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An Instrument To Measure Information Competency

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Abstract

This is a paper introducing an instrument to measure information competency. Information competency consists of the skills needed to become information literate. Information literacy is a set of abilities to recognize when there is a need for information and being able to identify, locate, evaluate, and effectively use that information when needed. Breviek and Gee (1989) believe this is a survival skill in for this information age. The problem is there is no instrument to measure the skills needed to become information literate. Those skills are called information competency. The Information Competency Assessment Instrument (ICAI) was designed to measure those skills. This paper discusses the development of the instrument. The instrument was issued to two different samples at two different times. The instrument demonstrated good reliability and validity. It is hoped that this instrument will be used to further support its reliability and solidify the validity.

An Instrument To Measure Information Competency

With the wealth of information available today on the Internet, "information overload," the concept of having too much information to adequately handle and assimilate, is a common occurrence. Teaching our students to deal with and handle the abundance of information and sources, we must become more attuned to the concept of "information literacy". This is not an easy concept to handle. The skills in becoming information literate deal with information competency, the skills to decide on a topic, search and finding the information, understand and organize the information, etc. Along with this concept of information competency is the need for an instrument to quantitatively measure this notion. The purpose of this paper is to bring the concept of information literacy and competency to our understanding and to introduce an instrument to measure an individual's perception of these skills needed (information competency) to become information literate.

The importance of this concept is that an individual who is information competent is a life long learner (Breivik, 1998). As we teach students to find information and communicate that information to others, we should be aware that we are also helping them to become life long learners. An instrument to measure information competency is, thus, an important item to address. First, a discussion of information literacy will be presented. Next a discussion of the method of designing the instrument and how it was tested will be given. Data resulting in the reliability and validity of the instrument will then be presented followed by a discussion of what this means and how this can assist in our instruction and research.

Literature Review

When people think of information, they are led to such connotations as product, facts, data, lore, and knowledge. The American Library Association (ALA, 1983, p. 117) defines

information as “all ideas, facts, and imaginative works of the mind which have been communicated, recorded, published, and/or distributed informally in any format.” As individuals move toward discussion of information literacy, two issues are particularly significant in the ALA’s definition. First, the definition refers to all information, as if it were possible for any individual (or institution for that matter) to possess all of it. Second, the definition refers to information only in the past tense, thereby pointing out the essential static nature of information. ALA’s definition seems to anticipate the assertion that by itself, information is not knowledge. Information is bits (or bytes) that are gathered by reading, observation, or hearsay. To become knowledge, information must be filtered through our experiences and applied to our lives. Referring to our colloquial fusion of data, information, symbols, and technology, Toffler (1990) defines “data” as unconnected facts; “information” as data that has been fitted into categories, classifications, schemes, or other patterns; and “knowledge” as information that has been further refined into more general statements. Toffler’s expanded definition of knowledge includes and subsumes “information, data, images, and imager, as well as attitudes, values, and other symbolic products of society, whether true, appropriate, or even false” (Lenox & Walker, 1993, p.313).

As Naisbitt (1982, p.24) stated over a decade ago, the emphasis in the information society has shifted from supply of information to selection. Selection, in turn, implies knowing what, where, and how to select, but is itself only an early step. One must then use appropriately the information/ data selected out of the torrent available, that is, be information “literate”.

Although the actual term “information literacy” is as yet unknown (one source notes it being used in a 1977 speech by the director of science information of the National Science Foundation {Breivik & Gee, 1989, p. 24}), the Final Report (American Library Association

Presidential Committee on Information Literacy, 1989) of the American Library Association's Presidential Committee on Information Literacy has certainly brought the term to the fore. This report defined an information literate person as one who is as follows:

> able to recognize when information is needed and having the ability to locate, evaluate, and use effectively the needed information. Ultimately, information literate people are those who have learned how to learn. They know how to learn because they understand how information is organized, how to find information, and how to use information in such a way that others can learn from them. They are people prepared for lifelong learning, because they can always find the information needed for any task or decision at hand. (p.1).

