To the Graduate Council:

I am submitting herewith a thesis written by Jacqueline Lou Kracker entitled "Changing Students' Perceptions about Research: Can Thirty Minutes Make a Difference?" I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Information Sciences.

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Changing Students' Perceptions About Research: Can Thirty Minutes Make a Difference?

A Thesis
Presented for the
Master of Science
Degree
The University of Tennessee, Knoxville

Jacqueline Lou Kracker
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DEDICATION

This thesis is dedicated to every student who has ever felt confusion, anxiety, and doubt when confronted with a research assignment.

It is also dedicated to all those who helped make this work a reality.

"Anything I've ever done that ultimately was worthwhile . . .
initially scared me to death."
- Betty Bender

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ABSTRACT

The ability to gather data and synthesize information is a valuable skill for students, an important life skill, and for many, an important job skill. Yet, confusion, fear, anxiety, and doubt are often associated with research assignments; these feelings can interfere with learning. Carol Kuhlthau showed that these emotions are a normal part of the research process for novice researchers and give way, in time, to increased interest and confidence as the work progresses. She demonstrated that awareness of the Information Search Process (ISP) model improves student's ability to tolerate the uncertainty inherent in the early stages of the process and increases their satisfaction. Because Kuhlthau showed that her model holds across a wide array of user needs and a wide range of ages, sharing the model with students about to begin a research assignment may serve their immediate needs and their needs well into the future.

At many educational institutions, contact time between information professionals and students is limited. Library instruction often consists of one fifty-minute bibliographic session designed to teach the organization of the library and library tool use. If it is possible to teach the model in a short thirty-minute presentation with positive results, educators may be able to reach more students without implementing major program changes.

The purpose of this study was to determine if a thirty-minute presentation of Kuhlthau's ISP model could: (1) improve awareness of the thoughts associated with the research process, (2) improve awareness of feelings associated with the research process, (3) reduce anxiety associated with the research process, and (4) improve satisfaction with the research process.

A new test instrument, the Research Process Survey (RPS), was designed and used to measure awareness and satisfaction levels associated with the research process. The population studied was upper division undergraduate students assigned a research paper of ten pages or more. The experimental design used pre-tests, post-tests, and interim tests.

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CHAPTER 1

INTRODUCTION

Research papers are a time-honored method for teaching students research and writing skills. They provide the opportunity to explore a topic, seek and gather information from a variety of sources and perspectives, find a common thread, discover new relationships, and construct an argument. In conducting research, students learn more about a particular subject, learn how to access information, develop critical thinking and analytic skills, and learn how to communicate ideas to others. For the novice researcher, this process can also produce intense stress. Students often feel "uncertainty, confusion, frustration, and doubt" at the start of a research project (Kuhlthau 1993, xx). How much of this stress is inevitable, a part of the research and learning process, and how much is unnecessary and avoidable with well-placed instruction?

Background

In the early 1980s, Carol Collier Kuhlthau began a series of investigations that led to a new theory describing the internal processes that occur when people do research. She named her theory the Information Search Process (ISP). One pioneering aspect of the work was her attention to affect – emotions – as part of the research process. From her initial investigation

emerged a six-stage model with roots in constructivist learning theory that describes the typical thoughts, feelings, and actions associated with each stage. The stages of the model are described in Chapter 2 and are summarized in appendix B.

Kuhlthau found that strong emotions are an important part of the research process and that these feelings are normal. They range from confusion and anxiety at the beginning to confidence and satisfaction or disappointment at the conclusion. She learned that improved awareness of the process leads to improved understanding of the students' personal styles of research and improved satisfaction with the research process. (Kuhlthau 1993).

Rationale for Teaching Students about the Research Process Using Kuhlthau's ISP Model

Educators and librarians have many reasons to be concerned about student attitudes and feelings towards research.

1. Research papers are part of most students' college experience.
2. Knowing how to gather data and synthesize information is an important life skill and, for many, an important job skill.
3. Studies show that confusion, fear, and anxiety are often associated with research assignments at the high school, undergraduate, and

even graduate level (Kuhlthau 1993, Mellon 1986, Onwuegbuzie 1997).

4. Feelings are an inseparable part of the human experience and are important factors in learning and decision-making. (Ablon 1993, Goleman 1995, Kuhlthau 1993[1]).
5. Fear and anxiety can greatly inhibit the ability to learn and to work logically and effectively (Mellon 1986, Goleman 1995).
6. Having a model and words to describe the research process allows students to observe the process at work within themselves and to identify the stages of the process that are most difficult for them. This insight can lead to a better understanding of their personal styles (Kuhlthau 1993).
7. Traditional library instruction primarily addresses Stages 5 and 6 of the ISP, but much of the effort and creativity of research lies in Stages 1 through 4. Time spent during the early stages is not wasted, contrary to many students' perceptions (Fister 1992). This time is necessary for the process to function well.
8. Increased understanding of and comfort with the process may lead to less procrastination and fewer avoidance behaviors, increase the ability to tolerate uncertainty, increase confidence, decrease the

[1]Carol Collier Kuhlthau summarizes the work of George Kelly

likelihood of giving up easily, and produce a better product – better research papers and better cognitive skills.

While both educators and librarians are capable of teaching research skills to students, there are many reasons librarians are best equipped for this responsibility.

1. Studies indicate that faculty tend to assume that students know how to do research, know how to use research tools, and that research skills are picked up along the way. These assumptions may derive from their own experience. Many faculty members were not taught research skills, and yet they do well with the process (Thomas 1994, Mellon 1988).
2. As indicated by the modern emphasis on bibliographic instruction, librarians believe that students may not begin their studies with adequate knowledge of library use and library tools, that research skills can be taught, and that it is important to teach basic research skills. Moreover, many students most in need of assistance will not ask for help (Karabenick and Knapp 1988).
3. Stages 1 through 4 of the ISP draw on resources that libraries hold – the body of knowledge that serves as background information.
4. Information specialists have traditionally taught search strategies and tools that are appropriate for Stages 5 and 6 of the ISP. It is practical

and reasonable to teach the entire process, including Stages 1 through 4, as an organic whole with stages that can iterate.

5. It is easier to incorporate this approach to teaching students about research from one central unit of the educational system – the library – than it is to implement it in every department making up the educational institution.
6. The job of teaching students about the research process from this larger perspective will allow information specialists to take on a greater educational role in schools and universities and will provide students with valuable life skills.

The Study

Following Kuhlthau's work, this study attempted to determine if a thirty-minute presentation of the six-stage ISP model can ease anxiety levels associated with doing research and improve understanding of and overall satisfaction with the process as measured by student perceptions. The population studied was upper division undergraduate students with a research paper of ten pages or more to write. Using an experimental design, data was collected from a class with four sections taught by three instructors. Students from two sections made up the experimental group and heard a presentation of Kulthau's ISP model. Students from the other sections were in the control

group and heard a placebo speaker. The effects of teaching Kuhlthau's ISP model were measured using pre-, post-, and interim tests.

CHAPTER 2

LITERATURE REVIEW

The literature review is composed of two sections. The first section describes five studies that Kuhlthau used to formulate and validate the Information Search Process model, a summary of the six stages of the model, and a summary of relevant findings. The remaining section describes research into (1) library anxiety, (2) the research process, and (3) bibliographic instruction that teaches the ISP model or addresses the negative emotions that students may experience. Studies in the second section examine different user groups, different aspects of the research process, and different applications.

Kuhlthau's Information Search Process Model

In a series of studies, Carol Kuhlthau explored the process of information seeking from the perspective of the novice researcher, developed the Information Search Process model, and validated the model across a variety of user ages and a variety of information needs. The five studies that comprise the series will be briefly explained and the model summarized

Development of the ISP Model

The first study published in 1983 was designed to develop a better understanding of the research process in students so as to improve student research skills through intervention. Kuhlthau followed twenty-six advanced placement high school English students for one year as they researched and wrote two papers, one each semester (1988b). The methods used to collect data included: (1) surveys, (2) analysis of student research journals, (3) observation, (4) analysis of student writings about the research process, (5) time lines, (6) flow charts, and (7) in-depth interviews with six of the students (Kuhlthau 1993). The data fit well with George Kelly's Five Phases of Construction, a theory that describes how people experience the world and how learning takes place. For more information about Kelly's theory, see appendix A. In both Kelly's and Kuhlthau's models, feelings are an important part of the learning process. A six-stage model of the research process *as experienced by the researcher* emerged from Kuhlthau's study. She described the tasks, thoughts, feelings, and actions associated with each stage. The stages are described here and are summarized in appendix B. Although the stages are presented in a linear, logical sequence, Kuhlthau did not claim the process to be rigidly linear. Each stage is a precondition for success in the next stage. The stages can iterate, and it is possible to complete the process without successfully completing each stage, although the result may be less

than satisfactory. An example of this incompleteness is the lack of coherence that results when a paper is written without a focus.

The Six Stages of the Process

Stage 1 – Task Initiation

Task initiation begins when a person perceives that a gap in knowledge or understanding exists. For students, the assignment of a research paper highlights a gap in knowledge For others, a gap may be perceived when a problem arises that has no obvious solutions. Feelings that come with this realization may include uncertainty, anxiety, confusion, and doubt. Will the information be available? Will it be timely? Will the assignment be difficult to complete? At this stage, more is unknown than is known, and most people are uncomfortable with high levels of uncertainty. Thoughts turn toward comprehending the need and planning strategies to fill the gap and resolve the situation. Actions may include talking with peers, mediators, and/or professionals to determine the size and scope of the problem, to understand the nature of the information need, and to find a way to begin. The task of Stage 1 is to understand the assignment and begin the process.

Stage 2 – Topic Selection

The task of Stage 2 for the student is to choose a general topic Within the constraints of the assignment, what knowledge is available from prior

experience? What areas of interest exist? What areas are likely to be rich in information; what areas poor? Thoughts involve weighing possible options and comparing them to the assignment guidelines, existing knowledge, personal interest, information availability, and time constraints. Actions may include browsing available collections and discussing topic options with others. The sense of unease from Stage 1 continues until a viable topic is selected. Then feelings may turn to relief and optimism. Uncertainty is reduced in making a choice. If topic selection is prolonged, tension may escalate until a choice is made.

Stage 3 – Prefocus Exploration

After a general topic is selected, the student is ready to explore the subject. This is an important time to gather general background information, to learn what is known and not known, to discover lines of thought that weave through the subject, and to begin to understand the overall topology of thought within the discipline, either current, historical, or both. Until this background is laid, it is hard for the student to know what questions to ask or to choose a viable focus Feelings of uncertainty, doubt, and anxiety may grow as the researcher takes in and tries to make sense of large amounts of new information, some inconsistent or contradictory. The new information may threaten established mental constructs (ways of seeing the world) and lead to even higher levels of negative emotion. Stage 3 is often the most

uncomfortable stage in the process. The task of Stage 3 is to gather background information and look for a focus. Thoughts involve seeking and finding general information, understanding how the pieces fit together, looking for common threads that indicate possible points of focus, and looking for a focus that will be viable. Actions include information seeking, reading, interviewing, and taking notes as needed.

Stage 4 – Focus Formulation

This may be the most critical stage to the success of the research – the turning point. The task is to find a viable focus within the topic. Attempts to proceed through the remaining stages without a focus can lead to increasing confusion, anxiety, and doubt. Actions involve reading, taking notes, and writing down ideas. Thoughts turn toward finding common threads, themes, or gaps in the body of knowledge ripe for investigation. Possible choices of focus are weighed against assignment criteria, material availability, time, and personal interest – factors that influence the likelihood of success. The focus may develop gradually or come as a sudden moment of insight when something "clicks."

With a focus chosen, the researcher more readily knows what information is needed, what is useful, what is irrelevant. Enough sense has been made of the situation to know a direction in which to proceed. Selection of a focus is accompanied by feelings of relief, optimism, and confidence in the

ability to succeed. Even more uncertainty has been reduced, and the uncertainty that remains is a relatively known entity. If the entire research process is completed without a clear focus, the resulting paper can lack coherence, understanding can remain incomplete, and new mental constructs fail to form.

Stage 5 – Information Collection

At this stage, the researcher knows what specific information is relevant to the focus. The task is to locate and collect useful information that supports, refines, and extends the focus. Relevance and pertinence judgments are clear. The size and scope of the remaining uncertainty is reasonably well-known. Feelings of confidence grow, interest increases as more and more sense is made of the incoming information, and uncertainty diminishes. Actions include searching for and selecting specific information, taking detailed notes, and organizing thoughts on paper. Thoughts involve refining the focus, determining specific information needs, and organizing available information.

Stage 6 – Search Closure

The task of Stage 6 is to conclude the search for information and prepare for the serious or final writing – personal styles vary. Closure of the search can come about in a number of ways: time runs out, the redundancy of incoming information increases, available resources have been exhausted, or

the level of effort expended is considered sufficient. Feelings may include a sense of relief and satisfaction that the process has ended well, or disappointment that it has not. Thoughts involve weighing the completeness of the information available, time and energy constraints, the likelihood of success of additional effort, and identifying last bits of information that are needed. Actions include reviewing available information for completeness and checking facts and bibliographic citations.

Relationships among the Stages

While the stages of the model are numbered and presented in a linear fashion, Kuhlthau found that they were likely to progress in an iterative manner (1991). An example is the refining or reshaping of the focus during the information collection phase. Iteration is an organic part of the process for many students. It is also possible to meet with failure at one stage, necessitating a return to an earlier stage. Failure to find sufficient information on a subject at the prefocus exploration stage could require selection of a new topic. Failures and dead ends increase negative feelings as time and energy are lost and pressure mounts.

An important finding of the study was that uncertainty, confusion, doubt and frustration are replaced with confidence as students work through the stages. Uncertainty diminishes as thoughts focus and become clearer. Another important result was the realization of the importance of Stages 1-4.

The work of these stages is creative and vital to the success of the project, but it is here that uncomfortable feelings can be the strongest.

Longitudinal Verification

Two longitudinal studies followed the initial research The original twenty-six students were re-contacted after they completed four years of college education. Twenty of the original twenty-six responded to a mailed survey similar in content to the survey used in the first study (1988b). In a second, related study (1988a), four of the original six in-depth interviewees were again interviewed in-depth.

Together, these studies revealed that the model holds for a user across time. With experience, students expected their interest to grow as they learned more about their topic, and they expected their topic and focus to change and evolve as they searched for information. Awareness of the process led to understanding of personal styles of research, and all expressed confidence in their abilities. Iteration was common for some of these researchers.

Verification Across User Groups

Two studies examined the applicability of the model to researchers in different environments. One study (1989) looked at a large group of high school seniors with greater academic diversity. One hundred and forty-seven high-, middle-, and low-achieving high school seniors in six English classes

were followed over four weeks as they worked on a research assignment. Surveys were given to the students, and teachers were asked to evaluate the assignments for evidence of focus and for the quality of sources used. Thoughts and confidence levels changed as predicted by the model for the high- and middle-achieving seniors. There were an insufficient number of low-achieving students to analyze data for that sub-group The model was found to be valid across a wider population of high school student researchers.

The second study (1990) surveyed 385 undergraduate academic, public, and school library users at twenty-one institutions. Although the percentage of participants from public libraries was small (13%), the study showed that across this wide range of users, thoughts and feelings changed as predicted by the model as the participants moved through the research process.

Relevant Findings

Kuhlthau's series of studies resulted in several important findings and implications. They will be discussed as they relate to the current study.

1. The ISP Model
2. The role and nature of affect in the process as a whole and across the six stages
3. Verification of the model across time and across diverse groups
4. Awareness of the process improves the perception of and satisfaction with the process.
5. A gap exists between the research process as taught in traditional library instruction and as experienced by students.

1. The ISP Model.

The ISP was the first model of the research process to include emotions as an important factor. Using a foundation of constructivist learning theory, Kuhlthau developed a grounded theory of the research process from the initial study of twenty-six high school students. The six stages presented are well delineated and identifiable, even when traversed in an iterative manner.

2. The Role of Affect.

The role and nature of emotions experienced during research had not been explored prior to Kuhlthau's work. George Kelly and Jerome Bruner described affect as an important factor in learning and in the development of personal constructs (Kuhlthau 1993, 19-26), but it had not been specifically viewed as an organic part of the research process.

