Information Literacy and College Student Anxiety

by

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Abstract

The skills surrounding the use of information as part of today's common literacy has been formalized into a schema known as information literacy. A brief background on information literacy helps substantiate the importance of information literacy to society, teaching and learning. Information literacy's potential relationship with college student anxiety is explored and assessed. Two anxiety assessment instruments were researched and tested as the first stage of research. A custom rubric was authored to assess information literacy. Additional obstacles and incentives challenged students as they worked through an assignment requiring information literacy skills. The students' anxiety was assessed incrementally throughout the research experience. The participating sample was composed of Midwestern college students. The findings failed to correlate information literacy with anxiety. The use of the information literacy rubric suggested a relationship between feedback provided to students, assignment rework, and improvements in the student's individual scores.

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My family who has endured a neglected existence.

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Chapter I: Introduction

Research is part of learning. Human beings have always been driven to seek out and use information (Pobiner, 2016). In college classes students are challenged to apply their best inquiry skills as tools of research for learning. This is the scenario in this researcher's classes of 100 students, ranging in age from 17-42 who are studying in the field of graphic communications at a small Midwestern University. Handling data and solving problems associated with information are huge components in the needed skillset for graphic communications.

Statement of the Problem

Learning in a college setting requires some minimal skills. Students without skills of how to structure inquiry, or who are unaware of how to find information, or do not know how to ask effective questions are slowed in their progress (Gross, 2005). Information inquiry skills support problem solving and workplace success (Kuhlthau, 1987). Learning the literacy skills to effectively embrace information is important to developing communications and essential to lifelong learning with its economic value (G. S. Becker, n.d.). A current problem is that students set out in their college career without many prerequisites including information literacy.

This debility has been demonstrated through a University class assignment used by the researcher for several years. Each student selected their own desired job role as their subject of research for the assignment. With the assignment, students spent an hour with a librarian receiving instruction regarding the use of using multiple mainstream resources that were all readily available. Students received both a printed and digital PDF version of an evaluation worksheet questioning the resource criteria regarding, currency, relevance, authority, accuracy and purpose, known by the acronym CRAAP (Blakeslee, 2010). The intent was to scaffold students learning and inquiry skills as students begin to build their information literacy skills. A

distributed PDF included a link to Purdue's writing lab, its American Psychological Association (APA) formatting references (Purdue Online Writing Lab, n.d.), as well as other resources. Job roles in the graphic communications industry often require planning, documentation and communication skills. These are essential to production details and specifications. The described assignment, investigating job roles, asks students to judge the validity and reliability of their resources. Bias issues are discussed and the authenticity of information sources questioned. The critical evaluation of resources is at the heart of the assignment's attempt to instill the skills of information literacy with handling information. The job and its research are relevant to their future.

Historically, students have commented on the difficulty and the massive time investment consumed by the assignment. The assignment results have not yielded the desired student information literate expertise. APA citations appear in less than 50% of the papers. Copied and pasted hyperlinks are considered complete citations and some students include no source citations at all. The students have freely selected to pursue graphic communications and these classes are designed to reflect and instill the required job skills. In their chosen vocation, students will be required to use and communicate all sorts of information with diverse and unusual techniques. These job roles typically require emailing, video conferencing, remote proofing, interpretation of client notes, editing text materials, manipulating visuals, integrating mixed media, repurposing existing information for other presentation formats, and adapting existing materials to other languages and cultures. Partnering with their clients, the student-now-employee will work with imagery, text files, videos, audio files, fonts, software and PDF pages. All the materials are subject to physical and intellectual property laws. There are significant legal ramifications if forgery, privacy, copyright and piracy infringements occur (United States Patent

and Trademark Office [USPTO], 2019). Understanding how to examine and handle information will be critical. Given the context of the industry, the instructor is challenged to integrate such information literacy skills into the students' learning experience.

The skills named as "information literacy" offer research aides to students (Bingham et al., 2017). The foundations of information literacy competencies stem from multiple disciplines including library, research and workplace skills (Tobin et al., 2014). Information literacy addresses research as a process of inquiry and discovery. It is this process that can build curiosity and inquiry that will prove useful across a lifetime (Eichelberger & Imler, 2016; Grassian & Kaplowitz, 2001; Lau, 2006). The development of information literacy skills can help students find, ingest, rightfully use and repurpose information (American Library Association [ALA], n.d.). The skills are an asset to their educational success.

In this researcher's classroom, students have described difficulty sleeping, muscle tension, stomach aches and panic attacks which are symptomatic of anxiety (Zung, 1971). Students may fail to get out of bed due to anxiety. They have emailed the instructor explaining their anxieties. Some students shy away from speaking. Some students will not come to class if they have lost or forgotten their anxiety medication. Anxiety is a reality for these college students (Scheffler et al., 2018).