The library profession has spearheaded the development of this concept. In fact, there is some debate in the literature about the differences between library instruction, bibliographic instruction, and information literacy instruction (Breivik, 1989, 1991; Estabrook, 1986; McCrank, 1991; Naito, 1991; Rader, 1991; White, 1992). However, the concern goes well beyond any vested interest on the part of libraries, librarians, and other information intermediaries.

A Learning Skill!

"Information literacy is a survival skill in the information age" (Breivik & Gee, 1989, p. 12). It should help to keep one from "drowning in the abundance of information" that floods our everyday lives. It is just as important in the context of the workplace as it is in one's personal life. Some professionals in the library field see the teaching of information literacy as the teaching of conceptual foundation and organization of information sources and systems, that is, as education in the awareness and scope of options. Breivik and Gee (1989) note that it

"includes (the teaching of) an integrated set of skills (research strategy and evaluation) and knowledge of tools and resources" (p. 24).

Education for information literacy is necessary for both staff and students in higher education. The goal of information literacy education is to ensure that individuals are equipped and encouraged to learn from the range and information resources surrounding them. In other words, they should acquire, over a course of study or through staff development opportunities, the characteristics of information literate individuals. Attention to the information literacy agenda when designing higher education courses ensures that information literacy is both the object of learning and the medium through which learning occurs.

There have been many attempts and multiple programs established to help instruct an individual to become more information literate. The following are some examples of programs and the criteria established as important for information literacy.

The ALA (*Information literacy competency standards for higher education*, 1998) has established nine standards divided into three main components. They are as follows:

Information Literacy

Standard 1: The student who is information literate accesses information efficiently and effectively.

Standard 2: The student who is information literate evaluates information critically and competently.

Standard 3: The student who is information literate uses information accurately and creatively.

Independent Learning

Standard 4: The student who is an independent learner is information literate and pursues information related to personal interests.

Standard 5: The student who is an independent learner is information literate and appreciates literature and other creative expressions of information.

Standard 6: The student who is an independent learner is information literate and strives for excellence in information seeking and knowledge.

Social Responsibility

Standard 7: The student who contributes positively to the learning community and to society is information literate and recognizes the importance of information to a democratic society.

Standard 8: The student who contributes positively to the learning community and to society is information literate and practices ethical behavior n regard to information and information technology.

Standard 9: The student who contributes positively to the learning community and to society is information literate and participates effectively in groups to pursue and generate information.

The WAAL Information Literacy Committee (1998) creating the Information Literacy Competencies and Criteria for Academic Libraries in Wisconsin established 10 criteria considered important in becoming information literate. The student who is information literate is able to do the following:

1. Identify and articulate need which require information solutions.
2. Identify and select appropriate information sources.
3. Formulate and effectively execute search queries appropriate for the information resource.

4. Interpret and analyze search results and select relevant sources.
5. Locate and retrieve relevant sources in a variety of formats from the global information environment.
6. Critically evaluate the information retrieved.
7. Organize, synthesize, integrate, and apply the information.
8. Self-assess the information-seeking processes used.
9. Understand the structure of the information environment and the process by which both scholarly and popular information is produced, organized, and disseminated.
10. Understand public policy and the ethical issues affecting the access and use of information.

The CSU Work Group defined a set of core competencies with the following statement and competencies: In order to be able to find, evaluate, use, communicate and appreciate information in all its various formats, students must be able to demonstrate the following skills:

1. Formulate and state a research question, problem or issue not only within the conceptual framework of a discipline, but also in a manner in which others can readily understand and cooperatively engage in the search.
2. Determine the information requirements for a research question, problem or issue in order to formulate a search strategy that will use a variety of resources.
3. Locate and retrieve relevant information, in all its various formats, using, when appropriate, technological tools.
4. Organize information in a manner that permits analysis, evaluation, synthesis and understanding.
5. Create and communicate information effectively using various media.