Kuhlthau's use of qualitative methods revealed a relationship between Robert Taylor's levels of need, Kelly's phases of construction, and the research process. She discovered that feelings are as important as thoughts and actions at each stage of the ISP. The early stages were marked with confusion, doubt, anxiety, and possible threat. This observation mirrored Kelly's model of construction well Negative feelings diminished as uncertainty decreased. Kelly and Bruner also believed that feelings are as important to the process of learning as are thoughts and actions. Uncertainty, doubt, and

anxiety are a natural part of the early phases of the constructive process of learning. Too strong a threat to existing constructs can turn one away from the learning process, and in turning away, new understanding is abandoned for the preservation of old (Kuhlthau 1993). Likewise, optimism and confidence can keep the process moving forward. (Kuhlthau 1991).

3. Verification Across Time and User Groups.

The studies conducted longitudinally and across large user groups confirmed that the process is not isolated to the small group first studied. Kuhlthau demonstrated that her ISP model is valid across a wide population by surveying 385 library users at twenty-one institutions including academic, public, and school libraries. The model held across a group of users that spanned first-year high school students to undergraduate students to adult public library users (Kuhlthau 1990). This study provided validation that the process involved in seeking information is similar across a wide range of information needs and a wide range of ages. The longitudinal study of the original participants showed that the model holds across time for individuals.

4. Awareness of the Process Improves Perceptions of the Process.

Longitudinal studies with the original participants after four years of college showed that awareness of one's personal style of research, in terms of the ISP model, had important benefits. Students were able to observe and

know their own process and pacing. Understanding that uncertainty in the early stages is part of the process led to better tolerance of the uncertainty. The ISP became more than a means to an end; it became a way to learn (Kuhlthau 1991, 368). These studies revealed that an awareness of the research process improves students' perception of the process and helps students understand and cope with the feelings of uncertainty, confusion, doubt, and frustration that are a natural part of the process.

5. A Gap in Library Instruction.

Traditional library instruction focuses on information collection – gathering, sorting, and processing information to support a topic. These activities correspond to Stages 5 and 6 of the model. The original study uncovered the number, nature, and importance of earlier stages. Browsing and acquiring background information prior to finding a focus can be viewed by students as unproductive time (Isbell and Kammerlocher 1998). These activities can be time consuming, and it is in these early stages where the emotions of confusion, doubt, and anxiety predominate. Negative emotions, when not perceived as part of the process itself, may be viewed as a personal flaw, leading to feelings of inadequacy and incompetence, which can further impact the process in a negative way These negative feelings when coupled with the belief that others know what they are doing and do not feel these negative emotions only heightens negative feelings. Acknowledging that the

roots of uncertainty lie within the process itself and not within the individual may increase tolerance for these early, uncomfortable feelings.

Carol Kuhlthau learned that the model helps students understand and feel more comfortable with the research process. An important implication of her series of studies is that the model can be useful throughout life and in a variety of information-seeking situations. Sharing the model with students as they begin a research assignment may serve them not only with their immediate needs but with their future information seeking needs as well. These reasons justify teaching the model to students.

Other Research Relevant to This Study

Other researchers have explored concepts discussed in Kuhlthau's work and closely related concepts. The literature survey that follows is grouped into studies of library anxiety, the research process, and bibliographic instruction that teaches the ISP model or addresses the negative emotions that students feel.

Library Anxiety

Library anxiety is a state anxiety brought on by being in a library or in anticipation of having to use a library. Because research generally involves some use of the library, library anxiety may contribute to anxiety experienced in connection with the research process. The model of library anxiety defined

by Constance Mellon and extended by others does not include awareness of the internal process of research as described by Kuhlthau as a contributing factor. It seems reasonable, however, to suggest that lack of awareness of the process may heighten library anxiety.

Constance A. Mellon (1986) was the first researcher to use the phrase *library anxiety* to describe the strong negative emotions that students often feel in response to using a library or in anticipation of having to use a library. Coming after Kuhlthau's first study, Mellon's investigation appears to be independent of Kuhlthau's research and evolves from a different framework. The anxiety described in Kuhlthau's model comes from uncertainty inherent in the internal processes of sense-making and learning, while Mellon's library anxiety grows from other factors related to the library environment.

Mellon's qualitative study began as an attempt to discover better ways to teach library use. Student research journals and essays about the research process and library use were collected by twenty composition instructors over a period of two years at a small university. She analyzed this data for recurring "'themes' using the constant comparative method" (Mellon 1986, 162). The focus of the research shifted when it became apparent that anxiety related to library use was a major problem for students, with 75-80% feeling fear and anxiety when confronted with library assignments. Some students experienced anxiety at levels high enough to interfere with their ability to work logically and effectively on assignments.

Mellon (1986, 162) found four recurring themes:

1. Fear and anxiety (due to confusion, helplessness, feeling lost, and fear of the unknown)
2. Confusion about where things were located
3. How to begin
4. What to do

In her experience, the four factors contributing to library anxiety focused on issues that are traditional concerns to library instruction: understanding how the library is organized and laid out and how to use the library. She drew three concepts for a grounded theory from these themes:

> "(1) students generally feel that their own library-use skills are inadequate while the skills of other students are adequate, (2) the inadequacy is shameful and should be hidden, and (3) the inadequacy would be revealed by asking questions." (Mellon 1986, 160)

She also found that students felt they were expected to know how to use the library and that they alone were having these difficulties. For some students, it was clear that anxiety was interfering with the learning process.

It should be noted that these anxieties are well-founded. Libraries can be large and confusing places to novice researchers, both in terms of physical organization and access and in terms of intellectual organization and access.

Suggested remedies included teaching students library tool use, telling students about library anxiety, assuring students that feelings of anxiety are common, and maximizing contact between students and librarians. The focus was on traditional library instruction and assurance that anxiety is normal. While her findings seem to point to students' lack of awareness of the

research process (points 3 and 4), she does not draw this conclusion into her theory.

Sharon Bostick (1992), following Mellon, developed a Likert-type instrument to measure library anxiety. Using a nonexperimental research design that included a panel of experts, she identified a list of key conceptual components. From this list, statements were generated to measure the level of anxiety due to each component. Experts reviewed the statements before they were evaluated using factor analysis. The result was a 43-question Library Anxiety Scale (LAS) using a 5-point Likert scale that identified five factors contributing to library anxiety among college students. These factors are: (1) barriers with staff; (2) affective barriers; (3) comfort with the library; (4) knowledge of the library; and (5) mechanical barriers. Affective barriers in this study refers to perceived lack of library skills and lack of confidence in using the library. Absent among the factors is awareness of the research process from the student's internal perspective. Bostick's LAS has been used in subsequent studies of library anxiety.

A series of studies published between 1996 and 1999 by Qun G. Jiao and Anthony J. Onweugbuzie, together, separately, and with others, examine many facets and causes of library anxiety among undergraduate and graduate students. Their work builds on the foundation laid by Bostick and Mellon. It examines library anxiety in relation to demographic variables such as age, sex, grade point average, and native language (Jiao, Onweugbuzie, and

Lichtenstein 1996); learning styles (Onweugbuzie and Jiao 1998a); and perfectionism among students (Jiao and Onweugbuzie 1998) Findings and recommendations relate to the five factors that Bostick described. These studies do not specifically address lack of awareness of the research process as a factor in provoking anxiety. Anxiety due to uncertainty inherent in the early stages of research was also not addressed.

Terrence F. Mech and Charles I. Brooks (1995) followed Mellon with a quantitative study of college freshmen, sophomores, juniors, and seniors to determine if library anxiety (state anxiety) is a different phenomenon than anxiety as a personality trait (trait anxiety). They found that the two are different. The distribution of trait anxiety was constant across class levels, and library anxiety decreased as students gained more experience. The work also studied self-evaluation of library skills and confidence in the use of the library. Mech and Brooks found that library anxiety decreased as skills and confidence levels increased. Again, lack of awareness of the research process as described by Kuhlthau was not addressed.

Library anxiety as envisioned by Mellon and expanded upon by Bostick, Jiao, Onweugbuzie, Mech, and Brooks is a measurable state anxiety that decreases with experience. Some of the antecedents have been identified.

Studies of the Research Process

Since Kuhlthau published her first study, additional research using qualitative methods has been conducted into the nature of the research process in students. The research that follows studied undergraduates and high school juniors and seniors. Methods included interviews, focus groups, observation, and journals.

Building on the work of Kuhlthau and Mellon, Barbara Fister studied fourteen successful college freshmen using interviews (1992). Like Kuhlthau, she found that formulating a focus was critical to the research process and that prefocus exploration required an investment of time for novice researchers. Students perceived prefocus work as unproductive and filled with anxiety. Fister advised of the need to warn students that developing a focus is creative, intuitive, and takes time. Tool-based library techniques do not emphasize the exploration, browsing, and scanning that are important for building a foundation of general subject knowledge. They concentrate, instead, on locating answers to specific questions (Fister 1992).

She also noticed that steps iterate, as when a focus is revised or refined. Gathering information and writing were not seen as separate processes. For most study participants, writing was important at many stages: keeping notes, organizing ideas, and writing the draft in stages. Fister suggested that search skills and research skills are different and that search skills should be taught in the broader context of research.

Barbara Valentine (1993) studied research behavior among undergraduate students using focus groups and individual interviews. Her study follows Mellon and Kuhlthau. Questions posed in the interviews and group discussions related to Stages 1, 2, 3, and 5 of Kuhlthau's model and also included questions about writing the paper and completing the project. Thoughts, feelings, and actions were discussed. Her results showed that students tended to find the fastest, easiest way to do a research assignment, often using strategies that minimized time spent in the library. They tended to rely on known tools and methods rather than learn new methods that might be more appropriate for the situation. Organization of the research was haphazard and generally did not to follow approaches taught in library instruction sessions. Feelings of confusion and anxiety were strong, yet students were reluctant to request assistance from a librarian, feeling it would be an admission of failure or cause embarrassment. They were more comfortable talking with peers and faculty. These results strongly indicate lack of awareness of and discomfort with the research process.

Following the work of Kuhlthau, Judy M. Pitts (1995) studied high school juniors and seniors to understand why students make the decisions they do when seeking and using information. She observed students in a natural setting while they worked in groups to produce videos about marine biology. A key finding was that students relied on established mental models and known resources, trying all available options, sometimes creatively, rather

than ask for help or learn new methods to acquire the needed information. She also compared two traits related to research and examined the effect of their various combinations upon chances of success. The traits were novice/expert subject knowledge and poor/good information skills. She found that when novice level subject knowledge is combined with good information skills, the researcher is able to locate needed information. When expert subject knowledge is coupled with poor information skills, acquisition of needed information is possible through good use of intermediaries. These researchers are able to pose requests for information in terms that intermediaries and information systems can handle well. When novice subject knowledge is combined with poor information skills, however, researchers encounter many problems acquiring needed information. These findings strengthen the need to teach library and research skills and to increase students' awareness of the research process.

Deborah Swain (1996) examined the research process in college freshmen to validate and extend Kuhlthau's model. Overall, the model held. Student journals and interviews indicated that some students followed the stages in an iterative manner and that some did not complete the stages in order. High stress and anxiety levels were prominent during early stages, but social interaction with peers and others about the assignment helped to reduce early stage stress.

These studies directly and indirectly support the framework that Kulhthau's model provides and the importance of teaching students about the process of research. Deborah Swain validated Kuhlthau's model with college freshmen. Barbara Fister confirmed the need to find a focus, the importance of the work leading to a focus, the discomfort that often accompanies the early work of research, and the iteration of stages. She highlighted that writing is important in many of the stages. Valentine's study strongly suggests lack of awareness of and discomfort with the research process in student researchers and Pitts' study strengthens the need to teach library and research skills. These studies along with the previous studies discussed create a strong imperative to take these findings into the classroom.

Applications in Library Instruction

With the importance of affect on student research documented and knowledge of the research process expanded, what efforts are being made to bring these valuable insights to students? Traditional library instruction takes the form of a one-shot, one-hour introduction to library organization and library tool use. Recently, some information professionals have demonstrated the usefulness of expanded library instruction, and others have found innovative ways to work within the current system to bring a greater awareness of the research process to students.

Building on the foundations laid by Kuhlthau and Mellon, Dale Vidmar (1998) studied an innovative way to reduce negative affect in freshman college students facing a research assignment by adding ten to twenty minute "Pre-Sessions" to the standard one-hour instruction. Recognizing that library anxiety diminishes the potential for learning, librarians at Southern Oregon University met with students in their regular classroom a few days prior to the library instruction session. This time was used to establish a rapport between students and the librarian; to assess the needs of the class so as to tailor the coming instruction session; to explain to students what would be covered; and to reassure students that uncertainty and stress are a normal part of the process. Attitudes, feelings, and beliefs about the library were measured with pre- and post-test questionnaires. Results indicated a positive influence among those exposed to pre-sessions. Anxiety was addressed, but awareness of the research process was not.

The Arizona State University, West, an upper division campus of Arizona State University in Phoenix, has expanded library and research instruction. The curriculum now includes a one-credit hour course as part of a writing certificate program. In addition to traditional library skills, students are introduced to Kuhlthau's model. Dennis Isbell and Lisa Kammerlocher (1998) describe how Kuhlthau's model is being integrated into the new course and into reference services. The "Kuhlthau Exercise," as they call it, takes about an hour and begins by having students write down how they begin a research

assignment, the steps they take, and how they feel about the assignment. Observations are compared in small groups of two or three. Class discussion follows in which each group shares their findings and the findings are compiled. Kuhlthau's model is introduced as part of the discussion, and it is compared with student-generated observations. Attention is brought back to the model throughout the course in lessons and discussions.

Although results were not measured, the following outcomes are reported to have been observed:

1. Student feelings and research processes mirror Kuhlthau's model well.
2. Initial stages of the process are typically viewed as unproductive, and feelings of frustration are common. Students expect the research process to begin with a focused topic at Stage 5.
3. Students find that the model resonates with their own experience, and they feel reassured.
4. The importance and nature of the initial stages grows as students work with the model.

No formal study was conducted, but Virginia Rankin (1992) reports success in teaching eighth graders library and research skills that mirror the first four Stages of Kuhlthau's model: task initiation, topic selection, prefocus exploration, and focus formulation. In a process she calls "Pre-Search," Rankin teaches students how to read, scan, and skim encyclopedia articles and other materials appropriate to the age group. She encourages them to think, ask questions, reflect upon and judge the value of the information before taking notes or making photocopies. This develops a foundation of background information on the assignment subject that will lead to questions

to investigate – a focus. Students are taught note-taking skills that involve scanning and skimming, finding main and supporting ideas, and evaluating information before actually making notes. The result is that anxiety related to the research project appears to diminish and students become more interested in the assignment. Rankin teaches skills related to the first four stages of Kuhlthau's model, giving students a better experience of research, without describing the stages as such. For this age group, direct experience is the teaching method. Meta-cognition – thinking about the process in abstract terms – is premature.

These reports show the importance of addressing the feelings, thoughts, and actions associated with the Stages of Kuhlthau's model when working with student researchers. Assurance that confusion and anxiety are normal can help reduce negative emotions. Providing a way for students to observe the research process within themselves and to reflect upon and discuss the thoughts, feelings, and emotions at each stage may lead to better understanding of, and better tolerance for, the process.

In this sub-section, Dale Vidmar's work is the only study that generated data to use in evaluating success of the program described. Anecdotal reports are encouraging, but are used with caution.

Summary

Research is a complex process with identifiable stages. Investigation of the process has shown that it is often accompanied by uncomfortable feelings. In Kuhlthau's model, the anxiety, uncertainty, doubt, and confusion that characterize the early stages of research are a natural part of the learning process. During the early stages, the researcher is trying to understand the nature, size, and scope of the information need. Negative feelings may continue as the researcher takes in a large amount of new information, trying to make sense of it, trying to find a focus, and trying to complete the assignment. Kuhlthau further showed that these early negative feelings give way to confidence as sense is made and the work progresses. She verified the model across time for individual researchers and across a wide range of ages and a wide range of information needs.