As students share their anxiety and its triggers, other factors come to light. The experience of researching for homework assignments has been discussed as a consistent anxiety trigger in the researcher's classroom and in existing research literature (Celik & Yesilyurt, 2013; İşgör, 2016; Núñez-Peña et al., 2016; O'Donnell, 2017). The instructor/researcher used this student input to formulate this research project to examine the practices students use in their research, associated skills, and anxiety. The research skills required, paralleled information

literacy skills. Information literacy provides a framework useful for identifying and assessing needed research skills. During research, anxiety levels could be assessed using one of several existing anxiety self-assessment instruments. The scores from information literacy assessments and students' anxiety scores may be examined for a relationship.

Student's attitudes and perceptions, impact all of their learning experiences (Marzano, 1992). Perceptions impact students' social, cognitive and emotional state and its development should not be lightly dismissed (Gogus & Ertek, 2016). A student's perception may influence their overall lifetime successes (Stewart et al., 2015).

Learning and anxiety have had a long and tumultuous relationship (Barrows et al., 2013; Jiao & Onwuegbuzie, 2004; Kavanagh et al., 2016; Khoshlessan & Das, 2017). Learning seeks to process the contexts of unexplored components influenced by interfaces, technologies and the information itself (Fraillon et al., 2013; Worthington & Zhao, 1999). Those influences, pressures and anxieties form an ecosystem surrounding the learner (Bronfenbrenner, 1981). The ecosystem described by Bronfenbrenner (1981) provides a foundation, orienting this research as it considers the environment as a system molding human learning (Bronfenbrenner & Evans, 2000). The ecosystem engages as a series of experiences involving time, culture, society, interconnections and perceptions influencing the evolving individual (Bronfenbrenner, 1999; 2005). Information literacy competencies provide tools altering the interaction of the learner and their experience with information through this ecosystem.

As an interconnected system, some research suggests that the broader connotations of society, self, and culture is at the root of anxiety for novice learners (Worthington & Zhao, 1999). The learner can be further disoriented by technology blurring distinctions between information, reality and its medium of delivery (Hobbs, 2010; Worthington & Zhao, 1999). These troubling

aspects underpinning data elicit frustration, apprehension and unsettled feelings often recognized as anxiety (The World Economic Forum & The Boston Consulting Group, 2016). Experiencing difficulties in finding and identifying information, can amplify anxiety (Khoshlessan & Das, 2017; Samoilova et al., 2017). Persistent anxiety can become a mental health issue (Xiao et al., 2017). Mental health issues can inhibit student success (American College Health Association [ACHA], 2018; Beiter et al., 2015; Rankin et al., 2018). Research suggests that student success benefits from minimized anxiety and information literacy can provide useful skills helpful to minimizing anxieties (Beiter et al., 2015).

Anxiety appears as students consider their role in the world, question beliefs, self-identity, choices and meanings as they navigate through their educational experiences (Bingham et al., 2017; Millett-Thompson, 2017). Questioning is part of a student's introspection and self-examination as they journey toward adulting – a term commonly used to describe acting like an adult while denying being at that stage of development (Kuehner-Hebert, 2017; Marano, 2015; Raza, 2016; Tait, 2017). Technology has provided an Internet of unmoderated and unrestricted sources freely providing unauthenticated information which adds to complexities as students cast judgements (Kumar & Mondal, 2018). Not only does the magnitude of available data have repercussions, but the information's usefulness can seem overwhelming and oppressive to student success (Lee et al., 2016; Rosen, 2013).

Within the last decade, researchers have identified an increasing number of anxiety cases among students in schools and colleges (Millett-Thompson, 2017; Posselt & Lipson, 2016; Yusufov et al., 2019; Xiao et al., 2017). The World Mental Health Survey's International College Student Project indicates that increasing levels of anxiety are consistent worldwide (ACHA, 2018; Auerbach et al., 2018). The rising numbers of students needing mental health assistance is

unsettling (The Bronfenbrenner Center for Translational Research at Cornell [BCTR], 2018; Bourdon et al., 2020). The mental welfare challenges faced by schools and post-secondary institutions is suggestive of a shared storm precipitated by an onslaught of information, technology, societal issues and our ubiquitous need to learn (Auerbach et al., 2018).

The rising number and severity of student anxiety cases is profiled by the Center for Collegiate Mental Health (CCMH) in their 2017 Annual Report (2018). The continually rising levels of anxiety are becoming difficult for teachers, mental health workers, institutions and students to ignore (Horowitz & Graf, 2019). Research has concluded that one in every five youths today meets the criteria suggesting a mental disorder with severe impairment during their lifetime (Merikangas et al., 2010).