6. Understand the ethical, legal and socio-political issues surrounding information.
7. Understand the techniques, points of view and practices employed in the presentation of information from all sources. (Curzon, 1997)

The Booth Library (2000), of Eastern Illinois University, established the following standards concerning information competency:

Standard One

The information literate student determines the extent of the information needed and constructs a framework for obtaining the information.

Standard Two

The information literate student accesses needed information effectively and efficiently.

Standard Three

The information literate student evaluates information and its sources critically, and as a result, considers whether or not to modify the initial query and/or seek additional sources.

Standard Four

The information literate student understands and respects the ethical, social, and legal issues surrounding the use of information and its technologies.

Standard Five

The information literate student understands that information literacy is an ongoing process and one component of lifelong learning.

The "Information Literacy" standards require individuals to be able to access information efficiently and effectively, evaluate the information critically and competently, and use the information accurately and creatively. These standards require skills that individuals use to become literate. The first competency an individuals needs is to be able to decide on a topic to research, recognizing the need for information (Curzon, 1997; WAAL Information Literacy Committee, 1998). In other words, the individual needs to state a research question, problem, or issue to study (Curzon, 1997). In sum, an individual needs to know what to study.

After deciding on a topic, the individual needs to be able to determine the requirements for the assignment, recognizing information is generated for different purposes (informative or persuasive), audiences, levels of comprehension, and credibility (WAAL Information Literacy Committee, 1998). Knowing this assists the individual in choosing appropriate sources (Curzon, 1997). Viewing the information critically and competently helps the individual identify and select appropriate information (*Information literacy competency standards for higher education*, 1998; WAAL Information Literacy Committee, 1998).

This leads to the information competent individual knowing how to search for the specific topic (WAAL Information Literacy Committee, 1998). First, because simple answers are rare, questions need to be defined, clarified, narrowed or broadened to determine what information is needed (WAAL Information Literacy Committee, 1998). Knowing what one needs to complete an assignment makes it easier to prioritize the plethora of available information and to use various information technologies (library catalogs and databases, network

search tools, etc.) to locate and retrieve information (Booth Library, 2000; Curzon, 1997; WAAL Information Literacy Committee, 1998). Knowing multiple search strategies (e.g., Boolean logic, truncation, searching by keyword or subject headings) and distinguishing among different types of sources (e.g., popular or scholarly material; primary or secondary sources; whether the source is current, historical, or retrospective or biographical, statistical, or theoretical) contributes to information literacy (Booth Library, 2000). The systematic arrangement of libraries, information centers, or archives along with understanding library loan procedures, document delivery services, and electronic transmissions are important to the competent individual (Curzon, 1997). Information competent individuals realize they do not need to be an expert, but rather they need to understand when to seek professional assistance from the reference librarian (WAAL Information Literacy Committee, 1998).

While the library is one information source, mass media offer a wealth of information. Using information from mass media requires obtaining it and using it ethically. An information competent individual should be able to understand the ethical and legal issues surrounding information use (Curzon, 1997; WAAL Information Literacy Committee, 1998). Competent individuals should also be able to use, evaluate, and treat critically information received from mass media (Curzon, 1997). Breivik points out that the search process must move away from "single-text teaching" and expose students to "real-world information resources and technologies" (Breivik, 1998, p. 26). There is a wealth of information out there; individuals must have the knowledge of how to access it and when to use it.

After gathering the material, one must read, understand, and organize it to meet the specified assignment. The information competent individual should be able to assess the scope, content, and type of information retrieved (WAAL Information Literacy Committee, 1998).

Here, the individual needs to synthesize and organize the information so the audience can best understand it (Curzon, 1997; WAAL Information Literacy Committee, 1998). Synthesizing the information highlights important points. Organizing the information will help in preparing the individual to write the report or prepare the presentation and, also, should help the reader or listener to accept this prepared information. An information competent individual should recognize the importance of information to a democratic society, practice ethical behavior regarding information/information technology, and participate in groups to pursue and generate information (*Information literacy competency standards for higher education*, 1998, Booth Library, 2000).