The work on library anxiety, begun by Mellon, addresses many factors contributing to library anxiety but does not include awareness of the internal process of research as a factor in producing this anxiety. It is likely that library anxiety and anxiety associated with the research process affect each other, but this potential link is not explored at this time. Studies of library anxiety are included because most student research involves library use and library anxiety may contribute to anxiety associated with research.

The research of Fister, Valentine, Pitts, and Swain support the ISP model, the importance of feelings to the research process, and the reluctance

of students to seek new ways to do research or to ask for help. These studies demonstrate the need for sharing knowledge of the research process as an internal process of thoughts and feelings with novice researchers. As suggested in the report of Isbell and Kammerlocher, attempts to take this knowledge into the classroom may be successful when information professionals work with students over the course of an assignment. Vidmar demonstrated the usefulness of a fifteen- to twenty-minute pre-session designed to evaluate student needs and allay anxiety in improving students' affect levels.

At many institutions, it is not possible for information professionals to work with students throughout the course of a research assignment. If the model can be taught in a single session of thirty minutes or less, it may be possible to reach students with little disruption to existing academic norms. This study attempted to learn if a short introduction to Carol Kuhlthau's model of the Information Search Process could improve students' awareness of the cognitive and affective aspects of the research process, ease anxiety levels associated with the process, and improve overall satisfaction with the process.

CHAPTER 3

CONCEPTUALIZATION AND HYPOTHESES

The chapter begins with a list of key terms. Study variables are then listed, defined conceptually, and operationalized. The chapter concludes with the hypothesis statements.

Terminology

Terms Relating to Affect

Affect – Emotions or emotional states such as love, hate, fear, and anxiety; emotional feelings.

Anxiety – *Anxiety* is the pervasive and unpleasant feeling of tension, dread, apprehension, and unease. It is associated with an anticipated, undefined, or unknown threat rather than with a clear and present danger. Anxiety is accompanied by arousal of the autonomic nervous system.

Library Anxiety – *Library Anxiety* is a form of state anxiety that is precipitated by being in a library setting or by anticipation of having to use a library.

State Anxiety – Anxiety experienced in a particular situation. State anxiety is a temporary emotional state.

Trait Anxiety –The measure of a person's proneness to react to stressful situations with elevated anxiety levels. This personality trait is relatively stable over time.

Terms Relating to Awareness

Awareness – *Awareness* is the state of being mindful or heedful of internal or external events or experiences.

Cognitive Awareness – *Cognitive awareness* is a conscious awareness that can be articulated in speech.

Cognitive Awareness Level – *Cognitive Awareness Level,* in Kelly's Personal Construct theory, is "the degree to which a construct is expressed in effective symbols, has alternatives, but is not contradicted by other constructs" (Corsini 1999).

Pre-cognitive Awareness – An awareness that can be felt but not articulated; a vague awareness.

Terms Relating to Construction

Construct – "A *construct* is an idea or thought that directs a person's feelings and actions. Constructs include both thoughts that can be articulated in speech and those that are inexpressible or tacitly known. . . . Constructs are clustered by the individual to form a way of anticipating and predicting events." (Kuhlthau 1983, 117)

Constructivist Learning Theory – *Constructivist learning theory* is based on George Kelly's phases of construction through which a person progresses when forming new constructs.

Variables

Four variables were studied in this research: (1) ***awareness of the cognitive aspects of the research process,*** (2) ***awareness of the affective aspects of the research process,*** (3) ***anxiety associated with the research process,*** and (4) ***satisfaction with the research process.*** Awareness of the cognitive aspects of the research process, awareness of the affective aspects of the research process, and satisfaction with the research process are complex variables.

Conceptually, ***awareness*** is used as defined in the terminology section. Operationally, awareness includes only cognitive awareness. It does not include pre-cognitive awareness

Conceptually, ***awareness of the cognitive aspects of the research process*** is awareness of the thought processes associated with research. It includes awareness that research proceeds in stages, awareness of the thoughts typical for each stage, and awareness that the stages can iterate. Operationally, the variable is measured by the sum total of eight sub-variables:

1. Stage 1 – Task Initiation – Cognitive Aspect
2. Stage 2 – Topic Selection – Cognitive Aspect
3. Stage 3 – Prefocus Exploration – Cognitive Aspect
4. Stage 4 – Focus Formulation – Cognitive Aspect
5. Stage 5 – Information Collection – Cognitive Aspect
6. Stage 6 – Search Conclusion – Cognitive Aspect
7. Iterative nature of the process – Cognitive Aspect
8. Overall process – Cognitive Aspect

Conceptually, ***awareness of the affective aspects of the research process*** is awareness of feelings associated with research. It includes feelings typical for each stage, feelings about the iterative nature of the process, and feelings about the overall process. Operationally, the variable is measured by the sum total of eight sub-variables:

1. Stage 1 – Task Initiation – Affective Aspect
2. Stage 2 – Topic Selection – Affective Aspect
3. Stage 3 – Prefocus Exploration – Affective Aspect
4. Stage 4 – Focus Formulation – Affective Aspect
5. Stage 5 – Information Collection – Affective Aspect
6. Stage 6 – Search Conclusion – Affective Aspect
7. Iterative nature of the process – Affective Aspect
8. Overall process – Affective Aspect

Anxiety associated with the research process is the third variable. Conceptually, ***anxiety*** is defined as in the prior terminology section. Operationally, anxiety is used as defined conceptually, with the focus on

anxiety as it relates to the research process. Anxiety associated with the research process is a state anxiety. While it is impossible to completely divorce other contributions to anxiety, participants were asked to consciously describe anxiety as it relates to their research only. Anxiety was measured using the state anxiety measure of the State-Trait Anxiety Inventory (STAI) Form Y-1 as published by Consulting Psychologists Press (1977).

Conceptually, ***satisfaction*** is the pleasant feeling of contentment that comes when a need or desire has been fulfilled so that it no longer affects or motivates behavior. Operationally, ***satisfaction with the research process*** is measured by the sum total of two sub-variables:

1. Satisfaction with the process itself – a student's perception of satisfaction with the process as she experiences it; how satisfied the student is with her own process in comparison with her expectations.
2. Satisfaction with the product – the finished paper.

Research Hypotheses

Four hypotheses were tested using the null hypothesis and one-tailed tests of significance.

Cognitive Aspect

1. $\mathbf{H_0}$: A thirty-minute presentation of Carol Kuhlthau's Information Search Process model has no effect on awareness of the thoughts associated with the research process.

H_1: A thirty-minute presentation of the ISP model improves awareness of the thoughts associated with the research process.

Affective Aspects

2. H_0: A thirty-minute presentation of the ISP model has no effect on the awareness of the feelings associated with the research process.

   H_1: A thirty-minute presentation of the ISP model improves awareness of the feelings associated with the research process.

3. H_0: A thirty-minute presentation of the ISP model has no effect on perceived levels of anxiety associated with the research process.

   H_1: A thirty-minute presentation of the ISP model reduces perceived anxiety levels associated with the research process.

4. H_0: A thirty-minute presentation of the ISP model has no effect on perceived satisfaction with the research process.

   H_1: A thirty-minute presentation of the ISP model improves perceived satisfaction with the research process.

CHAPTER 4

METHODOLOGY

This chapter describes the study setting, population and sampling, treatment and data collection, and consent and anonymity procedures. It opens with a description of the Research Process Survey (RPS) and the make-up of the pre-test, interim tests, and post-test Development of the RPS, validity issues, and reliability testing are detailed in appendix C.

Test Instruments

At the time the research was conducted, no instrument existed to measure the variables of interest. The Research Process Survey was designed and tested as part of the study. The RPS measures awareness of the cognitive aspects of the research process, awareness of the affective aspects of the research process, and satisfaction with the research process. Demographic data was collected to allow comparison of experimental and control groups. A standard state anxiety inventory, STAI form Y-1, was used to measure anxiety levels associated with the research process. The RPS was pilot tested on a small group of first-year graduate students before it was used in the study. See appendix C for additional information.

The Research Process Survey

The Research Process Survey consists of two parts, a qualitative measure and a quantitative measure. The qualitative portion is intended to provide a better understanding of the participants' experience than is possible using a survey alone. It serves to measure awareness levels and provides a means to verify responses given in the survey. The qualitative portion uses the Critical Incident Technique. Subjects are asked to recall a specific research assignment and describe in a paragraph their thoughts, feelings, and actions as they worked through the process.

The quantitative survey portion of the RPS provides data at the ordinal level for computing awareness and satisfaction levels. It consists of a set of statements designed to measure:

1. Awareness of the cognitive aspects of the research process – eight sub-variables
2. Awareness of the affective aspects of the research process – eight sub-variables
3. Perceived satisfaction with the research process – two sub-variables

Eighteen pairs of statements make up the survey, and responses are measured using a five-point Likert-type scale ranging from *Strongly Disagree* to *Strongly Agree* with a middle point of *Sometimes.* The thirty-six statements are presented in mixed order. Two statements are used to measure each sub-variable. One statement in each pair is written so that a high score (strongly agree) measures a high awareness or high satisfaction level. The second

statement is worded to reflect the reverse, or inverse, of the first statement. In this case, a high score (strongly agree) measures a low awareness or low satisfaction level Inverse statements are re-coded during analysis so that a high level of awareness or satisfaction results in a high score. Scores for each pair are averaged to obtain a single measure for each sub-variable, and scores for sub-variables are summed to obtain a single measure for each variable.

Pre-Test

The pre-test collects basic demographic data and measures: (1) baseline awareness of the cognitive aspects of the research process; (2) baseline awareness of the affective aspects of the research process; (3) baseline anxiety levels; and (4) baseline satisfaction with the research process. A sample of the pre-test can be found in appendix F.

The pre-test has three parts plus a cover sheet for the demographic data. Demographic data includes class standing, gender, age (classified in 5-year intervals), highest level of education, and major field of study. Part one is the qualitative portion of the RPS. Participants are asked to describe in a paragraph their most recent or most memorable research assignment. In part two, they are instructed to consider the same incident when evaluating the thirty-six statements comprising the quantitative portion of the RPS. Part three is the state anxiety indicator STAI form Y-1, and participants were asked to

respond to the statements in the context of the assignment described in part one.

Interim Tests

The interim test consists of the state anxiety test only. It is given at two points, once early in the course of the research and a second time before participants complete their research and begin the final writing. In each instance, students are asked to think about their current research assignment and respond to the statements in this context. A copy of the interim test is included in appendix G.

Post-Test

The post-test is administered after the assignment is completed. It is the same instrument as the pre-test but includes two additional questions on the cover page. The first question asks the respondent for the stage of completion of the assignment at the time of the post-test. This question is included to ensure that only students who have completed Stage 6 of Kuhlthau's model are included in the analysis for both experimental and control groups. The second question asks if the student heard the guest speaker. Only those students in the experimental sections who heard the speaker are included in the experimental group for analysis. The second question is of no consequence for students in the control sections because the

model was not discussed. The post-test measures the variables in the context of the completed assignment. See appendix H for a copy of the post-test.

Setting

The study took place at a large state university in the southeast with an enrollment of over 25,000 students. One hundred forty-six graduate and professional degree programs are offered, along with 110 undergraduate programs. The student population is 48% male, 52% female, and undergraduates make up 77% of the student body.

Population and Sampling

The population studied is upper division undergraduate students who have a research paper of ten pages or more to write as part of their coursework. This population was selected because a substantial research paper requiring synthesis provides a good situation for testing. Students at the upper division are capable of synthetic writing but may find it to be a new challenge. Information contained in the model could assist them in completing the assignment. A research paper of at least ten pages requires a substantial amount of research and the processing of a large amount of information. Students not accustomed to writing long, in-depth papers would likely experience higher stress levels. This would improve the chance of measuring changes in anxiety over the course of the assignment

Subjects were originally to be selected from among classes scheduled for bibliographic instruction on use of the library's online catalog, bibliographic sources, and other reference sources useful to their research. A class with two sections taught by the same instructor was sought. One section would be assigned to the experimental group and the other section assigned to the control group. Compared to random assignment, this strategy would minimize diffusion of treatment from the experimental group to the control group and minimize disruption to student and faculty schedules.

Among the classes requesting bibliographic instruction the semester the experiment was conducted, none met the requirements for paper length and population profile. The group chosen for participation in the study was an upper division class in technical and professional writing with four sections. One instructor (Instructor A) taught two sections, and two additional instructors (Instructors B and C) taught the remaining sections. One of Instructor A's sections (Section 1) was assigned to the experimental group and the other (Section 2) to the control group. Instructor B's section (Section 3) was assigned to the experimental group, and Instructor C's section (Section 4) was assigned to the control group. The research assignment involved writing a recommendation report requiring substantial research and a minimum of fifteen pages. Students had approximately eight weeks to research and write the report. This assignment was scheduled during the last half of the semester.

Data Collection and Treatment

Originally, students were to be pre-tested on the first day of class. Due to a number of factors, including high enrollment turnover during the first two weeks, pre-testing was postponed. The pre-test was administered in each section during the fifth week of class, before students began work on the recommendation report.

One week after pre-testing, the experimental group heard a thirty-minute presentation of Kuhlthau's Information Search Process model delivered by a faculty member of the School of Information Sciences. The control group heard a thirty-minute placebo talk given by a professional technical writer and editor about his personal experiences working in the field of technical writing. Information that might inform students about the internal process of research was not discussed during the placebo talk.

Two interim anxiety tests were given at three-week intervals, and post-testing was scheduled three weeks after the second interim anxiety test when the assignment was complete. The date of post-testing was adjusted for each section to coincide with the due date of the report. Sections one through three were post-tested on the day the report was submitted. Section four had a two-week period in which to turn in the final report. The due dates for section four spanned the last full week of classes through the optional final. Attendance was not mandatory during this period, so it was not possible to test the section after all of the students had completed their reports. Instead, students were

tested at a single point during the two weeks when attendance was likely to be high. At the time of post-testing, some participants had finished their papers or drafts while others had not. The status of the student's paper was requested on the post-test form.

Consent and Anonymity

Human subjects testing approval was obtained from the University using Form A. Before administering the pre-test, participants were informed that their participation was voluntary and that they would not be penalized for choosing not to participate. A statement addressing voluntary participation and informed consent was printed on each test given. Students were reminded in subsequent testing that participation was still voluntary.

Anonymity was secured by asking each student to choose a unique "nickname" that was easy to remember. Before giving the pre-test, a sign-up sheet was circulated on which students could write their chosen nickname. All tests requested the nickname of the participant. If a student forgot his nickname in subsequent tests, he was allowed to look over the list of nicknames to refresh his memory. No list associating real names with nicknames was compiled.

Interview with the Model Presenter

As a way to minimize distractions for the students, the researcher was not in attendance when the model was presented to the two experimental sections. The guest speaker who presented the model was later interviewed by phone to assess the effect of the presentation from the speaker's perspective. These questions were asked:

1. What percentage of the students appeared to be engaged during most of the presentation?
2. Did the model appear to make intuitive sense to the students? To approximately what percentage?
3. What were the students' reactions to hearing the model? In particular, what comments did the students offer?

Limitations of the Study

An effort was made to maximize the size of the analysis pool by including four sections of students, ninety in all, to compensate for the subject mortality that can occur across a semester. This strategy was successful for the pre- and post-test data set. It was not successful for the full set of anxiety tests and the number of subjects (eight control and ten experimental) was not large enough to permit meaningful analysis with inferential statistics.

A second limitation was the inability to perform reliability testing of the RPS with a separate group of comparable students. Although it is not the preferred practice, reliability testing was performed using participants' data.

Summary

The research used experimental and control groups and employed pre-, interim, and post-testing. Anonymity was assured by the use of nicknames selected by the students, with no master list matching real names with nicknames. Participation was voluntary at each phase of testing, and an informed consent notification appeared on each test administered.

CHAPTER 5

DATA ANALYSIS AND HYPOTHESIS TESTING

This chapter covers methods used to handle and store the data, basic computations performed, evaluation of cases for inclusion in the analysis, results of the interview with the model's presenter, a brief description of the participants, analysis of initial similarity of groups, methods used to analyze the data, and results of the analysis.