Anxiety itself, is a normal emotion (Mayo Clinic, 2019). Unfortunately, anxiety is becoming more frequent and inhibiting as a disorder, particularly for students (Gooblar, 2018; Marano, 2015). While not without exceptions, the National Institute of Mental Health (NIMH; 2017) has identified multiple causation factors behind rising student anxiety (Bullis, 2019; McHugh, 2019). Changes in technology, language, locations, cultures, procedures, society and even reality, are daily reminders of living in constant flux (Feather, 2006). Change is a factor associated with anxiety (Rose & Devine, 2014). Living in and with a highly technical, information-centric society is cited as a significant anxiety factor (Edmunds & Morris, 2000; Kuhlthau, 1987; Rainie & Anderson, 2017).

Purpose of the Study

The initial motivation behind this research was sparked by students' reports of growing anxiety. The purpose of this research study is to examine college student anxiety levels and a potential relationship with information literacy. The hope is to find ways to minimize anxiety and

integrate those techniques into teaching and learning experiences. The practice of critical assessment, authentic inquiry and valid data analysis involved with information literacy, may illuminate a relationship between student anxiety levels and information literacy competencies. This paper profiles information literacy, identifies its framework, describes the prevalence of college student anxiety, tests different anxiety measurement instruments and examines information literacy measurement along with assignment feedback for students. The primary research question explored asks, is there is a statistically significant correlation between students' anxiety scores and their information literacy scores?

Significance of the Study

Research insights may point to an appropriate strategy for training or re-training information literacy skills. Frameworks structuring information and its analysis may be enhanced. Insights reducing student anxiety levels could be helpful to many. Alternative strategies for delivering information and more palatable interpretation approaches may help post-secondary student learning. The perils or advantages of both anxiety for college students and information literacy competencies may be useful in reducing student anxiety and/or improving information literacy skill levels. The research may help broaden an understanding of student anxiety as well as the needs surrounding research and inquiry skills.

Assumptions

This researcher has, without intentional bias, made assumptions and readily acknowledges the existence of limitations within this study. The following list recognizes assumptions that have been made:

1. Most students experience anxiety.
2. Extensive or severe anxiety is not a required part of a college education.

3. Students' desire to, and practice the use of, digital information resources.
4. Survey, assessment and testing instruments are helpful for analysis.
5. Information literacy assessment and testing instruments are valid and reliable.
6. Anxiety analysis survey instruments are viable and reliable.
7. Information literacy can be judged from a single course assignment.
8. Data collection instruments accurately reflect students' anxiety levels.
9. Data collection instruments accurately reflect students' information literacy skills.
10. Research participants provide genuine responses to questions.

Limitations

Limitations exist with all human research. This small study is localized and constrained by costs and accessible resources. Consequential limitations include:

1. The population sample is very small.
2. The population sample is homogeneous.
3. The population sample may be susceptible to bias.
4. The researcher has limited experience with anxiety diagnosis.
5. Changes in technology and society may alter research results.
6. Students will not share the same foundational information literacy skills.
7. Students will not share the same anxiety stimuli, motivators or responses.
8. Honesty and authenticity among participants may not be complete.
9. The research takes place at one limited point in time rather than longitudinally.
10. The research takes place at one specific location geographically.

Definition of Terms

The terms and acronyms used by mental health care workers and educational professionals can be confusing. The same terms may be assigned different meanings as they are used in different contexts. This definition of terms section includes related vocabulary that supports the understanding and interpretation of this research.

Anxiety. Anxiety is a normal human reaction to stressful situations; it is often expressed as emotional or physical worry or distress (Conley et al., 2017).

Anxiety disorders. Anxiety disorders can severely impair a person's ability to function at work, school, and in social situations as well as it can interfere with a person's relationship with family, friends, and co-workers. There are multiple, detailed categories of anxiety related disorders (McHugh, 2019).

Competence. Competence is the ability to use tools and tasks to effectively and efficiently execute or accomplish the given objective (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2019).

Data. Datum is a piece of information without context or meaning. Data is considered the raw source and with context, it becomes classified as information (Bourgeois, 2014).

Digital literacy. Digital literacy is the ability to use digital technologies to find, understand, evaluate, create, and communicate digital information, an ability requiring both cognitive and technical skills (B. W. Becker, 2018).

Generalized anxiety disorder (GAD). The generalized anxiety disorder afflicts 4-6% of the general population. Often chronic, this disorder is characterized by persistent worry, anxious feelings, fatigue, restlessness, muscle tension, insomnia, poor coping strategies, and panic attacks. Comorbid disorders often include depression, obsessive-compulsive disorder, and social

phobia. The generalized anxiety disorder is the anxiety category used in this research (Gliatto, 2000).

General literacy. General literacy is defined as an individual's ability to understand, evaluate, use and engage with written text to participate in society. Individuals take advantage of this skillset to achieve their goals, develop knowledge and grow their potential (Programme of Assessment and Analysis of Adult Skills [PIAAC], 2015).