The final *Information literacy competency standards for higher education* (1998) component, "Independent Learning," entails pursuing information for personal interests, appreciating literature and other creative expressions of information, and striving for excellence in information seeking and knowledge generation. Students need to be given repeated opportunities to work with the "same information resources that will bombard them throughout their lives" (Breivik, 1998, p. 26). These skills should help the individual to appreciate the skills necessary to become a life-long learner (Booth Library, 2000; Curzon, 1997).

Overall, information literacy examines how information is discovered, assimilated, and organized. Developing the skills necessary to engage in this process constitutes information competency. With today's influx of information, an individual needs these skills to become a life-long learner.

Breivik, P., Hancock, and Seen (1998) and Bundy (1999) have called for a means to measure information competency as well as its effect on students' academics and career performance. An instrument would help determine if programs to develop information

competency are successful and what other variables are affected by information competency. Bruce (2000) proposed that high quality learning is usually about being able to focus simultaneously on the multiple dimensions relevant to understanding some phenomenon. If one takes research to be a form of learning, then one can reach a similar conclusion about various aspects of research. Based on the available literature, the following research question was generated. Can a reliable and valid instrument to measure information competency be developed?

Method

The testing of this instrument considers two separate studies with two different samples. The methodology will first discuss the instrument followed by the two separate administrations of the instrument.

Instrument

In developing the instrument to measure information competency, a literature foundation needed to be established. Marshall (2002) developed the Information Competency Assessment Instrument (ICAI) to measure information competency taking the ten areas that were considered of common importance for an individual to be competent: (1) identify a topic, (2) determine source requirements, (3) know how to search for needed information, (4) how to locate and retrieve the information, (5) evaluate the information, (6) synthesize and organize the information, (7) understand ethical, legal and socio-political issues of the information, (8) appropriately use mass media for information, (9) present the information, and (10) learn from feedback and apply to other projects. This self-report survey was made up of 40 statements, four

covering each of the 10 areas of concern. The participants were asked to rate their feelings concerning each statement along a seven-point, Likert-scale ranging from strongly disagree (1) to strongly agree (7) (see Attachment A).

The first area addressed an individual needing to identify a topic. Not only does an individual need to state a research question, problem, or issue (Curzon, 1997), but also he/she needs to understand that the type and amount of information selected is determined in part by the parameters of need and information available (WAAL Information Literacy Committee, 1998). Statements for this area, for example, were, "I can take a complex topic and break it down into more useful, simpler items" and "Confused is probably the best term to describe my starting a project."

The second area determined the topic and source requirements. An individual needs to recognize that information is available in different formats (microform, paper, electronic, oral, etc.), in different sources (primary or secondary), and with different characteristics (subjective/objective, conjectural/factual, popular/scholarly) (Booth Library, 2000; WAAL Information Literacy Committee, 1998). The individual must select types of information resources appropriate for a specific information need (Booth Library, 2000). Examples of statements in this area are "I know the difference between 'primary' and 'secondary' sources" and "I am sometimes unsure of how much information I need for an assignment."

Understanding how to conduct searches and use the information technologies is the third area. One must be able to select the search strategy appropriate to the topic and resources (WAAL Information Literacy Committee, 1998). In formulating queries, a knowledge of search techniques and tools (e.g., Boolean operators and symbols, limiters, and truncation) is important to locate relevant citations and further refine the search (*Information literacy competency*

standards for higher education, 1998; Curzon, 1997). "I know how to broaden or narrow a search using Boolean operators (AND, NOT, and OR) and truncation" along with "I'm not sure how to use an index (e.g., catalog, database, etc.)" are examples of statements for this area.

The fourth area involves knowing how to locate and retrieve the needed information. This includes not only knowing the layout of the library, where to find certain material (*Information literacy competency standards for higher education*, 1998; Booth Library, 2000), but also how to locate resources not owned locally and use the appropriate resource sharing systems, such as interlibrary loan or document delivery, to retrieve the information (Booth Library, 2000; WAAL Information Literacy Committee, 1998). Statements in this area consisted of knowing the library (e.g., "I understand the organization of materials in libraries.") and understanding departments within the library (e.g., "Government documents are confusing to me.").