Data Handling and Basic Computations

Pre-tests, interim tests, and post-tests were composed of one or more of four basic elements: (1) demographic data, (2) the qualitative portion of the Research Process Survey, (3) the quantitative portion of the Research Process Survey, and (4) a standard anxiety test. At this time, the qualitative data was not systematically analyzed but was used to corroborate responses to the quantitative measures and in evaluating questionable quantitative data for inclusion or exclusion. For example, when inconsistencies appeared in the quantitative portion of a test, explanations were sometimes found in the qualitative data. The qualitative data will be analyzed at a future date.

All other basic elements contained nominal or ordinal data that could be coded and stored in a commercial statistical software package SPSS was used in this study. Class standing, age, highest education level completed,

status of report at the time of post-testing, and whether the student heard the guest speaker was coded numerically as ordinal data. Nickname and major field of study were retained as nominal data.

Survey statements on the RPS were coded as follows for both forward and inverse statements:

Strongly Agree	5
Agree	4
Sometimes	3
Disagree	2
Strongly Disagree	1

The original data was entered and stored. Inverse statements were recoded into new variables to reflect high scores for high awareness and satisfaction levels and low scores for low awareness and satisfaction levels. Forward coded statements were not adjusted. The resulting values for statement pairs were averaged using the *mean function* to produce one measure for each sub-variable. When one value was absent, the mean equaled the value of the paired response. This method for handling the occasional missing value was chosen because the statement pairs, when corrected for reverse coding, were designed to measure the same aspect. Tests were removed from the evaluation pool when more than a few statements had missing data. Mean values for the sub-variables within each variable were summed to produce a measure for each of the three variables measured with the instrument.

Responses to the anxiety questionnaire were handled in a similar manner. The raw data for individual items was coded according to the

following scheme for both forward and reverse coded statements:

Very Much So	4
Moderately So	3
Somewhat	2
Not At All	1

Reverse coded statements were recoded into new variables so that high scores reflected high anxiety and low scores reflected low anxiety. The method for handling missing responses for the anxiety test is discussed in the next section. Responses to the twenty statements were summed to obtain the anxiety score after reverse coding was corrected. Tests were removed from the evaluation pool when more than a few statements were unanswered.

For each participant, gain scores were calculated for each variable to facilitate hypothesis testing. The gain score for a variable is the post-test value minus the pre-test value.

Evaluation of Cases

This section describes how individual cases were evaluated for inclusion in the analysis and for reassignment from the experimental to the control group. Additional methods used to address missing data points are also discussed.

Two distinct subsets were used in the final analysis. Data of students who took both the pre-test and the post-test was used to evaluate changes in awareness of the cognitive aspects, awareness of the affective aspects, anxiety, and satisfaction that occurred between the beginning of the

assignment and its conclusion. Failure to respond to a few statements did not constitute exclusion from the final pool, nor did failure to complete the qualitative portion of the test. Initially twenty control and twenty-seven experimental subjects qualified. The remaining forty-three subjects were excluded because of insufficient data.

A subset of this group was also present for both interim anxiety tests. Data of students with complete data sets (a pre-test, two interim tests, and a post-test) was used to track anxiety levels across the course of the assignment. Again, failure to respond to a few statements or failure to complete the qualitative portion of the pre- or post-test did not constitute exclusion. Initially nine control and thirteen experimental subjects qualified.

Students in the two experimental sections who indicated that they had not heard the guest speaker, and hence were not exposed to the model, were reassigned to the control group for analysis. This was possible because the model was not part of the course and thus was not discussed by the instructor during other class periods. The pre- and post-test group now consisted of twenty-six control and twenty-one experimental subjects. The subset of students with complete test sets contained eleven control and twelve experimental subjects.

Students who indicated that they had not completed the paper or a draft of the paper at the time of post-testing were eliminated from the pool because there was no assurance that they had completed Stage 6 of the model. This

decision affected only section four and resulted in the elimination of seven students from the pre-test/post-test control group and two from the complete data set group.

The remaining forty pre-test/post-test data sets were examined for questionable data. Anxiety tests with contradictory statements were evaluated to determine if the contradictions were reasonably possible. When present, the qualitative data was used to evaluate the reliability of the questionable data. Anxiety tests were also compared for each individual across time when a test appeared to contain questionable data.

Two cases illustrate two different outcomes. An anxiety test for one participant was marked with the response *somewhat* for each of the twenty statements. This test was suspect until the other anxiety tests for this individual were examined. Among the eighty statements that made up the set of four anxiety tests, only thirteen statements were marked with a different response. The tests were judged to be valid because they were consistent. An anxiety test for a different participant was marked with the same response for virtually all statements. When the other anxiety tests for this participant were examined, it was found that the first two had well scattered responses while the last two had virtually the same response for each statement. This pattern suggested that the participant may have lost interest, and the questionable tests were excluded Anxiety tests with several moderate contradictions or more than one strong contradiction that could not be explained were

eliminated from the pool. A similar evaluation of the RPS data was not attempted due to the complexity of the instrument.

After this step, there were nineteen control and twenty experimental subjects in the larger pre-test/post-test pool and eight control and ten experimental subjects in the smaller sub-set of students with complete test sets. The analyses were run on these final data sets.

The data was lightly cleaned before performing any analyses. Six missing data points were adjusted in the quantitative portion of the RPS survey by filling in the missing value with the value of the paired statement. This method was consistent with using the *mean function* to calculate the average value for the pair. For one missing anxiety data point, the average value of the answer choices was substituted. In this portion of the test, statements were not paired, so no other means of estimating the likely answer was available.

Interview Results

The guest speaker for Kuhlthau's model indicated that all of the students in attendance appeared to be engaged during most of the presentation. The model seemed to make intuitive sense for at least fifty percent of the students. The speaker asked the students how they felt when they learned about the research paper. They responded with expressions such as *terrified, frustrated,* and *I wanted to drop out.* The speaker asked if the

model made sense – did they think it would help? They replied with statements such as *I wish I had known this earlier; Yes, it would help;* and *Other classes would have been easier if I had known this.* The speaker indicated that the presentation placed extra emphasis on the affective aspects of the process, but that students seemed to have a clearer idea of how to begin after learning about the cognitive aspects. Some participants asked questions related to information seeking – questions for practical guidance.

Brief Description of Participants

The final pre-test/post-test group contained nineteen control subjects and twenty experimental subjects. Demographic data is summarized in table 1. The groups were similar with respect to the distribution of males and females and the distribution of juniors and seniors. A slight difference in ages between groups existed. The majority of students were between twenty and twenty-four years of age. The control group contained one student aged twenty-five to thirty, and the experimental group had one student younger than twenty years of age and three students over thirty. The groups were fairly similar in educational background with the majority holding a high school diploma. The control group contained four students with associate degrees and one student with a bachelor's degree The experimental group contained two students with associate degrees. The largest difference between groups can be found in the distribution of major fields of study. The control group

Table 1. Students' Demographic Data

$n_{control}$ = 19 $n_{experimental}$ = 20		Control Group Number (%)	Experimental Group Number (%)
Standing	Junior	8 (42.1%)	7 (35.0%)
	Senior	11 (57.9%)	13 (65.0%)
Gender	Female	11 (57.9%)	11 (55.0%)
	Male	8 (42.1%)	9 (45.0%)
Age	Less than 20 years	0 (0.0%)	1 (5.0%)
	20-24 years	18 (94.7%)	15 (75.0%)
	25-29 yr.	1 (5.3%)	1 (5.0%)
	30-34 yr.	0 (0.0%)	3 (15.0%)
Education	High School	14 (73.7%)	18 (90.0%)
	Associate Degree	4 (21.1%)	2 (20.0%)
	Bachelor Degree	1 (5.3%)	0 (0.0%)
Major	English	7 (36.8%)	4.5* (22.5%)
	Exercise Science	3 (15.8%)	1 (5.0%)
	Human Services	2 (10.5%)	2 (10.0%)
	Logistics/ Management	1 (5.3%)	1 (5.0%)
	Science, Engineering, Computer Science	6 (31.6%)	11.5* (57.5%)

* One student had a double major

contained more English students while the experimental group contained more science and engineering students.

Initial Similarity of Groups

A Mann-Whitney U test for two independent samples was run to determine if the control and the experimental groups were significantly different at the start of the experiment in terms of the study variables. (See Chapter 3 for a description of the variables.) This test is the nonparametric equivalent of the Student's t test and is appropriate for ordinal data. Results of the Mann-Whitney U test run on pre-test scores for cognitive aspects, affective aspects, anxiety, and satisfaction are given in table 2. Using p values for two-tailed tests at a ninety-five percent confidence level, the groups were not significantly different and thus represented two similar samples from the same population.

Table 2. Mann-Whitney U Test for Initial Similarity of Groups

	Pre-test Cognitive Aspects	Pre-test Affective Aspects	Pre-test Anxiety	Pre-test Satisfaction
Mann-Whitney U	158.500	184.500	184 000	170 500
Exact Sig (2-tailed)	383	884	873	590

Descriptive Statistics

Descriptive statistics for gain scores for cognitive aspects, affective aspects, anxiety, and satisfaction were calculated separately for the experimental and control groups to provide a general picture of the effect of the treatment. Means, standard deviations, maximum and minimum values, and ranges are given in table 3. The results show an interesting trend. Average mean differences were relatively small (near zero) within the control group for cognitive aspects, affective aspects, and satisfaction. Among the three, one average mean increased by less than one quarter of one point, one dropped less than one quarter of one point, and one dropped less than one half of one point. Some fluctuation in means for the control group was expected. In comparison, the experimental group showed positive gains for each of these variables from approximately one half of one point to more than one point. The differences in mean gains between groups for cognitive aspects and for affective aspects equaled approximately one point each, with the experimental group demonstrating higher awareness in both categories at the time of post-testing. These differences occurred on a scale of sixteen to eighty possible points. The difference in averaged means for satisfaction shows that the experimental group had a higher satisfaction level at the time of post-testing by about one half of one point. This change occurred on a scale of four to twenty possible points. If adjusted to a sixteen to eighty point scale, this would translate into a two-point difference. Mean gains in anxiety levels were

Table 3. Descriptive Statistics for Gain Scores

Control, Experimental		N	Minimum	Maximum	Mean	Std Deviation
Control	Cognitive Aspects Difference (Post -test - Pre-test)	19	-8 00	6.00	- 4211	3.1546
	Affective Aspects Difference (Post-test - Pre-test)	19	-5.50	5 50	2105	2.5783
	Anxiety Difference (Post-test - Pre-test)	19	-44.00	29.00	-2.6579	19 2729
	Satisfaction Difference (Post-test - Pre-test)	19	-3.00	2.50	-.1579	1.4439
	Valid N (listwise)	19				
Experimental	Cognitive Aspects Difference (Post -test - Pre-test)	20	-3.50	4.00	.6000	1 8680
	Affective Aspects Difference (Post-test - Pre-test)	20	-4 50	11 00	1 1500	3.9172
	Anxiety Difference (Post-test - Pre-test)	20	-25 00	6.00	-9 4000	9 7570
	Satisfaction Difference (Post-test - Pre-test)	20	-1.50	3.50	4000	1 2312
	Valid N (listwise)	20				

negative for both groups. The experimental group experienced a drop of seven points more than the control group. These trends suggest that an effect may be present.

Anxiety scores across the duration of the assignment were examined for the eighteen students with complete data sets by means of box and whisker plots. See figure 1. The boxes represent the interquartile range and the whiskers the outer quartiles. The median value is displayed as a line within the box, and outliers are plotted and labeled. The experimental group as a whole experienced the sort of change in anxiety that was anticipated as uncertainty diminished across the assignment. This trend is apparent in both the median scores and in the interquartile range. A similar trend is evident in the median scores of the control group, but the boxes show that anxiety levels changed little overall for the group as a whole. Because the number of participants was low, inferential statistics were not employed.

Analysis and Hypothesis Testing

Methods of Analysis

Two statistical analyses were performed on the data. The hypotheses were tested using the Mann-Whitney U test with one-tailed significance testing at a ninety-five percent confidence level on gain scores. The Mann-Whitney U test is a nonparametric test for two independent samples and is appropriate for ordinal data.

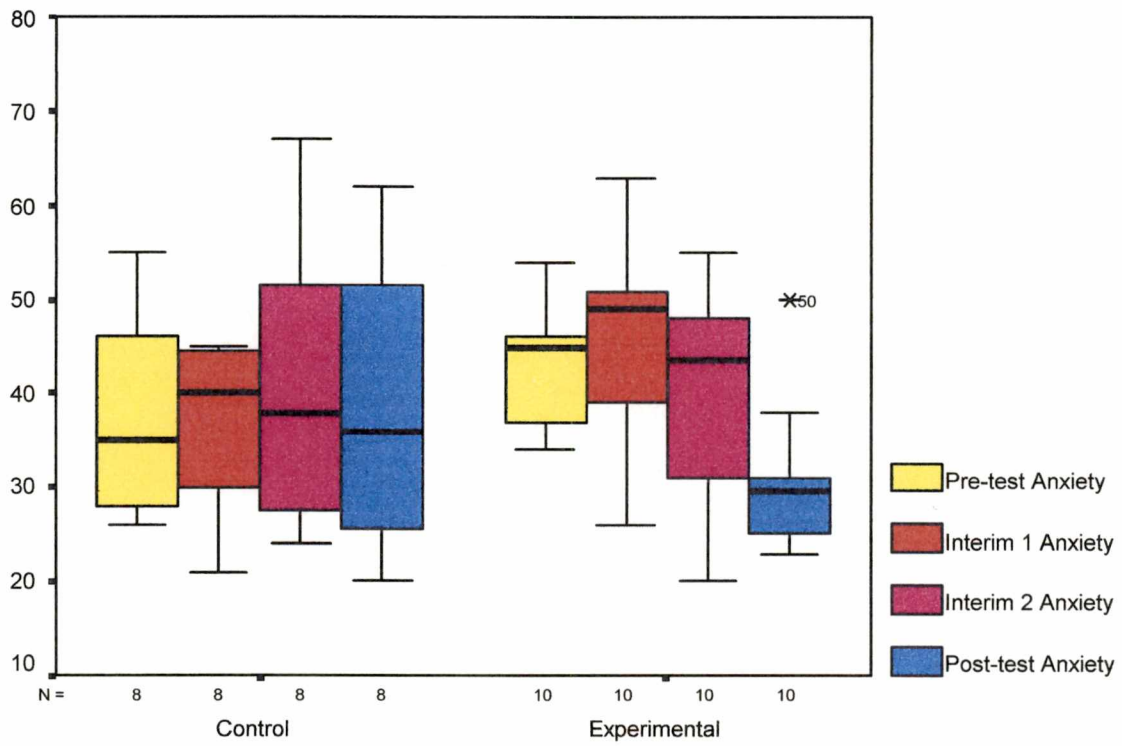


Figure 1. Pre-, Interim, and Post-test Anxiety Scores

A second analysis was run to determine the significance of the change within each group The Wilcoxon Signed Ranks test compares two related variables, in this case pre-test and post-test scores, to determine if there is a significant difference between scores. The test is suitable for ordinal data. Experimental and control groups were evaluated separately.

Hypothesis Testing

The results of hypothesis testing using the Mann-Whitney U test are summarized in table 4. Results of the Wilcoxon Signed Ranks test for change within each group are summarized in table 5.

Hypothesis 1 – Cognitive Aspect

H_0: A thirty-minute presentation of Carol Kuhlthau's Information Search Process model has no effect on awareness of the thoughts associated with the research process.
H_1: A thirty-minute presentation of the ISP model improves awareness of the thoughts associated with the research process.

The null hypothesis cannot be rejected based on the Mann-Whitney U test. The p-value at a ninety-five percent confidence level is 0.121. Analysis of the change within each group, as measured by the Wilcoxon Signed Ranks tests, shows no significant change for either the experimental or the control group at a ninety-five percent confidence level. The p-values were 0.088 and 0.287, respectively. If a ninety percent confidence level had been used, a

Table 4. Tests of the Null Hypotheses Using Mann-Whitney U Tests on Gain Scores

	Cognitive Aspects Difference (Post -test - Pre-test)	Affective Aspects Difference (Post-test - Pre-test)	Anxiety Difference (Post-test - Pre-test)	Satisfaction Difference (Post-test - Pre-test)
Mann-Whitney U	148 000	171 500	131 000	150 500
Exact Sig (1-tailed)	121	306	049	135

Table 5 Wilcoxon Signed Ranks Test for Significance of Change Within Groups

Control, Experimenta		Post-test / Pre-test Cognitive Aspects	Post-test / Pre-test Affective Aspects	Post-test / Pre-test Anxiety	Post-test / Pre-test Satisfaction
Control	Z	- 585[a]	- 456[b]	- 654[a]	- 476[a]
	Exact Sig (1-tailed)	287	.334	265	.326
Experimental	Z	-1 404[b]	-1 088[b]	-3 262[a]	-1 410[b]
	Exact Sig (1-tailed)	088	144	000	079

a Based on positive ranks.

b Based on negative ranks

significant change would have been observed within the experimental group and not within the control group.