Information. Information is the perception of data through the stimulation of the human senses. Information is interpreted, experienced and used across many venues and applications as a catalyst for thought, learning and creativity. Information is basic to human development and innovation (Lau, 2006).

Information literacy. Information literacy is a process using a set of abilities requiring acknowledging information as needed, possessing the ability to locate, evaluate, validate, and utilize the resourced data (ALA, 2000).

Literacy. Literacy indicates skills capable of generating competence in or with an element or concept (Lau, 2006).

Media literacy. Media literacy is the practice of applying skills toward identifying, understanding and unveiling different kinds of media and discovering the data and messaging from the media (Head et al., 2018).

Meta-literacy. Meta-literacy is a comprehensive category of literacy including media, technology, visual literacy, digital literacy, news literacy, and trans-literacy. This category of literacy promotes a unified and comprehensive approach to learning (Mackey & Jacobson, 2019).

Research As A Process. "Research as a process" was a concept drawn from volume four of the ACRL book series (Oberlies & Mattson, 2018). The phrase's acronym, RAAP, was used to refer to the evaluation rubric created by the researcher and used for assignment assessment. The RAAP was used multiple times to assess information literacy competencies.

The Programme of Assessment and Analysis of Adult Skill Competencies (PIAAC). This international survey is conducted in over 40 countries/economies and measures the key cognitive and workplace skills needed for individuals to participate in society and for economies to prosper (PIAAC, 2015).

Threshold concepts. "Threshold concepts" are categories of concepts that serve as portals to broaden understandings or ways of thinking and practicing (Association of College & Research Libraries [ACRL], 2015, p. 7). These are ideas that act as a precursor to developing further knowledge and insights (Hinchliffe et al., 2018).

Chapter II: Literature Review

The ensuing literature review begins much as the research itself began; by recognizing the existence of student anxiety and the students' need for competencies in information literacy to assure academic success and intellectual development. This literature review depicts information literacy and college students' anxiety as variables in life's ecosystem. Bronfenbrenner's ecological model is explored and used as an analogy illustrating the contextual ecosystem integrating life's issues. Extending the analogy, information literacy is described using several prominent models. The definition used by this researcher is presented. An appraisal of past research reveals four projects with particular relevance to this researcher. Each project is briefly described. The review of literature identifies several domains related to information literacy and its model. Those domains are portrayed as aligned with Bronfenbrenner's categories of influence including (a) timeframes and information literacy, (b) cultural and social conventions, and (c) the individual. Anxiety factors fold naturally into the categorical discussion. The research of anxiety instruments and their selection is inserted because the anxiety assessment tool evolved within the process of researching. The literature review continues with a definition of anxiety. An account of anxiety's manifestation in higher education is profiled. In closing, the contextual ecosystem integrating information literacy and student anxiety is reviewed.

Theoretical Framework

Bronfenbrenner, a developmental psychologist, authored a series of models representing human and social development as a progression of communal interactions within a physical environment identified as an ecosystem (Bronfenbrenner, 1981). Bronfenbrenner's initial model focused upon the importance of research techniques that were inclusive of the

environment or whole ecosystem as integral to the research itself. He used the ecosystem to illustrate a series of nesting attributes interacting as influences steering human development (Bronfenbrenner, 1981). Later editing to the model added several modifications including, chronosystem, representing time as a factor (Bronfenbrenner, 1986). Subsequent revisions oriented the model toward a bioecological focus (Bronfenbrenner & Evans, 2000). The interaction of multiple factors including the environment, interplay, reciprocity, connections, interpersonal relationships, and social customs are fundamental to his models. The ecosystem's complex relationships, perspectives, interactions, and interpretations are analogous to the experiences of the college student. Those interactions of inquiry and discovery are also fundamental to the skills of information literacy (Bundy, 2004; Hallowell, 2005; Löfström et al., 2015).

Bronfenbrenner's work initially targeted early human development. Later he expanded the model to span into geriatric development (Bronfenbrenner, 1981). Like the information literacy models, the Bronfenbrenner models are purposefully designed as pliable so specific situations can be accounted for. His outline of interrelationships and environmental factors embraces the spectrum of overlapping factors. Bronfenbrenner acknowledges the environment along with human perspectives and interpretations as impacting the creation of reliable research that attempts to avoid distortions (Bronfenbrenner, 1981, 1986, 1999; Bronfenbrenner & Evans, 2000). According to Bronfenbrenner's models, the perception of content, with context, is key to constructing learning and a better understanding of human development.