Knowing how to evaluate the information is the fifth area of concern. An individual needs to determine the authority, reputation, point of view, and stability of the publication/source (Booth Library, 2000). He/she should be able to assess the relevancy of a source to an information need by examining publication date, purpose, and the intended audience (Curzon, 1997; WAAL Information Literacy Committee, 1998). Examples of statements to investigate this area are "The information I use is complete and reliable" and "The information I find is so confusing that I don't know if I can use it."

At this point, it is important to organize and synthesize the information. An individual must be able to summarize the information retrieved, synthesize ideas and concepts, and create a logical argument based on the information retrieved (Curzon, 1997; WAAL Information Literacy Committee, 1998). "A lot of the information I find is irrelevant or unnecessary" and "After

collecting my information, it is easy to sort by content that is similar" are statements representing this area.

Students need to know the ethical, legal, and socio-political issues involved with the information, such as appropriately citing sources to avoid plagiarism (WAAL Information Literacy Committee, 1998). Information competent individuals understand intellectual property rights and issues relating to censorship, intellectual freedom, and respect for differing points of views (Curzon, 1997). Statements to measure this area include "I'm not sure how to record or cite all my sources" and "I know when material is confidential, should not be used."

Because important information may become available immediately through late-breaking news or through radio reports or pictures available through the mass media (Curzon, 1997), an information competent individual should know how to use this material and cite it appropriately. Sample statements for this area are "I can use many different types of media (print, video, photography, etc.) confidently as information for my topic" and "At times, the producer of the information is not clear."

Ninth, an information competent individual should recognize the best method for presenting the finished product. Not only should the individual have confidence the material will fit the needs of the intended audience, but also should be able to communicate using a variety of information technologies (Curzon, 1997). "I am confident that my information is clearly and confidently presented" and "I am not sure which communication medium (transparencies, slides, video, etc.) is appropriate for the delivery of this information" represent this area.

Finally, the information competent individual needs to learn from the project and apply the learning to future projects (Curzon, 1997). He/she should be able to assess the effectiveness of each step in the process and refine the process to make it more effective (WAAL Information

Literacy Committee, 1998). Statements to measure perceptions in this area are "I am able to learn what processes would be helpful for finding information in the future" and "Feedback is demoralizing to me."

Study One

Participants. The participants for this study were the students in 12 sections of the Public Speaking classes taught during the Spring, 2001 semester at a major Southeastern university. . The number of students that completed all the surveys totaled 276. The ages ranged from 18 – 43 (M = 20.54 (1.99)). There were 17 first-year students, 71 sophomores, 123 juniors, and 63 seniors representing 7 areas of study (Agriculture = 29, Arts and Sciences = 28, Business = 119, Communications = 47, Education = 22, Human Ecology = 15) while 8 were undecided. There were 120 females and 156 males in the study.

Instrument. For this study, the Information Competency Assessment Instrument produced a Cronbach Alpha = .90. Because this instrument has not been previously used, validity is of prime importance. It was distributed to five different classes (not associated with the present study) where students were assigned a major research project or presentation. The research project or presentation was a major part of the student's final grade. At the semester's end, 106 students completed the Information Competency Assessment Instrument after the research project/presentation was turned in. Total scores for the Information Competency Assessment Instrument (Alpha = .92, $N = 106$) were correlated with the grade on projects (e.g., A = 4, B+ = 3.5) to assess predictive validity. The result was significant (rho = .29, $p < .01$) showing a low correlation with a definite, but small, relationship. These analyses demonstrate initial predictive and content validity.

Study Two

Participants. The second study was conducted at a medium sized midwestern university during the Fall, 2005 semester. The number of individuals completing this survey totaled 520 students consisting of 325 females. Ages ranged from 18 years to over 24 years. There were 94 first-year students, 158 sophomores, 149 juniors, 100 seniors and 19 graduate students participating in the study. The students were asked to rate their GPA according to a scale of 1 = 2.0 or below, 2 = 2.01-2.49, 3 = 2.5-2.99, 4 = 3.0-3.49, and 5 = 3.5-4.0 (M = 3.62 (1.05)). There were 41 different majors (areas of study) represented in the study.