Hypothesis 2 – Affective Aspect

H_0: A thirty-minute presentation of the ISP model has no effect on the awareness of the feelings associated with the research process.
H_1: A thirty-minute presentation of the ISP model improves awareness of the feelings associated with the research process.

The null hypothesis cannot be rejected based on the Mann-Whitney U test with a p-value of 0.306. Analysis of change within groups shows no significant change for either group, with p-values equal to 0.144 for the experimental group and 0.334 for the control group.

Hypothesis 3 – Anxiety

H_0: A thirty-minute presentation of the ISP model has no effect on perceived levels of anxiety associated with the research process.
H_1: A thirty-minute presentation of the ISP model reduces perceived state anxiety levels associated with the research process.

The null hypothesis is rejected at the ninety-five percent confidence level based on the Mann-Whitney U test and a p-value of 0.049. Change in anxiety within groups shows significant change for the experimental group and no significant change for the control group. The p-values are 0.000 and 0.265, respectively.

Hypothesis 4 - Satisfaction

H_0: A thirty-minute presentation of the ISP model has no effect on perceived satisfaction with the research process.
H_1: A thirty-minute presentation of the ISP model improves perceived satisfaction with the research process.

The null hypothesis cannot be rejected based on the Mann-Whitney U test with a p-value of 0.135. Evaluation of change within groups shows no significant change for either the experimental or the control group at a ninety-five percent confidence level. The p-values are 0.079 and 0.326, respectively. Had a ninety percent confidence level been used, a significant change would have been observed within the experimental group but not within the control group.

Summary

Experimental and control groups did not differ significantly in terms of the test variables at the beginning of the experiment and thus represent two samples from the same population. Four hypotheses were tested. One null hypothesis was rejected. A thirty-minute presentation of Kuhlthau's model is sufficient to reduce anxiety associated with research paper assignments. Results for anxiety are tied to the research process by use of the Critical Incident Technique. The null hypotheses for the remaining three variables cannot be rejected. Changes in awareness of cognitive aspects, awareness of affective aspects, and satisfaction were measured in the direction anticipated, but the differences were not large enough to be statistically significant.

In the sub-set of participants with complete data sets, the median anxiety values for both groups follow the expected pattern. Anxiety began at moderate levels and rose before falling off when the assignment was complete. The differences for the experimental group, however, were pronounced while the control group showed only moderate change. Comparison of the interquartile ranges shows that the control group experienced little change across the duration of the assignment, while the experimental group exhibited clear change.

Implications of the findings are discussed in Chapter 6.

CHAPTER 6

DISCUSSION AND CONCLUSIONS

Discussion

This study grew from concern about the anxiety students often feel when faced with research papers. Because anxiety and stress can interfere with learning, reducing anxiety may foster greater satisfaction with the process and lead to better papers, better cognitive skills, and better information literacy skills. Kuhlthau's Information Search Process model was used to "treat" research paper anxiety through education. Support of the hypothesis that teaching the ISP model can reduce anxiety (by rejection of the third null hypothesis) suggests that a thirty-minute presentation of Kuhlthau's model is sufficient if reducing anxiety is the only goal. Improvements were measured in awareness of the thoughts and feelings associated with the stages of the model and in satisfaction with the research process, but not at statistically significant levels.

A meaningful change in anxiety without commensurate changes in cognitive and affective awareness suggests that knowledge of the model at a general level coupled with the opportunity to discuss the uncomfortable feelings associated with research may be enough to reduce anxiety. Naming the unspoken feelings opens the topic for discussion, and sharing uncomfortable feelings with others who can relate to the experience can be an

effective way of diffusing their impact. Moreover, correctly placing the root of the negative emotions within the process itself, rather than within the individual, allows students to experience the emotions in a less threatening and less "personal" way, and may help them feel less responsible for the discomfort they encounter. This could reduce the sense of inadequacy described by Mellon (1986) and by Mech and Brooks (1995). It may also enable students to seek assistance without feeling they will be judged inadequate. Mellon (1986) and Vidmar (1998) also believe that anxiety can be lessened by discussing negative emotions with students facing a research assignment and assuring students that these feelings are normal.

The study suggests that knowledge of the ISP model at a general level can reduce anxiety. To help students retain the model without further reinforcement, grouping the stages into three overarching phases may prove useful, especially for a thirty-minute presentation. This recommendation is supported by the theory that summarizing key concepts aids memory (Coon 1997, p 347). From the perspectives of anxiety, reduction of uncertainty, and satisfaction, it makes sense to group the stages into:

Phase 1 – Topic Phase (Pre-focus Phase) – Stages 1 and 2

Phase 2 – Focus Phase – Stages 3 and 4

Phase 3 – Development Phase (Post-focus Phase) – Stages 5 and 6

The completion of each phase signals that a significant decision has been made. Each of these decisions greatly reduces uncertainty, which can lessen

anxiety. At the end of Phase 1, a topic has been selected; at the end of Phase 2, a focus has been found; and at the end of Phase 3, the decision to close the search has been made. Completion of each phase can be accompanied by a sense of relief, as described in the stages of Kuhlthau's model. Pertti Vakkari also found it useful to regroup the ISP model's six stages into three broader stages. In evaluating information seeking behavior in graduate students, he divided the research process into *pre-focus, focus,* and *post-focus stages* (Vakkari forthcoming). Further investigation into adding an additional overarching, conceptual layer to the model for short presentations is justified.

The RPS instrument, which was based on the detailed ISP model, may have contributed to the failure to reject two null hypotheses because the level of detail in the instrument was greater than that retained by the students. An instrument growing out of the broader phases should prove more sensitive when classroom instruction is limited to a single thirty-minute presentation. It is recommended that the instrument be revised based on the three-phase concept, shortened, and tested for reliability using various student populations. A revised instrument would be useful for evaluating the effectiveness of one-time bibliographic instruction that includes the greater process that is research. The RPS in its existing form is suitable for testing student's knowledge of the model when reinforcement has been provided. It is also appropriate for

measuring students' awareness of the research process prior to teaching the model.

If the goal of educating students about the research process goes beyond anxiety reduction and aims to instill a greater knowledge of the process, then results show that a thirty-minute presentation is insufficient. Reinforcement is recommended to help move knowledge from short-term memory into long-term memory. Because the model makes good intuitive sense, as indicated by the students' comments reported by the model's presenter, knowledge of it may be processed easily at a shallow level upon first hearing but may not reach a long-term, deep level of learning. Reinforcing the model across the duration of an assignment, when students are highly sensitized to their thoughts and feelings about research, should provide the ideal situation for learning the stages of research and for encouraging students to observe how the process works for them. With some classes, it may be possible to gain additional contact time; for others, this goal may be unrealistic.

A shift in presentation to a more prescriptive approach for extended presentation formats might speed assimilation of the model Expanding the model to include typical problems encountered at each stage along with helpful strategies to deal with each problem is worthy of inquiry. What information gaps can arise at each stage, and what should the student do to move forward? When must the student move back in order to move forward?

This study focused on the research process rather than on the end product. A related and beneficial line of research would investigate whether students who learn the model produce higher quality papers. Better papers suggest better research, cognitive, and information literacy skills – all primary goals of education.

The current research focused on upper division undergraduate students. Kuhlthau observed anxiety in high school and college students faced with research assignments. Mellon (1986), Fister (1992), Keefer (1993), Valentine (1993), and Mech and Brooks (1995) studied anxiety related to research in college undergraduates at many levels. Jiao and Onwuegbuzie (1998) examined library anxiety in graduate students. Clearly a need exists within each of these populations, and research into the usefulness of teaching the model to these students is warranted.

Librarians planning information literacy programs for any of these groups must move beyond traditional bibliographic instruction that features tours and tool use. While these are important aspects of information literacy, information professionals need to address feelings as an important part of the research process and to present *search skills* in the context of *research skills* – as part of the larger process that is research. Fister (1992), Vidmar (1998), Mellon (1986), and others also emphasize the need for this type of approach.

Conclusions

Kuhlthau's model presented in a thirty-minute format can reduce the anxiety that is often associated with research paper assignments for novice researchers. Students' response to the model was positive, and some expressed the wish that they had learned about it sooner. Satisfaction and awareness of the cognitive and affective aspects of the ISP model improved, but not at statistically significant levels. Together, these results imply that knowledge of the model at a general level is sufficient to reduce anxiety. If anxiety reduction is the only goal, adding an additional conceptual, summary layer may be appropriate for thirty-minute, one-shot presentations. For short sessions, grouping the stages of the ISP into three overarching phases of two stages each makes sense from the perspective of anxiety, reduction of uncertainty, and satisfaction. If knowledge of the model for improving research, cognitive, and information literacy skills is also desired, it will be necessary to reinforce the model during the course of the research assignment.

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APPENDICIES

APPENDIX A

George Kelly's Personal Construct Theory

Personal Construct Theory is the work of George A. Kelly (1905-1967), an American psychologist. He believed that each person's experience of the world is unique. Individuals evaluate and interpret events to understand the world. This understanding, in turn, allows them to predict the outcome of future events (Cote 1995). According to Kelly's principle of *constructive alternativism,* reality is subject to many interpretations. Each person experiences reality through the filters of his unique personal construction of the world. The way we anticipate and predict future events colors our perceptions. Our individual, subjective reality, in turn, determines how we act and relate with others and with the world (Adams-Webber 1994). Kelly's fundamental postulate states that "a person's processes are psychologically channelized by the ways in which he anticipates events." (Adams-Webber 1994, 43)

Not all interpretations are equal, however. Some interpretations are better at predicting future events than are others. Because an individual constructs his reality, he can also change or replace his interpretation of events Subjective reality is under continual evaluation and revision. This evaluation and revision is part of the process of learning and growing (Adams-Webber 1994).

A key concept to Kelly's theory is the *construct,* a bipolar way to perceive and analyze events. Something may be viewed as tall or short, or somewhere on the continuum between. The poles of a construct may be diametrically opposite, as in the case of tall/short, but this is not always the case. Give/receive can form a construct as can give/take (Roeckelein 1998). Each construct has a domain of events in which it is valid. This domain is called the *range of convenience* (Adams-Webber 1994). For example, a healthy individual would probably not apply the construct happy/sad to a computer. Constructs are seldom used alone but are organized into a hierarchical system. This organization is necessary for producing organized thoughts and actions. Each hierarchical system is unique to an individual and the system allows one to interpret and predict future events (Adams-Webber 1994).

One feature of constructs is their *permeability.* Permeability is the degree to which a construct can change by adding events to the range of convenience or by adding subordinate constructs. Constructs that are most resistant to change are called *core constructs.* Constructs that are easily changed or adapted are termed *peripheral constructs.* Changing a peripheral construct does not affect core constructs. Resistance to changing a core construct can be so severe that one may manipulate perceptions to fit expectations or may dismiss a perception entirely (Cote 1995).

Change in one's personal construction of reality is important for the individual to grow and develop, but change may be difficult. Changing a single construct can cause changes in other parts of the system. Attempts to change core constructs may be experienced as a threat. According to Kelly, anxiety represents a threat to an individual's self-concept based on the core constructs (Cote 1995). Because learning involves growth and change, it may also cause anxiety.

APPENDIX B

Kuhlthau's Stages of the Information Search Process (ISP)[1]

Stage 1 – Task Initiation

Task	Thoughts	Feelings	Actions
To prepare for the decision of selecting a topic	Contemplating assignment; Comprehending task, Relating prior experience and learning; Considering possible topics	Apprehension at the work ahead; Uncertainty	Talking with others, Browsing the library collection

Stage 2 – Topic Selection

Task	Thoughts	Feelings	Actions
To decide upon topic for research	Weighing topics against criteria of personal interest, project requirements, information available, and time allotted; Predicting outcome of possible choices, Choosing a topic with potential for success	Confusion; Sometimes anxiety, Brief elation after selection, Anticipation of prospective task	Consulting with informal mediators, Making preliminary search of resources; Using the reference collection

[1] Based on tables 3-1 through 3-6 in Kuhlthau, Carol Collier (1993) *Seeking Meaning: A Process Approach to Library and Information Services.* Norwood, NJ Ablex, p 44-51.

Stage 3 – Prefocus Exploration

Task	Thoughts	Feelings	Actions
To investigate information with the intent of finding a focus	Becoming informed about the general topic; Seeking focus in information on the general topic; Identifying several possible focuses, Inability to express precise information needed	Confusion, Doubt, Sometimes threat, Uncertainty	Locating relevant information; Reading to become informed, Taking notes on facts and ideas; Making bibliographic citations

Stage 4 – Focus Formulation

Task	Thoughts	Feelings	Actions
To formulate a focus from the information encountered	Predicting outcome of possible foci, Using criteria of personal interest, requirements of assignment, availability of materials, and time alloted; Identifying ideas in information from which to formulate a focus; Sometimes characterized by a sudden moment of insight	Optimism; Confidence in the ability to complete the task	Reading notes for themes

Stage 5 – Information Collection

Task	Thoughts	Feelings	Actions
To gather information that defines, extends, and supports the focus	Seeking information to support the focus, Defining and extending the focus through information, Gathering pertinent information, Organizing information in notes	Realization of extensive work to be done; Confidence in the ability to complete the task, Increased interest	Using the library to collect pertinent information, Requesting specific sources; Taking detailed notes with bibliographic citations

Stage 6 – Search Closure

Task	Thoughts	Feelings	Actions
To conclude the search for information	Identifying needs for any additional information, Considering the time limit; Diminishing relevance of material found, Increasing redundancy, Exhausting sources	Sense of relief; Sometimes satisfaction; Sometimes disappointment	Rechecking sources for information initially overlooked, Confirming information and bibliographic citations

APPENDIX C

Development and Testing of the Research Process Survey

At the time the research was begun, no survey was found that could measure the variables and sub-variables of interest, so a new instrument was constructed. The goal was to use two statements to measure each sub-variable for awareness of the cognitive and affective aspects (sixteen sub-variables, total) and two statements to measure each sub-variable for satisfaction (two sub-variables). The result was a thirty-six statement survey with a five-point Likert-type scale. In this appendix, the process of developing and testing the instrument is discussed.

A statement pool was generated using select statements describing the research process suggested by existing surveys and statements constructed to specifically describe each sub-variable. An expert panel was enlisted to evaluate the statement pool. Because individuals perceive and understand language differently, it was important to obtain opinions from a group of people, each with his or her unique way of using and understanding language. Careful use of language in survey statements avoids ambiguity, confusion, and bias, and evaluation of statements by several individuals provides the best measure of statement suitability for a diverse population of test subjects. Panelists were selected for their knowledge of Kuhlthau's model and/or for their experience in constructing surveys. The expert panel consisted of the

Director of the School of Information Sciences, three School of Information Sciences faculty members, and two senior reference librarians Three panel members were also members of the thesis committee. The panel participated in two rounds of evaluation.

In round one, the variable *satisfaction* was not yet split into two sub-variables. Statements were grouped into seventeen categories that corresponded to the sixteen sub-variables related to awareness of cognitive and affective aspects and the variable satisfaction. Henceforth, all will be referred to as sub-variables. Panel members were provided with a detailed summary of Kuhlthau's Information Search Process model and definitions of the variables of interest that included a breakdown by sub-variable. Each panelist was asked to perform two tasks. The first was to select two statements from each category that best fit the sub-variable and mark both statements with an "A." They were also asked to select their third and fourth choices, and mark these statements with a "B." The second task was to suggest any additional statements that would measure the sub-variable. Each member of the panel worked independently to evaluate the statement pool.

