifespan. The fact that the mastery of critical thinking and knowledge about information itself is a lifelong process making the job of information literacy librarians even more challenging. When speaking of college freshman not critically thinking or not being information literate by the end of their first year of college, librarians acknowledge the complexity of the issue. For if Kuhn’s developmental model is correct, then some college students might not master this type of learning and thinking even by their senior year. Librarians and those teaching information literacy, must know about critical thinking and how critical thinking and information develops. These librarians also must know how to assess the level of critical thinking of students in order to make the information literacy instruction a success.

While some colleges and universities have moved away from a onetime information literacy session into having even a semester long course, information literacy alone has so much content to cover. There are different levels of information literacy instruction starting with the basics to more advanced research strategies. Which level the librarians address depends on the foundation that the students have coming in with. Besides working with students, even more interaction between discipline faculty and librarians is needed as well. Subject specialist librarians also work to help professors incorporate information literacy skills into their classes. Students might simply lose attention or not see the importance of thinking critically in all classes. This lack of
interest or desire of information literacy could come from the fact that the students are either too far below or too far ahead of the content that is being taught within the sessions. Students need to understand the importance of critical thinking in lifelong learning and of maintaining flexibility in a rapidly changing world. Librarians can help to bring the discipline faculty to keep current with what types of information students know and use, and work towards developing lessons on finding information resources that will be most suitable for their assignments. Ward (2001) spoke of instruction being more about finding and using information. This technical approach today is still prevalent in universities in the United States.

Critical thinking is more complex than many assume. Higher order thinking takes both reflective thought and the use of cognitive skills. Kuhn (1999) discusses the developmental stages of critical thinking which is particularly relevant to information literacy instruction. Furthermore, there is the movement from looking at one point of view. For an information literate individual, this translates into taking a look at information resources from not only one perspective, but also moving into multiple perspectives and the subsequent evaluation of these perspectives. Norris and Ennis (1989) pointed out that there is a need for critical thinking to serve both practical and academic needs of students. Meta-knowing and critical thinking relate in the developmental stages as one grows cognitively. By adolescence not all youth have developed the skills to effectively critically think. Therefore, it is safe to say that not all college freshmen have developed enough by Kuhn’s stages to be considered strong critical thinkers. Critical thinking does take effort on the students’ parts and realistically it does not matter what a librarian or professor does. If the student does not want to participate then the
information literacy session will be useless. The librarian and professor are both accountable however, for engaging students in the learning process.

The case studies looked at from the 20\textsuperscript{th} and 21\textsuperscript{st} centuries document the significant impact that information literacy instruction by librarians has had on universities across the United States. Library outreach at Eastern Michigan both to students and faculty was found to be helpful even though critical thinking was not on the forefront of its library instruction programs. San Diego State University incorporated critical thinking and information literacy into their freshman classes. Oregon State University later wanted to promote critical thinking by incorporating information literacy into their first year experience program. Students were found to be more academically successful with the development of critical thinking (Deitering & Jameson, 2008, p. 72). Washington State University’s creation of a freshman seminar proved to integrate critical thinking into their information literacy courses that became part of the baccalaureate curriculum (C. M. Johnson et al., 2008, p. 241). Miami University later proved to create a “faculty learning community” to reach out to faculty and librarians alike. Students initially saw research as simply research strategies for locating information resources. Once professors integrated librarian information literacy instruction into their curriculum, they found a complete change in student perspectives. 95% of the students surveyed at Miami University found the instruction to be beneficial for their future academic careers (Resnis et al., 2010, pp. 288-289).

As previously mentioned, Sonia Bodi believed that critical thinking was part of information literacy from its establishment of bibliographic instruction. There is a need for librarians to be capable of teaching critically thinking skills as a fundamental part of
teaching information literacy. Both of these were identified as being important since the incorporation of information literacy instruction in libraries. Professors in colleges and universities often do not always know that librarians are suited to teach critical thinking since past library instruction would have mostly focused on teaching bibliographic instruction not information literacy. The fact is that professors often do not understand that critical thinking is a fundamental component of information literacy as it exists today. The reality is that students need to be able not only to find, but also to evaluate the information resources that they have found, whatever the format of the information. Conversely, it is questionable as to whether or not critical thinking can be truly taught in a single session that could last as little as an hour. The Internet has changed the format of the resources that are found, and the amount of information resources that are easily available to all. It is clear that some students enter college already feeling that their researching abilities would term them information literate. Furthermore, librarians need to focus their instructional goals and curricula to focus on developing students’ abilities to reflect and critically evaluate their resources.