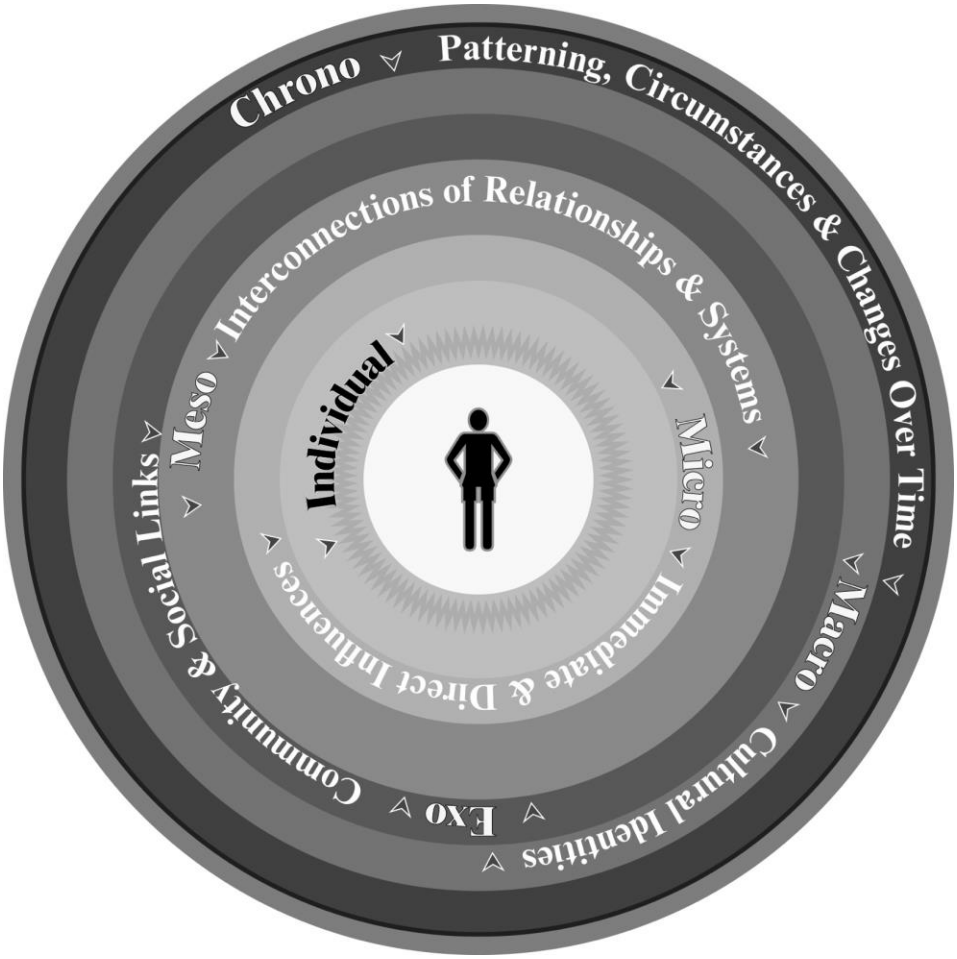
Bronfenbrenner's human development model is used in this research to represent the dynamic relationships between information literacy alongside of anxiety and the many intersecting variables involved with life and research. A rendition from Bronfenbrenner's 1986

version is adapted as an illustration in Figure 1. The application of Bronfenbrenner's model to this research is interpretive. The diagram follows the holistic approach of Bronfenbrenner's models while blending the characteristics of both information literacy and anxiety. Bronfenbrenner's original models identified nested layers as concentric circles. On this illustration, the labels are named as originally defined by Bronfenbrenner, and then broadened with the addition of terms representative of this research. Each circle represents factors impacting the individual in their ecosystem. As the factors centrifugally compound, they become pressures. Pressures turn into anxieties overwhelming the individual and pushing them toward anxiety disorders (American Psychiatric Association [APA], 2018; Keough et al., 2010).

In Bronfenbrenner's diagram, the chronosystem represents the widest aspects impacting human experience as changes occur over time (Bronfenbrenner, 1986). The consideration of time as a variable factor, accounts for the historic time period, events, societal, and cultural changes, as well as the individual's development over time. Life transitions, such as leaving home to attend college, marriage, divorce and having children, each coerce an individual's development and growth. As described in his text, the passage of time can cloud foresight and hindsight, impairing interpretations (Bronfenbrenner, 1981). As time passes, technologies evolve and they spawn socio-economic developments, growth and adaptive changes in society (Latour & Venn, 2002; Norris & Poulton, 2008).

Figure 1

Bronfenbrenner's Ecosystem Model Interpretation



The overarching chronosystem, adapted in later versions of the illustration, represents the progression and passage of time. The macrosystem represents the set of encircling factors described as the culture or subculture a person lives in. The culture and subculture impact the meso-, micro-, and exo-systems, including individual ideology and belief systems. The all-embracing actions and influences such as government, religion, the economy, social class and patterns of connections common to a culture, and are some examples provided by Bronfenbrenner (1981, 1986). Students are subjected to pressures from macrosystem factors

including their progressively changing social conditions, new customs, practices, challenges in becoming an adult, complications in technologies, and social media (Parker et al., 2019; Rosen, 2013). As society begins interlacing with technology, the distinctions are less obvious, and technology, as an isolated factor, is subtly woven into society's fabric (Symonds et al., 2011).