Results were tabulated by assigning each "A" two points, each "B" one point, and totaling points for each statement. The four highest-ranking statements in each category were retained for further consideration, and new suggestions were added to the pool. At this point, a decision was made to use a forward and reverse (or inverse) statement pair to measure each sub-

variable, rather than two separate statements. In a forward coded statement, a high score reflects a high level of awareness. In a reverse coded statement, a high score reflects a low level of awareness. An example is the pairing of the statements, "At the start of a research project, I feel confident," and "At the beginning of a research assignment, I feel uncertain." This method improves the reliability of responses. Reverse coded statements would be recoded, so that a high score reflected a high level of awareness, and the new value would be averaged with the value of the forward coded statement to obtain one score for each sub-variable.

To this end, two statements from the results of round one were selected with careful attention to Kuhlthau's model. Statements were chosen to accurately reflect the thoughts or feelings most common at each stage. For the sub-variables related to iteration, statements that best represented the idea that the stages can iterate were selected. Statements for the sub-variables related to overall awareness were chosen to express important overarching concepts not addressed in the other categories of awareness. Twenty-three statements from the original list and ten new statements were selected. Two sub-variables were represented with one statement and one with three.

For each statement chosen, an inverse statement was carefully written. When the key concept in a statement had more than one logical inverse, all choices were presented to the thesis committee members for interim evaluation. For example, *confident* can be paired with either *anxious* or

uncertain. In a few instances, two inverse statements with similar merit were included. A pool consisting of two statement pairs for each sub-variable, on average, was assembled for interim evaluation. Feedback from the committee was used to select the best logical inverse when more than one existed and to refine wording of the statements.

The revised pool that was presented to the full panel for the second round of evaluation consisted of two statement pairs for each sub-variable, on average. Two sub-variables had only one statement pair. The aim of the second round was to select one pair to measure each variable. In round two, panelists were again given a detailed summary of the model and a description of the variables and sub-variables of interest. Participants were asked to perform two tasks. The first was to select the pair that best measured the concept. The second task was to suggest any modification in wording that would improve the pair.

When the results were tabulated, all but five sub-variables received ratings that were unanimous or off by one vote. Statement pairs with mixed ratings were carefully evaluated, and the researcher selected one pair in each category. After evaluating round two, a decision was made to split the variable *satisfaction* into two sub-variables. One would measure satisfaction with the process, and the other would measure satisfaction with the product. These are two different aspects of the variable, and satisfaction with one does not imply satisfaction with the other. The result of the selection process was thirty-six

statements that measured eighteen sub-variables in both a forward coded and a reverse coded manner

To construct the pre-test, the statements were randomized, and the anxiety test and instructions for the descriptive paragraph and for the demographic data were added. The pre-test was pilot-tested on a small group of first-year information science graduate students before use in the study. Students were asked to take the pre-test with two perspectives in mind: (1) as though they were actual test subjects, and (2) as evaluators who were looking for ambiguity No changes were deemed necessary as a result of their evaluation.

Reliability testing of the instrument was not performed using the group of graduate students for two reasons: (1) the group was too small, with only nine participants, and (2) the population was different from the target population of upper division undergraduates. There was not sufficient time to perform reliability testing with a larger independent group of comparable students. Although it is not the preferred practice, reliability testing was done with data from the study participants. Tests for Chronbach's alpha were run on the final set of thirty-nine pre-test scores using the data set before missing values were adjusted. Separate tests were run for the three variables of interest, and reliability figures of alpha equal to .7775, .8717, and .7729 were calculated for awareness of cognitive aspects, awareness of affective aspects, and satisfaction, respectively. A reliability of alpha greater than or equal to

.7000 is considered satisfactory for social science research. The instrument is reliable for this group of students.

Repeated iteration of the reliability test with stepwise elimination of statements suggests that the target of a twenty-statement survey is possible. A carefully chosen subset of ten statements for cognitive aspects, including at least one for each sub-variable, generated a reliability alpha of .7806. A select subset of eight statements for affective aspects, including one for each sub-variable, generated a reliability of .8220. It is recommended that all four statements be retained for measuring satisfaction.

The new instrument possesses content validity because the survey is designed to test awareness based on Kuhlthau's model. The statements contained in it are derived directly from the model, and the model itself has been well researched.

APPENDIX D

Material Supplied to the Expert Panel for Round 1 of the Statement Pool Evaluation

December 16, 1999

[Name]
[Address]

Dear [Name],

As described in an earlier email correspondence, I am developing a survey instrument to measure students' awareness of the research process based on the stages of Carol Kuhlthau's Information Search Process (ISP) model. The survey will be in the form of a questionnaire that consists of a set of statements defined by the ISP model. A 5-point Likert Scale will be used to measure the degree of agreement from *Strongly Disagree* to *Strongly Agree* with a middle point of *Undecided.*

I have prepared a pool of statements for use in the survey. Statements are grouped into seventeen concepts, with two to nine statements in each group. The final survey will use two statements to measure each concept.

The panelist is asked to do two tasks:

1. Select the best statements for inclusion:
   a. Select the two best from the set under each concept and mark them with an **A** in the space provided to the left of the statement.
   b. Select the next two best statements, your 3rd and 4th choices, and mark them with a **B** as the best alternate statements.
2. The panelist may suggest any statements suitable for measuring the concept. Please write these in the appropriate section or clearly label the section for which they are intended. Your statements will be added to the pool for the final evaluation

For the concepts with two to four statements, rank those that qualify for the "top tier" with an **A** (a maximum of two) and those that qualify for the "second tier" with a **B** (a maximum of two).

Definitions of the variables are enclosed to aid in evaluating the statements. A summary of Kuhlthau's Six Stages is also included if you wish to use it

Please respond at your earliest convenience and return the Statement Pool in the self-addressed, stamped envelope. I would like to have the results back for tabulation by Friday, January 7th. You can contact me by email <Email address> throughout most of the semester break if any questions arise. I greatly appreciate your help in constructing the survey.

Be Well,

Jacqueline Kracker
Graduate Student
[Address]

Return Mailing Address:

[Address]

Enclosure a: The Six Stages of the Process
Enclosure b: Definitions of Variables
Enclosure c: Statement Pool 4 for Kuhlthau's Model of the Information Search Process (ISP)
Enclosure d: Envelope for return mail

The Six Stages of the Process

Stage 1 – Task Initiation.

Task initiation begins when a person perceives that a gap in knowledge or understanding exists For students, the assignment of a research paper highlights a gap in knowledge For others, a gap may be perceived when a problem arises that has no obvious solutions. Feelings that come with this realization may include uncertainty, anxiety, confusion, and doubt. Will the information be available? Will it be timely? Will the assignment be difficult to complete? At this stage, more is unknown than is known. Most human beings are uncomfortable with high levels of uncertainty. Thoughts turn toward comprehending the need and planning strategies for filling the gap and resolving the situation. Actions may involve discussions with peers, mediators, and/or professionals to determine the size and scope of the problem, the nature of the information need, and to find a way to begin. The task of stage 1 is to begin the process.

Stage 2 – Topic Selection.

The task of stage 2 for the student is to choose a general topic. Within the constraints of the assignment, what knowledge is available from prior experience? What areas of interest exist? What areas are likely to be rich in information, what areas poor? Thoughts involve weighing possible options and comparing them to the assignment guidelines, existing knowledge, personal interest, information availability, and time constraints. Actions may include browsing available collections and discussing topic options with others. The sense of unease from stage 1 continues until a viable topic is selected. Then feelings may turn to relief and optimism. Uncertainty is reduced in making a choice. If topic selection is prolonged, tension may escalate until a choice is made.

Stage 3 – Prefocus Exploration.

With a general topic selected, the student is now ready to explore the subject. This is an important time to gather general background information, to learn what is known and not known, to discover lines of thought – some opposing – that weave through the subject, and to begin to understand the overall topology of thought within the discipline, either current, historical, or both. Until this background is laid, it is difficult for the student to know what questions to ask or to choose a viable focus. Feelings of uncertainty, doubt, and anxiety may grow as the researcher takes in and tries to make sense of large amounts of new information, some inconsistent or contradictory. The new information may threaten established mental constructs, leading to even higher levels of

negative emotion. Stage 3 is often the most uncomfortable stage in the process. Thoughts involve seeking and finding general information, understanding how the pieces fit together, looking for common threads that indicate possible points of focus, and looking for options that will be viable. Actions include information seeking, reading, interviewing, and taking notes as needed. The task of stage 3 is to explore the subject to gather background information and find a focus.

Stage 4 – Focus Formulation.

This may be the most critical stage to the success of the research process – the turning point. Attempts to proceed through the remaining stages without a focus can lead to increasing confusion, anxiety, and doubt. Actions involve reading, taking notes, and writing down ideas. Thoughts turn toward finding common threads, themes, and gaps in the body of knowledge ripe for investigation. Possible choices of focus are weighed against assignment criteria, material availability, time, and personal interest – factors that influence the likelihood of success.

When a focus is chosen, the researcher knows what information is needed, what is useful, what is irrelevant. Enough sense has been made of the situation to know a direction in which to proceed. Selection of a focus is accompanied by feelings of relief, optimism, and confidence in the ability to succeed. Even more uncertainty has been reduced and the uncertainty that remains is a relatively known entity. If the entire research process is completed without a clear focus, the resulting paper can lack coherence, understanding can remain incomplete, and new constructs fail to form.

Stage 5 – Information Collection.

At this stage, the researcher knows what specific information is relevant to the focus, supporting it and building on it. The task is to locate and collect useful information. Judgements of relevance and pertinence are clear. The size and scope of the remaining uncertainty is reasonably well-known. Feelings of confidence grow, interest increases as more and more sense is made of the incoming information and uncertainty diminishes. Actions include searching for and selecting specific information, taking detailed notes, and organizing thoughts on paper. Thoughts involve refining the focus, determining specific information needs, and organizing available information.

Stage 6 – Search Closure.

Closure of the search can come about through a number of ways: time runs out, the redundancy of incoming information increases, available resources

have been exhausted, or the level of effort expended is considered sufficient. Feelings can include a sense of relief and satisfaction that the process has ended well, or disappointment that it has not. Thoughts involve weighing the completeness of the information available, time and energy constraints, the likelihood of success of additional effort, and identifying last bits of information that are needed. Actions include reviewing available information for completeness and the checking of facts and bibliographic citations.

While the stages of the model are numbered and presented in a linear fashion, Kuhlthau found that they were likely to progress in an iterative manner (1991). An example is the refining or reshaping of the focus during the information collection phase. Iteration is an organic part of the process for some students. It is also possible to meet with failure at one stage, necessitating a return to an earlier stage. Failure to find a focus within a subject at the prefocus exploration stage could require selection of a new topic. Failures and dead ends increase negative feelings as time and energy are lost and pressure mounts.

One important finding of the study was that uncertainty, confusion, doubt and frustration are replaced with confidence as ideas focus and become clearer -- as uncertainty diminishes. Another was the importance of Stages 1-4. The work of these Stages is creative and vital to the success of the project, but it is often accompanied by uncomfortable feelings.

Definitions of Variables

The variables to be studied in this research are ***awareness of the research process, anxiety associated with the research process,*** and ***satisfaction with the research process.*** Awareness of the research process is a complex variable.

Conceptually, ***awareness*** is the state of being mindful or heedful of something. Awareness can be cognitive or pre-cognitive. ***Cognitive awareness*** is a conscious awareness that can be articulated in speech. ***Pre-cognitive awareness*** is an awareness that can be felt, but not articulated – a vague awareness. Operationally, awareness is defined as above and includes cognitive and pre-cognitive awareness.

Conceptually, ***awareness of the research process*** is the awareness that research progresses in stages that can iterate, what those stages are, and the thoughts, feelings, and actions typical for each stage. Operationally, awareness of the research process will be measured by the sum total of: (1) awareness that the process progresses in stages (overall process), (2) awareness of the parts of the process as defined by Carol Kuhlthau, and (3) awareness of the iterative nature of the process. Affective and cognitive aspects will be measured separately. Actions will not be measured. The sixteen sub-variables comprising *awareness of the research process* are:

1. Stage 1 – Task Initiation – Affective Aspect
2. Stage 1 – Task Initiation – Cognitive Aspect
3. Stage 2 – Topic Selection – Affective Aspect
4. Stage 2 – Topic Selection – Cognitive Aspect
5. Stage 3 – Prefocus Exploration – Affective Aspect
6. Stage 3 – Prefocus Exploration – Cognitive Aspect
7. Stage 4 – Focus Formulation – Affective Aspect
8. Stage 4 – Focus Formulation – Cognitive Aspect
9. Stage 5 – Information Collection – Affective Aspect
10. Stage 5 – Information Collection – Cognitive Aspect
11. Stage 6 – Search Conclusion – Affective Aspect
12. Stage 6 – Search Conclusion – Cognitive Aspect
13. Iterative nature of the process – Affective Aspect
14. Iterative nature of the process – Cognitive Aspect
15. Overall process – Affective Aspect
16 Overall process – Cognitive Aspect

Conceptually, ***satisfaction*** is the pleasant feeling of contentment that comes when a need or desire has been fulfilled so that it no longer affects or motivates behavior Operationally, ***satisfaction with the research process*** is

a student's perception of satisfaction with the process as she experiences it; how satisfied the student is with her own process in comparison with her expectations.

Statement Pool 4

For Kuhlthau's Model of the Information Search Process (ISP)

December 15, 1999

Statements appearing on the survey will use a 5-point Likert Scale of *Strongly Disagree; Disagree; Undecided; Agree; Strongly Agree.*

Statements are grouped into seventeen concepts with two to nine statements in each group. Two statements will be selected from each concept for inclusion in the survey. Within each group below, select the **2 statements** that **best** describe the variable and mark them with an **A** in the space provided to the left of the statement. Also, select **2 alternate statements,** your 3rd and 4th choices, and mark them with a **B.** For concepts with 2 to 4 statements, rank those that qualify for the "top tier" with an **A** (a maximum of two) and those that qualify for "second tier" with a **B** (a maximum of two).

If a good survey statement comes to mind, please write it in the appropriate section or clearly mark the section for which it is intended. Your statements will be added to the pool for the final evaluation.

Please respond at your earliest convenience. I would like to have the results for tabulation by Friday, January 7th. When completed, return this form in the self-addressed, stamped envelope to:

Jacqueline Kracker
[Address]

Thank you again for your participation!

Variable 1: Awareness of the research process. (Sixteen factors)

Part I: Knowledge of the ISP Model's Specific Stages

Stage 1 – Task Initiation – Feelings – Affective Aspect

_____ I feel nervous at the beginning of a research assignment.

_____ I feel excited at the beginning of a research assignment.

_____ When first assigned a research paper I feel uncomfortable.

_____ When given a research assignment, I feel unsure about how to begin.

_____ When first given a research assignment, I feel better about it after talking it over with friends.

_____ When first given a research assignment, I feel uncertain.

_____ When first given a research assignment, I feel optimistic after talking it over with friends.

_____ New research assignments make me feel anxious at first.

Stage 1 – Task Initiation – Thoughts – Cognitive Aspect

_____ I am unsure about how to begin my research.

_____ When I come to the library to begin work on a paper, I know where to start.

_____ I like to begin by browsing.

_____ I must have a topic before I begin looking in the library for information.

_____ When first given a research assignment, I never know what to do it on, or how to find a topic.

_____ When first given a research assignment, I try to find a topic that includes my own personal interests.

_____ When first given a research assignment, I try to choose a topic that will be easy.

_____ When first given a research assignment, I try to choose a topic that will be rich in information.

_____ When first given a research assignment, I know how to begin.

Stage 2 – Topic Selection – Feelings – Affective Aspect

_____ I feel good when I have decided upon a topic

_____ I feel excited when I have chosen a topic.

_____ I feel relieved when I have chosen a topic.

_____ I feel relieved when I know what my topic will be.

_____ I feel optimistic when I know what my topic will be.

Stage 2 – Topic Selection – Thoughts – Cognitive Aspect

_____ I have difficulty selecting a topic for a research paper.

_____ I like to browse in books and journals to help select a topic.

_____ When looking for a topic, I usually consider several options before choosing one.

Stage 3 – Prefocus Exploration – Feelings – Affective Aspect

_____ I become more interested in my topic as I gather information.

_____ I feel relieved when I know that there is enough information available on my topic to write a paper.

_____ Looking for information on my topic makes me feel uneasy.

_____ Looking for information on my topic makes me feel anxious.

Stage 3 – Prefocus Exploration – Thoughts – Cognitive Aspect

_____ When I choose a topic, I have a clear idea about what I will write about.

_____ I like to gather background information on my topic before I focus on what to write about.

_____ I have to learn something about my topic before I narrow my focus.

Stage 4 – Focus Formulation – Feelings – Affective Aspect

_____ My sense of confidence grows as I find my focus when researching information on my topic.

_____ I feel relieved when I know what the focus of my topic will be.

Stage 4 – Focus Formulation – Thoughts – Cognitive Aspect

_____ I can usually determine which items I've found are relevant to my research.

_____ A central theme evolves as I gather information on a topic.

_____ It is hard to know what information is relevant to my topic and what is not.

_____ I don't know what to do with all of the information that I collect on my topic.

_____ There is usually a moment when it all clicks and I know just what my focus on the topic will be.

_____ I never know what focus my paper will take until I sit down to write it.

_____ My focus evolves as I get into the research.

_____ When I've finished a paper, I know exactly what the topic and focus of the topic are.

_____ When I've finished a paper, I still don't understand what it is all about.

Stage 5 – Information Collection – Feelings – Affective Aspect

_____ I become more interested in my paper as I gather information.

_____ I feel relieved when I know that I have enough information on my topic.

_____ When I have a focus on my topic, I feel nervous until I know that there is enough information available on the subject.