Instrument. For this study, the ICAI showed a Cronbach Alpha of .90. In a correlation with the GPA, the result was significant (rho = .109, $p < .05$). Thus this study also demonstrated the predictive validity of the instrument.

Discussion

This study was designed to answer the research question: Can a reliable and valid instrument to measure information competency be developed? The instrument shows good reliability. The two major studies were to two separate groups of individuals on two separate campuses. The individuals were varied in age and in areas of study. Variability of individuals was sought for and accomplished in the second study particularly, representing 41 different areas of study. With the Crobach Alpha being in the high eighties and low nineties each time it is given shows consistent reliability.

The goal of any instrument is that of validity. Validity is very important in showing that the instrument measures what it intends to (Singletary, 1994). With the instrument designed from the literature describing what is expected from an individual that is information competent, it is good to see that the reliability is present. Also, the content of the validity supports the

instrument in the reliability. Comparing the ICAI scores to the grades of a final project and GPA of the students is a good avenue to check validity of the instrument. The reason for this is that a high grade on a research project and a high GPA should show that the student has a good grasp of the skills needed to be information literate. It should be expected that a student that has these skills should make good grades. The positive correlations of the ICAI with the GPA and grades should boost the validity of the instrument suggesting that the higher an individual scores on the ICAI then the student should have a higher GPA and research grades.

Another argument for validity is comparing the mean of the ICAI scores. The mean score for the 2001 study was M = 170.65. The 2005 mean score was M = 170.23. (Table 1). Being given to two different groups, at two different times (years), both with a wide diversity of studies and interests should show the stability of the instrument itself.

Insert Table 1 about here

But one note of warning needs to be discussed. What is measured in this instrument are mainly the skills needed to become information competent. Information literacy goes beyond what this instrument measures. Kaulthau believes that information literacy is not a discrete set of skills but rather a way of learning (1993). Information literate individuals need to be flexible thinkers and perpetual learners. Only in this way can individuals be able to meet new challenges awaiting them in the Information Age. (Kalulthau, 1993). The instrument could be combined with qualitative research to gain a better understanding of what is required to become an information literate individual. But this is

a good starting point. If one gains the skills to become information competent, then the individual is well on the way to becoming information literate.

Finally, information competency had received increased attention in recent years (see Breivik, 1998; Bruce, 2000). As with any new area of study, the ability to measure it accurately has hindered progress. Additional research should begin to explore the variables that should correlate highly with this form of competency as well as the variables that information competency should predict. Looking at the instrument and the skills required to be information competent, one can see that almost any course requiring research should help develop these skills in the students. In particular, those classes associated with learning the research and information gathering processes should help students learn these skills.

As industry moves more toward the Internet and use of it, information competency skills expand beyond the educational environment and become expected in the workplace. What jobs require an individual to be information competent? Are particular job responsibilities more strongly tied to information competency? If the skills are not enough to meet the specific or changing work environment, employers can now see where additional training is required. Outside of work, where does information competency become important – in our friendships, romantic relationships, and/or families? As with any new area of study, the possibilities for using and testing this instrument are endless.

This study developed an instrument to measure information competency. With more and more information being made available through the Internet, information competency skills will become more important. They will be important in the classroom as well as in the work place. For the discipline of communication, studies need to be conducted to validify the instrument and to investigate what classes help in producing the information competency skills. It is this

author's belief that there are many courses taught in communication that would be of service to student learning more of these skills. Now that more is known of this concept, more studies can be conducted with this in mind.

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Appendix

Information Competency Assessment Instrument

DIRECTIONS: This instrument is composed of 40 statements concerning feelings about finding and disseminating research information. Please indicate the degree to which each statement applies to you by circling the number that best fits your feelings on the statement from whether you (1) strongly disagree to (7) strongly agree. Using the following scale, please record your first impression.