The exploration, use, and application of information in its context, continues to shape values and norms (Granovetter, 1978). In each of these layers, momentous events plea for the support of information literacy in interpreting, generating useful meanings and re-packaging the information to grow knowledge (United Nations Educational, Scientific and Cultural Organization [UNESCO, 2019]; Winters et al., 2016). The interactive turbulence of the strata mix into what is today's dynamic ecosystem. As individuals (students) seek higher education, their ecosystems are disrupted and changed. Disrupted or tidy, good times and bad, students are in their ecosystem experiencing life and learning.

Absorbing an experience is learning, and research is an experience (Dewey, 1909). Learning from acquired information and practicing critical analysis (judgement), builds the individual a strong foundation. Information literacy fosters, not only inquiry, but also the process of research and enabling students to construct their own learning (Lutz & Huitt, 2004). Constructing the self-sufficiency of "learning-to-learn" has become more important than ever and equips an individual with self-sustaining strengths (Granovetter, 1973; Wirth & Perkins, 2008). Changes and evolutions reorienting the individual's environment, are influential on their development (Bronfenbrenner, 1986). The analogy of the framework is erected by Bronfenbrenner's model. Structures within the frame are installed using information literacy and, for many students, it is decorated by anxiety.

Information Literacy

America's organized information literacy movement had its initiation in the late 1960s as part of the National Commission on Libraries and Information Science (NCLIS) and their publications for the United States Government (Horton, 2007). Zurkowski, employed by the NCLIS, wrote a paper describing the rise of an "information age", with associated information publishing activities, and used the term "information literacy" (Zurkowski, 1974). The term referred to information literacy's social and economic importance. The information age, as described by Zurkowski, brought with it years of expanding computer use as computers moved into homes across America (Moseman, 2013). The ability to understand all things digital was suddenly a priority for the consumer, in the workplace, and in education (Kuhlthau, 1987; Martz et al., 2017).

During the 1980s-1990s, state and federal initiatives, policies, and legislation, shifted, following the information age, to include digital literacy in formal education programs (Boethel et al., 1998). Legislation, such as *the Adult Education and Family Literacy Act of 1998*, encouraged training investments targeting new technologies and their literacies (U.S. Department of Education, 2013). At this stage, computers were not involved with pedagogical complexities (Coley et al., 1997). School budgets concentrated on invested in computer hardware for schools (Roser & Ortiz-Ospina, 2016). The ability to utilize the technical tool, named as a computer, grabbed education's attention (Bundy, 2004; Fabos & Young, 1999). The soft skills that would prove foundational to technology's use and information literacy, were not yet a priority (Byerly & Brodie, 2005). Technology enjoyed its popularity (Lee et al., 2015; PIAAC, 2015). Regardless of the training taking place and the legislated incentives, attaining technology and data, did not give rise to its literacy (Lau, 2006). Schools and organizations soon recognized the unmet and

swelling need to build competitive skills and information literacy was a key (Hoffman & Litow, 2011; Pennsylvania's State System of Higher Education, 2016; Shivakumar, 2018). Librarians gained a unique status as they taught the use of information literacy skills with new technologies (Small et al., 2004). The necessity, popularity and regularity of information literacy embedded into curriculum grew as well (Correia, 2002; EducationNews, 2013; International Federation of Library Associations and Institutions [IFLA], 2005).

With their experience in research, the American Library Association, was instrumental in developing literacy learning materials for many applications (ALA, n.d.). In 1999 the ALA formalized a strategic model targeted at teaching information literacy skills. Their first publication of *Information Literacy Competency Standards for Higher Education* was formally approved in 2000 (ALA, 2000). In 2015, the Association of College & Research Libraries (ACRL), revised the model to include *Framework for Information Literacy for Higher Education* (ACRL, 2015). This framework is popular in the United States and one of many models used as a foundation by information literacy-centric organizations worldwide.

Globally, organizations characterize information literacy with a variety of definitions typically based on three core activities: (1) acquiring or prospecting for information, (2) interpreting meaning, and (3) transferring or distributing a useful rendition (repurposing) information (Lau, 2006). Through the use of optional components, information literacy is able to span multiple disciplines and support a variety of approaches to research and inquiry (ACRL, 2019). The information literacy processes include critical evaluations of sourced material checking its legitimacy, value, content, and context (Horton, 2013). Strategic planning, accessing data, analysis through critical thinking, ethical use, and scholarship have been central to the development of information literacy (Bundy, 2004). Traditional library science practices and

processes have grown in accordance with information literacy (Lamb, 2019). As accessibility to data has expanded, the process of research has become complicated by the need for validating and processing data while critically interpreting its content (Howard et al., 2018).