_____ Collecting information for my research assignment makes me feel uncomfortable.

_____ I become more confident as I gather information for my paper.

Stage 5 – Information Collection – Thoughts – Cognitive Aspect

_____ When I know what my focus I am taking on my topic, I know what material is relevant to my paper and what is not.

_____ As I collect more and more information, I begin to think about how it all fits together.

Stage 6 – Search Closure – Feelings – Affective Aspect

_____ I feel optimistic as I head into the serious writing of my paper.

_____ I feel relieved when I know that I have enough information to write my paper.

Stage 6 – Search Closure – Thoughts – Cognitive Aspect

_____ I am unsure about how to complete my research.

_____ Toward the end of my information collecting, I know exactly what I need to find to finish up.

_____ Toward the end of collecting information, I know where everything will fit in.

_____ I have a sense of when I have enough information to complete the assignment.

_____ I stop looking for information when time runs out.

_____ I stop looking for information when I no longer find anything new.

_____ I stop looking for information when I sense that I "have enough."

_____ I don't know when to stop collecting information.

Part II: Meta Knowledge of the General Research Process

Iterative Nature of the Process – Feelings – Affective Aspect

_____ If my choice of topic does not work out, I feel like I have failed.

_____ If my choice of topic does not work out, I feel anxious.

_____ If my choice of topic does not work out, I take it in stride – sometimes that just happens.

Iterative Nature of the Process – Thoughts – Cognitive Aspect

_____ My focus changes as I gather information about the topic.

_____ Sometimes my topic does not work out and I have to begin again.

_____ My topic changes as I gather information.

Overall Process – Feelings – Affective Aspect

_____ In comparison with other people, my research skills are poor.

_____ I tend to eat a lot when I'm working on a paper.

_____ I am comfortable with research paper assignments.

_____ I know how to find things in the library, but I am still nervous about research assignments.

_____ I can research and write about nearly anything.

_____ I can become a good researcher.

_____ I find it fun to look for new information

_____ I can learn to be a good researcher.

_____ Research assignments are hard.

Overall Process – Thoughts – Cognitive Aspect

_____ When working on a research paper, I know what steps I will follow.

_____ I have my own research style and pacing.

_____ I have my own style of doing a research assignment.

_____ My research proceeds in stages.

_____ I know how to approach a research assignment.

_____ Making notes along the way helps me to organize my thoughts.

_____ I have a preferred way of organizing the information I collect for my paper.

Variable 2: Anxiety levels due to research assignments.

A standard state anxiety test will be used.

Variable 3: Satisfaction with the research process.

_____ Overall, I enjoy the research process.

_____ I generally do well on my research papers.

_____ When I finish a research assignment, I know that I have done a good job.

_____ When I finish a research assignment, I know that it is not a good piece of work.

_____ I can become a good researcher.

_____ I feel satisfied with my research style.

_____ I can learn to be a better researcher.

_____ I will never be a good researcher.

_____ With practice, I am getting better at research assignments.

APPENDIX E

Material Supplied to the Expert Panel for Round 2 of the Statement Pool Evaluation

January 27, 2000

[Name]
[Address]

Dear [Name],

Thank you for participating in round 1 of the survey statement evaluation for "The Kuhlthau Project." The responses and comments received from round 1 were used to identify the best statements for measuring each variable and the top one or two statements were selected from each category. For each statement chosen, an inverse statement was prepared to create a statement pair. The inverse statement is designed to express the reverse of opposite of the original statement and is included to ensure reliability of the data. The final survey will include one statement pair for each of the seventeen concepts. A five-point Likert Scale will gauge the degree of agreement with each statement from *Strongly Disagree* to *Strongly Agree* with a middle point of *Undecided.*

In this second and final round, one or two statement pairs are presented for each of the seventeen concepts to be measured. Panelists are asked to do two tasks:

1. Select the best pair for each concept and mark them with a check (√) or an X in the space to the left of the statement. There are several factors to consider when selecting a statement pair.
    a. Is the statement pair meaningful in terms of measuring the variable?
    b. Does the statement pair adequately measure the variable?
    c. Does the pair reflect an inverse relationship? There may be more than one possible inverse relationship.

2. If a better phrasing or a better pair comes to mind, please write your ideas in the appropriate section or clearly mark the section for which they are intended. Your comments will be considered in the final evaluation.

Definitions of the variables are enclosed to aid in evaluating the statements. A summary of Kuhlthau's Six Stages is also included if you wish to use it.

Please respond at your earliest convenience and return the statement pool by campus mail. I would like to have the results back for tabulation by late Friday, February 4th. You can contact me by email <jkracker@utk.edu> if any questions arise. I greatly appreciate your help in constructing the survey.

Be Well,

Jacqueline Kracker
Graduate Student
[Address]

Enclosure a: The Six Stages of the Process
Enclosure b: Definitions of Variables
Enclosure c: Expert Panel Evaluation, Round 2, for Kuhlthau's Model of the Information Search Process (ISP)

The Six Stages of the Process

Stage 1 – Task Initiation.

Task initiation begins when a person perceives that a gap in knowledge or understanding exists. For students, the assignment of a research paper highlights a gap in knowledge. For others, a gap may be perceived when a problem arises that has no obvious solutions. Feelings that come with this realization may include uncertainty, anxiety, confusion, and doubt. Will the information be available? Will it be timely? Will the assignment be difficult to complete? At this stage, more is unknown than is known. Most human beings are uncomfortable with high levels of uncertainty. Thoughts turn toward comprehending the need and planning strategies for filling the gap and resolving the situation. Actions may involve discussions with peers, mediators, and/or professionals to determine the size and scope of the problem, the nature of the information need, and to find a way to begin. The task of stage 1 is to begin the process.

Stage 2 – Topic Selection

The task of stage 2 for the student is to choose a general topic. Within the constraints of the assignment, what knowledge is available from prior experience? What areas of interest exist? What areas are likely to be rich in information, what areas poor? Thoughts involve weighing possible options and comparing them to the assignment guidelines, existing knowledge, personal interest, information availability, and time constraints. Actions may include browsing available collections and discussing topic options with others. The sense of unease from stage 1 continues until a viable topic is selected. Then feelings may turn to relief and optimism. Uncertainty is reduced in making a choice. If topic selection is prolonged, tension may escalate until a choice is made.

Stage 3 – Prefocus Exploration.

With a general topic selected, the student is now ready to explore the subject. This is an important time to gather general background information, to learn what is known and not known, to discover lines of thought – some opposing – that weave through the subject, and to begin to understand the overall topology of thought within the discipline, either current, historical, or both. Until this background is laid, it is difficult for the student to know what questions to ask or to choose a viable focus. Feelings of uncertainty, doubt, and anxiety may grow as the researcher takes in and tries to make sense of large amounts of new information, some inconsistent or contradictory. The new information may threaten established mental constructs, leading to even higher levels of

negative emotion. Stage 3 is often the most uncomfortable stage in the process. Thoughts involve seeking and finding general information, understanding how the pieces fit together, looking for common threads that indicate possible points of focus, and looking for options that will be viable. Actions include information seeking, reading, interviewing, and taking notes as needed. The task of stage 3 is to explore the subject to gather background information and find a focus.

Stage 4 – Focus Formulation.

This may be the most critical stage to the success of the research process – the turning point. Attempts to proceed through the remaining stages without a focus can lead to increasing confusion, anxiety, and doubt. Actions involve reading, taking notes, and writing down ideas. Thoughts turn toward finding common threads, themes, and gaps in the body of knowledge ripe for investigation. Possible choices of focus are weighed against assignment criteria, material availability, time, and personal interest – factors that influence the likelihood of success.

When a focus is chosen, the researcher knows what information is needed, what is useful, what is irrelevant. Enough sense has been made of the situation to know a direction in which to proceed. Selection of a focus is accompanied by feelings of relief, optimism, and confidence in the ability to succeed. Even more uncertainty has been reduced and the uncertainty that remains is a relatively known entity. If the entire research process is completed without a clear focus, the resulting paper can lack coherence, understanding can remain incomplete, and new constructs fail to form.

Stage 5 – Information Collection.

At this stage, the researcher knows what specific information is relevant to the focus, supporting it and building on it. The task is to locate and collect useful information. Judgements of relevance and pertinence are clear. The size and scope of the remaining uncertainty is reasonably well-known. Feelings of confidence grow, interest increases as more and more sense is made of the incoming information and uncertainty diminishes. Actions include searching for and selecting specific information, taking detailed notes, and organizing thoughts on paper. Thoughts involve refining the focus, determining specific information needs, and organizing available information.

Stage 6 – Search Closure

Closure of the search can come about through a number of ways: time runs out, the redundancy of incoming information increases, available resources

have been exhausted, or the level of effort expended is considered sufficient. Feelings can include a sense of relief and satisfaction that the process has ended well, or disappointment that it has not. Thoughts involve weighing the completeness of the information available, time and energy constraints, the likelihood of success of additional effort, and identifying last bits of information that are needed. Actions include reviewing available information for completeness and the checking of facts and bibliographic citations.

While the stages of the model are numbered and presented in a linear fashion, Kuhlthau found that they were likely to progress in an iterative manner (1991). An example is the refining or reshaping of the focus during the information collection phase. Iteration is an organic part of the process for some students. It is also possible to meet with failure at one stage, necessitating a return to an earlier stage. Failure to find a focus within a subject at the prefocus exploration stage could require selection of a new topic. Failures and dead ends increase negative feelings as time and energy are lost and pressure mounts.

One important finding of the study was that uncertainty, confusion, doubt and frustration are replaced with confidence as ideas focus and become clearer – as uncertainty diminishes. Another was the importance of Stages 1-4. The work of these Stages is creative and vital to the success of the project, but it is often accompanied by uncomfortable feelings.

Definitions of Variables

The variables to be studied in this research are ***awareness of the research process, anxiety associated with the research process,*** and ***satisfaction with the research process.*** Awareness of the research process is a complex variable.

Conceptually, ***awareness*** is the state of being mindful or heedful of something Awareness can be cognitive or pre-cognitive. ***Cognitive awareness*** is a conscious awareness that can be articulated in speech. ***Pre-cognitive awareness*** is an awareness that can be felt, but not articulated – a vague awareness. Operationally, awareness is defined as above and includes cognitive and pre-cognitive awareness.

Conceptually, ***awareness of the research process*** is the awareness that research progresses in stages that can iterate, what those stages are, and the thoughts, feelings, and actions typical for each stage Operationally, awareness of the research process will be measured by the sum total of: (1) awareness that the process progresses in stages (overall process), (2) awareness of the parts of the process as defined by Carol Kuhlthau, and (3) awareness of the iterative nature of the process. Affective and cognitive aspects will be measured separately. Actions will not be measured. The sixteen sub-variables comprising *awareness of the research process* are:

1. Stage 1 – Task Initiation – Affective Aspect
2. Stage 1 – Task Initiation – Cognitive Aspect
3. Stage 2 – Topic Selection – Affective Aspect
4 Stage 2 – Topic Selection – Cognitive Aspect
5. Stage 3 – Prefocus Exploration – Affective Aspect
6. Stage 3 – Prefocus Exploration – Cognitive Aspect
7. Stage 4 – Focus Formulation – Affective Aspect
8. Stage 4 – Focus Formulation – Cognitive Aspect
9. Stage 5 – Information Collection – Affective Aspect
10. Stage 5 – Information Collection – Cognitive Aspect
11. Stage 6 – Search Conclusion – Affective Aspect
12. Stage 6 – Search Conclusion – Cognitive Aspect
13. Iterative nature of the process – Affective Aspect
14. Iterative nature of the process – Cognitive Aspect
15. Overall process – Affective Aspect
16. Overall process – Cognitive Aspect

Conceptually, ***satisfaction*** is the pleasant feeling of contentment that comes when a need or desire has been fulfilled so that it no longer affects or motivates behavior. Operationally, ***satisfaction with the research process*** is

a student's perception of satisfaction with the process as she experiences it; how satisfied the student is with her own process in comparison with her expectations.

Expert Panel Evaluation
Round 2
For Kuhlthau's Model of the Information Search Process (ISP)
January 27, 2000

Statements in the pool are grouped into seventeen concepts. Within each concept, statements are paired as a statement and an inverse statement. A pair is numbered 1 and 1a, or 2 and 2a One or two pairs appear for each concept. A single pair of statements will be selected from each concept category for inclusion in the final survey. Statements appearing on the final survey will use a five-point Likert Scale of *Strongly Disagree; Disagree; Undecided; Agree; Strongly Agree.*

For each concept, select the **pair** that **best** describes the variable and mark it with a check (√) or an X If you feel that neither pair adequately describes the concept, make note of that within the statement area for the concept.

There are several factors to consider when selecting a statement pair:

1. Is the statement pair meaningful in terms of measuring the variable?
2. Does the statement pair adequately measure the variable?
3. Does the pair reflect an inverse relationship? There may be more than one possible inverse relationship.

If a better phrasing or a better pair comes to mind, please write your ideas in the appropriate section or clearly mark the section for which it is intended. Your comments will be considered in the final evaluation

Please respond at your earliest convenience. I would like to have the results for tabulation by late Friday, February 4th. When completed, return this form using campus mail to:

Jacqueline Kracker
[Address]

Thank you again for your participation!

Survey Statements
Round 2
1/27/2000

Stage 1 – Task Initiation – Feelings – Affective Aspect

1. At the beginning of a research assignment, I feel uncertain.

1a. At the start of a research project, I feel confident.

2. At the start of a research project, I feel apprehensive about the work ahead.

2b. At the beginning of a research assignment, I feel confident about the work ahead.

Stage 1 – Task Initiation – Thoughts – Cognitive Aspect

1. When first given a research assignment, I know how to begin.

1a. When first given a research assignment, I am unsure about how to begin.

2. At the start of a research project, my thoughts turn toward understanding the assignment and the task ahead.

2a When first given a research assignment, I am unsure about how to begin.

Stage 2 – Topic Selection – Feelings – Affective Aspect

1. When I look for a topic for my research, I feel nervous.

1a. As I work to select a research topic, I feel relaxed and optimistic.

2. I feel relieved after choosing a topic to research.

2a. I still feel anxious after choosing a topic to research.

Stage 2 – Topic Selection – Thoughts – Cognitive Aspect

1. When looking for a research topic, I usually consider several options before choosing one.

1a. When looking for a research topic, I usually go with the first idea that comes to mind.

2 There is a lot to consider when choosing a topic for research.

2a. There is not much to consider when choosing a topic for research.

Stage 3 – Prefocus Exploration – Feelings – Affective Aspect

1. As I begin to look for information on my topic, I feel confused and uncertain.

1a. I feel confident as I begin to look for information on my topic.