1	2	3	4	5	6	7
strongly disagree			neither agree or disagree			strongly agree

1. I feel confident determining what topic I need to search.	1 2 3 4 5 6 7
2. Sometimes I feel lost because the topic I want to research is not very clear to me.	1 2 3 4 5 6 7
3. I can take a complex topic and break it down into more useful, simpler items.	1 2 3 4 5 6 7
4. "Confused" is probably the best term to describe me when starting a project.	1 2 3 4 5 6 7
5. I am sometimes unsure of how much information I need for the assignment.	1 2 3 4 5 6 7
6. I know the difference between "primary" and "secondary" sources.	1 2 3 4 5 6 7
7. I get confused because of the many different formats (print, electronic, etc.) when searching for information.	1 2 3 4 5 6 7
8. I am certain that I can use the information I find.	1 2 3 4 5 6 7
9. I know how to broaden or narrow a search using Boolean operators (AND, NOT and OR) and truncation.	1 2 3 4 5 6 7
10. It is easy to interpret the results of a search.	1 2 3 4 5 6 7
11. I'm not sure how to use an index (e.g. catalog, database, etc.).	1 2 3 4 5 6 7
12. I can confidently get my hands on the material (by printing, e-mailing, interlibrary loan, etc.) I need.	1 2 3 4 5 6 7
13. I understand the organization of materials in libraries.	1 2 3 4 5 6 7
14. Government documents are confusing to me.	1 2 3 4 5 6 7
15. Web search engines are unreliable.	1 2 3 4 5 6 7
16. I know the difference between an abstract and an article.	1 2 3 4 5 6 7
17. Sometimes I cannot figure out for whom the information is intended.	1 2 3 4 5 6 7
18. I can use many different types of media (print, video, photography, etc.) confidently as information for my topic.	1 2 3 4 5 6 7

19. At times, the producer of the information is not clear.	1 2 3 4 5 6 7
20. I can confidently spot inaccuracy, errors, etc. in the information from mass media.	1 2 3 4 5 6 7
21. The information I find is so confusing that I don't know if I can use it.	1 2 3 4 5 6 7
22. I am not confident that the information I get is accurate.	1 2 3 4 5 6 7
23. The information I use is complete and reliable.	1 2 3 4 5 6 7
24. I am sure that the information I have answers my question or addresses my topic.	1 2 3 4 5 6 7
25. A lot of the information I find is irrelevant or unnecessary.	1 2 3 4 5 6 7
26. After collecting my information, it is easy to sort by content that is similar.	1 2 3 4 5 6 7
27. Sometimes my question changes depending on what information I find.	1 2 3 4 5 6 7
28. If my topical outline doesn't make sense, I get discouraged.	1 2 3 4 5 6 7
29.I am <u>not</u> sure which communication medium (transparencies, slides, video, etc.) is appropriate for the delivery of this information.	1 2 3 4 5 6 7
30. I know my audience and that the information I present meets their needs.	1 2 3 4 5 6 7
31. I sometimes have doubts as to why I am communicating this information.	1 2 3 4 5 6 7
32. I am confident that my information is clearly and confidently presented.	1 2 3 4 5 6 7
33. I'm not sure how to record or cite all my sources.	1 2 3 4 5 6 7
34. I have questions about the privacy of the information I receive.	1 2 3 4 5 6 7
35. I can tell when information is biased.	1 2 3 4 5 6 7
36. I know when material is confidential, should not be used.	1 2 3 4 5 6 7
37. While preparing a project, I am certain how it will be received by others.	1 2 3 4 5 6 7
38. Feedback is demoralizing to me.	1 2 3 4 5 6 7
39. I am able to learn what processes would be helpful for finding information in the future.	1 2 3 4 5 6 7
40. After the presentation of the information, I'm not sure how it was received.	1 2 3 4 5 6 7

Table 1

Mean Scores of 2001 and 2005 Study

Year	Mean	Std. Dev.
2001	170.65	13.01
2005	170.23	16.28