Models of Information Literacy

Information literacy is host to several distinct approaches or models. Each unique perspective incorporates a vocabulary, strategic requirements, and pursues the goal of information literacy education (Weiner, 2012). All categories of literacy are important for society's development (National Center for Education Statistics [NCES], 2016; Organisation for Economic Cooperation and Development [OECD], 2017). Many of the information literacy models have shared legacies stemming from common foundational literacy concepts. Some hint at the topic's breadth by including literacies related to technologies, media or political interests (Correia, 2002; Doherty & Ketchner, 2005; Jenkins, 2006).

Models, as well as instructional resources, are available from the Information Literacy Group, a special interest group of the Royal Chartered Institute of Library and Information Professionals (CILIP), housed in London (CILIP, 2019). The Information Literacy Group's web site's "Definitions-Models" section profiles prominent contenders that are current and active in the information literacy arena (Information Literacy Group, 2019). Those profiles are referenced below to characterize the merits of the described organizations and models.

The Chartered Institute of Library Information Professionals published a formal definition of information literacy in 2018. It portrays information literacy as a combination of practices and skills. These include the ability to think critically, find and use information, make balanced judgements, and empower citizens (CILIP, 2019).

The Society of College, National and University Libraries (SCONUL) used a pillar model and described the information literate user as demonstrating an awareness of information, its gathering, use, management, synthesis and creation, while acting ethically (SCONUL, 2018).

A New Curriculum for Information Literacy (ANCIL), in 2011, defined information literacy as a set of skills on a continuum, entwined with learning, scholarship and research that supports the scholar, citizen, and autonomous learner (Secker & Coonan, 2011).

The Research Information Network (RIN) supports both the CILIP and SCONUL's definition of information literacy, and further describes a broader interpretation recognizing information as inclusive of research data and encompassing information management (Information Literacy Group, 2019).

The Joint Information Systems Committee (JISC), a non-profit in the U.K., describes themselves as champions of digital technologies for U.K. education and research. They define information literacy as including capabilities for living, learning and working in a digital society (National Forum for the Enhancement of Teaching and Learning in Higher Education, 2015).

The UNESCO uses a definition drawn from their own Alexandria proclamation on information literacy and lifelong learning. It describes information literacy at the heart of lifelong learning, empowering people to seek, evaluate, use, and create information to achieve goals. They further describe information literacy as promoting social inclusion and as a basic human right in a digital world (International Federation of Library Associations and Institutions [IFLA], 2005; United Nations Educational, Scientific and Cultural Organization [UNESCO], 2005).

The descriptions of information literacy are varied. They have each been adapted for select implementations. Planned elasticity enables the customization of content to practices,

grade levels and targeted assessments. Processes for teaching, learning, and implementation, are supported by each of the described information literacy organizations (Hobbs, 2010).

The Referenced Framework

The Association of College & Research Libraries (ACRL) adapted and expanded the concepts of managing information through acquiring, making meaning and transferring knowledge that culminated in a framework (ALA, 2000). Six structured, yet flexible, frames were ultimately defined (ACRL, 2015, 2018). The definition of information literacy, and much of the framework, is purposefully designed to be pliable. The malleable frame information was composed into a six volume book series. Each book describes a single frame and provides a host of practical instructional examples (ACRL, 2018). The six-volume set is entitled *Framing Information Literacy (PIL#73): Teaching Grounded in Theory, Pedagogy, and Practice*, and acquaints users with an assortment of skills and foundational knowledge aligning with each of the six frames (ACRL, 2018). The six-frame approach facilitates orienting assessments with multiple analytical and scholarly evaluation approaches (Bundy, 2004).

At the time of this writing, the framework was last revised in 2015. Revisions have broadened the model's alignment with prevailing digital and social applications as well as meta-literacy (Jacobson & Mackey, 2013). This author uses the ACRL definition of information literacy along with its accompanying set of six frames throughout this research project. The ACRL definition reads: "Information literacy is the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning" (ACRL, 2015, p. 8).

The framework, has created a 6-volume set, used in any sequence, which is also available as individual books. The set is collectively authored by the ACRL and uses the individual titles to identify each frame and directly associate it to each individual book volume (ACRL, 2018, 2019):

- *Research as Inquiry*
- *Information has Value*
- *Searching as Strategic Exploration*
- *Information Creation as a Process*
- *Scholarship as Conversation*
- *Authority is Constructed and Contextual*

Existing Research Related on Information Literacy

Competencies growing from practiced information literacy, strengthen the students' efforts to be academically successful (ACRL, 2015; Siegel, 2018). These skills endure. Today, these are skills needed at the grocery store, the pharmacy, the research lab and at work (Adobe Systems Incorporated, 2014; Bandaranaike & Willison, 2010; IBM, n.d.; Perkins Collaborative Resource Network [PCRN], 2016). Literacy topics have a significant volume of research behind them, including many specific research projects.