2. As I begin to look for information on my topic, I sometimes doubt my ability to complete the assignment well.

2a. As I begin to look for information on my topic, I feel confident in my ability to complete the assignment well.

Stage 3 – Prefocus Exploration – Thoughts – Cognitive Aspect

1. As I start to look for information on my topic, I seek to learn more about the topic.

1a. As I start to look for information on my topic, I collect everything I can find and sort it out later.

2. I have to look for information to help me understand my topic before I narrow my focus.

2a. As I start to look for information on my topic, I collect everything I can find and sort it out later.

Stage 4 – Focus Formulation – Feelings – Affective Aspect

1. My sense of confidence grows as I find my focus when looking for information on my topic.

1a. Even after finding a focus on my topic, I feel anxious.

2. When I find a specific focus within my topic, I feel more confident in my ability to complete the task.

2a. When I find a specific focus within my topic, I still doubt my ability to complete the task.

Stage 4 – Focus Formulation – Thoughts – Cognitive Aspect

1. I try to look for a central theme or focus as I gather information on my topic.

1a. My thoughts become confused as I gather more and more information on my topic.

Stage 5 – Information Collection – Feelings – Affective Aspect

1. As I gather information on my topic, my confidence grows.

1a. As I gather information on my topic, I become less confident in my ability to complete the task.

2. I become more interested in my research as I gather information.

2a. I lose interest in my research as I gather information.

Stage 5 – Information Collection – Thoughts – Cognitive Aspect

1. As I collect more and more information, I begin to see how it all will fit together.

1a. I have trouble making sense of all the information I collect on my topic.

2. When I gather information on my topic, I have a sense of what material is relevant to my research and how it will all fit together.

2a. As I gather information on my topic, I find it difficult to know what information is relevant and how it will all fit together.

Stage 6 – Search Closure – Feelings – Affective Aspect

1. I feel relieved when I can stop looking for information and begin the final writing of my paper.

1a. When I stop gathering information and begin to write my paper, I feel anxious about the task ahead.

Stage 6 – Search Closure – Thoughts – Affective Aspect

1. Toward the end of collecting information, I know exactly what I need to find to finish.

1a. I often do not know when to stop looking for information.

2. I can sense when I have enough information to complete the assignment.

2a. I often do not know when to stop looking for information.

Iterative Nature of the Process – Feelings – Affective Aspect

1. If I can't find enough information on my selected topic, I feel like I have failed.

1a. If I can't find enough information on my topic, I do not become discouraged. I look for another topic.

2. If I must drop an unsuccessful line of research, I feel like I have failed.

2a. If I have to drop an unsuccessful line of research, I may feel disappointed, but that just happens sometimes.

Iterative Nature of the Process – Thoughts – Cognitive Aspect

1. Research is an orderly, linear process if you know what you are doing.

1a. Research can be a cyclical process. Sometimes I must go back and repeat earlier activities.

2. I expect that my topic or focus will change and evolve as the research progresses.

2a Once I have found a topic and a focus, I don't want to change it.

Overall Process – Feelings – Affective Aspect

1. I am comfortable with research paper assignments.

1a. Research assignments make me feel anxious.

2. Research assignments are difficult.

2a. Research assignments are no more difficult than other class assignments.

Overall Process – Thoughts – Cognitive Aspect

1. I know how to approach a research assignment.

1a. I don't understand how do to research.

2. I have my own research style and pacing.

2a. Every time I have a new research assignment, it seems like a whole new process.

Satisfaction with the Research Process

1. Overall, I enjoy the research process.

1a. Overall, I dislike the research process.

2. I generally feel satisfied with my research.

2a. I usually feel disappointed with my research.

APPENDIX F

Pre-test

Your participation in this study is voluntary You may decline to participate without penalty.
Return of the completed survey constitutes consent to participate

==========

Please provide the following information for statistical purposes·

Your chosen "nickname" (remember, do not use your real name) _____

Major field of study _____

Class Standing: Freshman ___ Sophomore ___ Junior ___ Senior ___ Graduate ___ Non-degree seeking ___

Gender: Male ___ Female ___

Age: Under 20 yrs ___ 20-24 yrs ___ 25-29 yrs ___ 30-34 yrs ___ 35-39 yrs ___ 40-44 yrs ___ 45 yrs or older ___

Highest level of education completed: High School ___ Associate Degree ___ Bachelor's Degree ___ Master's Degree ___ PhD ___ Other Professional Degree ___

==========

Part 1

1. Recall your most recent or most memorable experience of researching and writing a paper Write a paragraph describing your thoughts and feelings as you worked from the beginning of the assignment to its conclusion.

Part 2

Please consider the following statements as they relate to the assignment you just described Mark the most appropriate response with an **X**

		Strongly Agree	Agree	Sometimes	Disagree	Strongly Disagree
1	At the start of a research project, I feel confident.	[ ]	[ ]	[ ]	[ ]	[ ]
2.	I try to look for a central theme or focus as I gather information on my topic	[ ]	[ ]	[ ]	[ ]	[ ]
3.	When I look for a topic for my research, I feel nervous.	[ ]	[ ]	[ ]	[ ]	[ ]
4.	When first given a research assignment, I am unsure about how to begin	[ ]	[ ]	[ ]	[ ]	[ ]
5.	When I gather information on my topic, I have a sense of what material is relevant to my research and how it will all fit together.	[ ]	[ ]	[ ]	[ ]	[ ]
6	Overall, I enjoy the research process	[ ]	[ ]	[ ]	[ ]	[ ]
7.	Even when I find a specific focus within my topic, I doubt my ability to complete the task successfully	[ ]	[ ]	[ ]	[ ]	[ ]
8.	My thoughts become confused as I gather more and more information on my topic	[ ]	[ ]	[ ]	[ ]	[ ]
9.	I usually know when I have enough information to complete the assignment	[ ]	[ ]	[ ]	[ ]	[ ]
10.	When looking for a topic, I usually consider several options before choosing one	[ ]	[ ]	[ ]	[ ]	[ ]
11	Research assignments make me feel anxious	[ ]	[ ]	[ ]	[ ]	[ ]

	Strongly Agree	Agree	Sometimes	Disagree	Strongly Disagree
12. As I gather information on my topic, I find it difficult to know what information is relevant and how it will all fit together.	[ ]	[ ]	[ ]	[ ]	[ ]
13. I know how to approach a research assignment	[ ]	[ ]	[ ]	[ ]	[ ]
14. Research is an orderly, linear process when you know what you are doing.	[ ]	[ ]	[ ]	[ ]	[ ]
15 I usually feel disappointed with my research	[ ]	[ ]	[ ]	[ ]	[ ]
16 I often do not know when to stop looking for information.	[ ]	[ ]	[ ]	[ ]	[ ]
17 I feel relieved when I can stop looking for information and begin the final writing of my paper	[ ]	[ ]	[ ]	[ ]	[ ]
18. Overall, I dislike the research process.	[ ]	[ ]	[ ]	[ ]	[ ]
19. If I can't find enough information on my topic, I do not become discouraged. I look for another topic	[ ]	[ ]	[ ]	[ ]	[ ]
20. When looking for a research topic, I usually go with the first idea that comes to mind	[ ]	[ ]	[ ]	[ ]	[ ]
21 When I find a specific focus within my topic, I feel more confident in my ability to complete the task	[ ]	[ ]	[ ]	[ ]	[ ]
22. As I begin to look for information on my topic, I feel confused and uncertain.	[ ]	[ ]	[ ]	[ ]	[ ]
23 I am comfortable with research paper assignments.	[ ]	[ ]	[ ]	[ ]	[ ]
24 When first given a research assignment, I know how to begin	[ ]	[ ]	[ ]	[ ]	[ ]

	Strongly Agree	Agree	Sometimes	Disagree	Strongly Disagree
25 When I stop gathering information and begin to write my paper, I feel anxious about the task ahead.	[ ]	[ ]	[ ]	[ ]	[ ]
26 At the beginning of a research assignment, I feel uncertain	[ ]	[ ]	[ ]	[ ]	[ ]
27 As I gather information on my topic, my confidence grows.	[ ]	[ ]	[ ]	[ ]	[ ]
28. As I work to select a research topic, I feel relaxed and optimistic.	[ ]	[ ]	[ ]	[ ]	[ ]
29. If I can't find enough information on my selected topic, I feel like I have failed	[ ]	[ ]	[ ]	[ ]	[ ]
30. I have to look for information to help me understand my topic before I narrow my focus.	[ ]	[ ]	[ ]	[ ]	[ ]
31 I don't understand how to do research.	[ ]	[ ]	[ ]	[ ]	[ ]
32 I feel confident as I begin to look for information on my topic.	[ ]	[ ]	[ ]	[ ]	[ ]
33 As I start to look for information on my topic, I collect everything I can find and sort it out later	[ ]	[ ]	[ ]	[ ]	[ ]
34 As I gather information on my topic, I become less confident in my ability to complete the task.	[ ]	[ ]	[ ]	[ ]	[ ]
35. I generally feel satisfied with my research	[ ]	[ ]	[ ]	[ ]	[ ]
36 Research is not always a linear process Sometimes I must go back and repeat earlier activities	[ ]	[ ]	[ ]	[ ]	[ ]

Part 3:

DIRECTIONS Respond to the following statements as they apply to research assignments in general Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you feel about research assignments *at this time* There are no right or wrong answers Do not spend too much time on any one statement, but give the answer that seems to best describe your feelings about research assignments *at this time*

STAI form Y-1*

*Charles D Spielberger, *State-Trait Anxiety Inventory (From Y)* (Palo Alto, CA Consulting Psychologists Press, 1983)

APPENDIX G

Interim Test

Your participation in this study is voluntary You may decline to participate without penalty.
Return of the completed survey constitutes consent to participate.

Your chosen "nickname" _____
(do not use your real name)

DIRECTIONS: Respond to the following statements as they apply to the research assignment you are working on for this class. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you feel about your assignment *at this moment* There are no right or wrong answers. Do not spend too much time on any one statement, but give the answer that seems to best describe your feelings *at this time*

STAI form Y-1*

*Charles D Spielberger, *State-Trait Anxiety Inventory (From Y)* (Palo Alto, CA Consulting Psychologists Press, 1983).

APPENDIX H

Post-test

Your participation in this study is voluntary You may decline to participate without penalty
Return of the completed survey constitutes consent to participate

Your chosen "nickname" (remember, do not use your real name) _____

Where are you with your major report? Paper completed _____
Draft completed _____ (needs editing, revision)
Draft in progress _____ % completed
Writing to start in _____ days

Did you hear a guest speaker in this class? Yes ____ No ____

If you did not do so the first time, please provide the following information for statistical purposes·

Major field of study _____

Class Standing Freshman ___ Sophomore ___ Junior ___ Senior ___ Graduate ___ Non-degree seeking ___

Gender Male ___ Female ___

Age Under 20 yrs ___ 20-24 yrs ___ 25-29 yrs ___ 30-34 yrs ___ 35-39 yrs ___ 40-44 yrs ___ 45 yrs or older ___

Highest level of education completed High School ___ Associate Degree ___ Bachelor's Degree ___ Master's Degree ___
PhD ___ Other Professional Degree ___

Part 1

1 Recall your experience of researching and writing your major report. Write a paragraph describing your thoughts and feelings as you worked from the beginning of the assignment until now.

Part 2

Please consider the following statements as they relate to the assignment you just completed. Mark the most appropriate response with an **X**.

		Strongly Agree	Agree	Sometimes	Disagree	Strongly Disagree
1	At the start of a research project, I feel confident	[ ]	[ ]	[ ]	[ ]	[ ]
2	I try to look for a central theme or focus as I gather information on my topic.	[ ]	[ ]	[ ]	[ ]	[ ]
3	When I look for a topic for my research, I feel nervous.	[ ]	[ ]	[ ]	[ ]	[ ]
4	When first given a research assignment, I am unsure about how to begin.	[ ]	[ ]	[ ]	[ ]	[ ]
5.	When I gather information on my topic, I have a sense of what material is relevant to my research and how it will all fit together	[ ]	[ ]	[ ]	[ ]	[ ]
6	Overall, I enjoy the research process	[ ]	[ ]	[ ]	[ ]	[ ]
7.	Even when I find a specific focus within my topic, I doubt my ability to complete the task successfully	[ ]	[ ]	[ ]	[ ]	[ ]
8	My thoughts become confused as I gather more and more information on my topic	[ ]	[ ]	[ ]	[ ]	[ ]
9	I usually know when I have enough information to complete the assignment.	[ ]	[ ]	[ ]	[ ]	[ ]
10	When looking for a topic, I usually consider several options before choosing one.	[ ]	[ ]	[ ]	[ ]	[ ]
11.	Research assignments make me feel anxious	[ ]	[ ]	[ ]	[ ]	[ ]

	Strongly Agree	Agree	Sometimes	Disagree	Strongly Disagree
12 As I gather information on my topic, I find it difficult to know what information is relevant and how it will all fit together.	[ ]	[ ]	[ ]	[ ]	[ ]
13 I know how to approach a research assignment	[ ]	[ ]	[ ]	[ ]	[ ]
14. Research is an orderly, linear process when you know what you are doing.	[ ]	[ ]	[ ]	[ ]	[ ]
15. I usually feel disappointed with my research	[ ]	[ ]	[ ]	[ ]	[ ]
16. I often do not know when to stop looking for information.	[ ]	[ ]	[ ]	[ ]	[ ]
17 I feel relieved when I can stop looking for information and begin the final writing of my paper.	[ ]	[ ]	[ ]	[ ]	[ ]
18 Overall, I dislike the research process.	[ ]	[ ]	[ ]	[ ]	[ ]
19 If I can't find enough information on my topic, I do not become discouraged. I look for another topic	[ ]	[ ]	[ ]	[ ]	[ ]
20 When looking for a research topic, I usually go with the first idea that comes to mind.	[ ]	[ ]	[ ]	[ ]	[ ]
21. When I find a specific focus within my topic, I feel more confident in my ability to complete the task	[ ]	[ ]	[ ]	[ ]	[ ]
22 As I begin to look for information on my topic, I feel confused and uncertain.	[ ]	[ ]	[ ]	[ ]	[ ]
23. I am comfortable with research paper assignments	[ ]	[ ]	[ ]	[ ]	[ ]
24 When first given a research assignment, I know how to begin.	[ ]	[ ]	[ ]	[ ]	[ ]

	Strongly Agree	Agree	Sometimes	Disagree	Strongly Disagree
25 When I stop gathering information and begin to write my paper, I feel anxious about the task ahead	[ ]	[ ]	[ ]	[ ]	[ ]
26. At the beginning of a research assignment, I feel uncertain.	[ ]	[ ]	[ ]	[ ]	[ ]
27. As I gather information on my topic, my confidence grows.	[ ]	[ ]	[ ]	[ ]	[ ]
28 As I work to select a research topic, I feel relaxed and optimistic	[ ]	[ ]	[ ]	[ ]	[ ]
29 If I can't find enough information on my selected topic, I feel like I have failed	[ ]	[ ]	[ ]	[ ]	[ ]
30. I have to look for information to help me understand my topic before I narrow my focus	[ ]	[ ]	[ ]	[ ]	[ ]
31 I don't understand how to do research.	[ ]	[ ]	[ ]	[ ]	[ ]
32. I feel confident as I begin to look for information on my topic	[ ]	[ ]	[ ]	[ ]	[ ]
33 As I start to look for information on my topic, I collect everything I can find and sort it out later.	[ ]	[ ]	[ ]	[ ]	[ ]
34. As I gather information on my topic, I become less confident in my ability to complete the task	[ ]	[ ]	[ ]	[ ]	[ ]
35 I generally feel satisfied with my research.	[ ]	[ ]	[ ]	[ ]	[ ]
36 Research is not always a linear process Sometimes I must go back and repeat earlier activities.	[ ]	[ ]	[ ]	[ ]	[ ]

Part 3:

DIRECTIONS Respond to the following statements as they apply to the research assignment you have just finished for this class Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you feel about your assignment *at this moment* There are no right or wrong answers Do not spend too much time on any one statement, but give the answer that seems to best describe your feelings *at this time.*

STAI form Y-1*

*Charles D Spielberger, *State-Trait Anxiety Inventory (From Y)* (Palo Alto, CA Consulting Psychologists Press, 1983)

VITA

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