Ever since the advent of the Internet, libraries have changed as well as the roles and responsibilities of librarians. As generations of students pass through college, changes in their information needs and also their expectations have also changed. For librarians to teach critical thinking, according to the developmental model of critical thinking that Kuhn (1999) has proposed, there are obvious progressions in thinking that must be understood. The initial step of moving away from first-order thinking is complex; especially when it is looking to move past understanding one’s own perception of the world around them. While the developmental model discusses a progression from
childhood through adulthood, it is crucial to recognize that critical thinking is something that is mastered in different areas at different times; in childhood, adolescence, and in adulthood, others might never completely master at all.

Meta-knowing, in an information literacy respect, should promote critical thinkers who can evaluate resources through multiple perspectives. In the same respect, assignments that are given to the students by the librarians and professors need to stimulate this type of thought process. While college students are technically adults, one might wonder about how and even if students have been challenged and nurtured in their earlier school experiences to develop their critical thinking skills. Information literacy skills, like reading, writing, and numeracy skills need to be assessed and instruction provided for students at different levels. In some respects, this would make an information literacy session that much more important and difficult at the same time.

When thinking of epistemological meta-knowing: realists, absolutist, multiplist, and evaluativist, there is no guarantee which of these that college students will bring to their work with information. Ideally the evaluativist level of knowing about information would be the ideal for all college graduates. However, this is not to say that the realist or absolutist levels could not be successfully reached through instruction in bibliographic or information search skills. What is a reality though is that teaching the developmental epistemological states which incorporate critical thinking into an information literacy session moves beyond basic bibliographic instruction, since critical thinking is not a priority in the two lower levels of thinking.

While academic libraries and librarians have striven to meet the academic missions of their universities, there are varying opinions as to what their main goals
should be. Librarians work to fulfilling the Association of Research and College Libraries’ information literacy standards have critical thinking and epistemological instructional goals. Critical thinking continues to be a question not only in libraries but also in all disciplines across university and college campuses. Where and how information literacy will be integrated into the curriculum is a challenge facing all higher education faculty and administrators. However, for librarians, the goal of information literacy founded and supported by critical thinking is still present and will continue to be a part of information literacy instruction. While some freshman may enter the academic library as critical thinkers, one cannot ignore that some of these students might not have had the experiences which have supported their development of epistemological thinking, as described in Kuhn’s developmental model of critical thinking.

Information literacy and critical thinking skills are useful and necessary to students throughout their freshman year, but furthermore for the rest of their studies and careers. The skills taught within the library translate to being relevant in any discipline that they choose to study and in future work places. Students need to know not only how to find an information resource, but also how to evaluate one. Higher education institutions’ administrations, faculty, and librarians recognize that students will need to continue to work towards meeting the Association of Research Libraries (ACRL) information literacy standards.

Academic librarians have used online and written assessment tools in order to determine the effectiveness of information literacy instruction. One might propose however, that measuring critical thinking could potentially give a new perspective on the effectiveness of information literacy. Measuring students’ critical thinking in a one-stop-
shop course is difficult because of the fact that students are only seen once and there are usually time constraints. For those information literacy sessions that meet multiple times throughout a semester, or an actual credit bearing class, these students would be more logical participants for a study. If this were the case, then critical thinking skills of freshmen writing classes could be evaluated more successfully. For example, the freshmen students could be given a research assignment that would be an on-going assignment throughout a semester and for which Kuhn’s developmental model of critical thinking could be applied. Students could be evaluated by a team of librarians and writing professors throughout the semester to gauge their metacognitive, metastrategic, and epistemological stances. Potentially, students will enter the semester at different epistemological levels that Kuhn described; realist, absolutist, multiplist, and evaluative. Students could be asked to map out their initial knowledge on the research topics, and what their research steps will be. As the course progresses, students’ work could be evaluated. Along with evaluation of their work, informal interviews of the students could be held to look more closely at metacognitive, strategic, and epistemological stances. One would hope to see a progression not only in their skills at finding information resources for their papers, but also there would be a transition of some of the students to move up the levels of epistemology. A study like this would prove to be successful for the fact that it would give the librarian and professor a look at what the students are thinking, what epistemological stance they are in, and if the students are critically thinking.

So are students critically thinking or learning to copy information correctly? This is a fundamental question for library instruction. Most likely it is a mix of both. Just as some students want to engage in learning, there are always going to be students who do
not want to work beyond getting an assignment completed and graded. The better statement would be to critically think one must critically engage in the information world.
References