A base of general research exists examining information literacy and specific situations and disciplines related to student anxiety (Jenkins, 2006; Mendez-Carbajo et al., 2019; UNESCO, 2019). Relatively few studies examine the competency of college students with information literacy skills along with general anxiety. The numbers of research articles, fluctuates mildly across the range of years investigated (1990 to 2020). This researcher used EBSCO, ELSEVIER, ERIC, Google Scholar, Harvard Business Review (HBR), IES/NCES,

IntechOpen, SAGE, Statista, and Wiley to keyword, cross-reference and timeframe-search for related materials.

The review of existing literature quickly pointed to information literacy materials that concentrated on libraries and librarians (Lamb, 2019; Wallis, 2005). Both share a common focus on inquiry, finding, and referencing information (Budd & Lloyd, 2014). Topics relating to library sciences often led to valid and palpable information literacy resources. Continuing the research on information literacy-specific data, shepherded the research topics into disciplines with heavy research and inquiry skills requirements that (perhaps ironically) generate anxiety. Academic topics such as writing, math, statistics, research, and librarianship presented multiple articles on the discipline's ability to generate anxiety as well as the student's need for specific research and inquiry skills (Erfanmanesh et al., 2014; Haciomeroglu, 2017; Jiao et al., 1996; Stewart et al., 2015).

These disciplines were exemplified in research projects affiliated with general anxiety disorders (GAD), anxiety comorbidity, technology relationships and specific anxiety measurement scales (Alkis et al., 2017; Harris & Coy, 2003; Jiao & Onwuegbuzie, 2004; Taylor, 2018). Delving further, the research seamlessly shifted toward a smaller set of anxiety projects exploring select segments of the college student's life. College student anxiety-specific research frequently focused on general anxiety disorders, social anxiety, test anxiety, phobias and social media anxiety (Beck et al., 1988; Dawood et al., 2016; Pizzie & Kraemer, 2019; Taylor, 2019; Van Bockstaele et al., 2014). This research provided an eclectic assortment examining anxiety and the college student. Only the weakest of threads tied directly to a combined examination of information literacy and college students' general anxiety.

Relevant Research Projects

During the literature review, four specific research projects were apropos and aroused particular interest for this researcher. The most intriguing findings included writings by Erfanmanesh et al. (2014), Gross & Latham (2007), Kwon (2008), and Mac Callum et al. (2014). The four research projects are briefly described below.

In "Comparing the role of ICT Literacy and Anxiety in the Adoption of Mobile Learning," the authors Mac Callum et al. (2014) examined information communication technology (ICT), mobile device use, adaption factors, inclination of use, and instructor anxiety. ICT literacy was defined as an individual's ability to use digital technology as a communication tool and manage data integration with learning resources using mobile devices. This project concentrated on perceptions by teachers as well as students, instructor's technical literacy competencies, and their openness to technology adoption.

Mac Callum's team recognized the predisposition of ICT to spontaneously generate unusually high levels of anxiety and identified this as a factor inhibiting instructor adaption (2014). Anxiety assessment was directed at the anxiety related to using technology and did not address general anxiety nor assessment instruments. Outcomes indicated that high levels of anxiety disincentivized technology and device use. This relationship is worthy of note, as anxiety in the student may be indicative of a more hesitant technology user when performing research. The definition of technical literacy, in Mac Callum's study, equated with technical performance competencies. In opposition, information literacy is defined as a process. Mac Callum's research findings indicated that user perceptions were the dominate factor in determining technology adaption. Both ease of use and effectiveness of use, influenced adaption. Users with high levels

of ICT anxiety were less likely to engage with mobile technology for learning. Similar user perceptions, predispositions, and attitudes may be factors hindering students' technical research.

The research entitled "The Prevalence and Correlates of Information Seeking Anxiety in Postgraduate Students" by Erfanmanesh, et al. (2014) examined fear, frustration, and apprehension as postgraduates sought out research information. The research team developed an Information Seeking Assessment Scale (ISAS) that was used to examine a potential relationship between demographic characteristics and anxiety in postgraduate students during research. The findings did not indicate a relationship between any of the cited demographic characteristics and anxiety. Anxiety was identified in over 96% of their sample of 375 postgraduate students. Library anxiety was cited as one of the most prevalent types of anxiety (Jiao et al., 1996). The Erfanmanesh et al. (2014) research found no correlation between those individuals with or without information literacy training and anxiety levels. This may bode of a need for self-evaluation and awareness strategies underscoring the significance of applying information literacy skills. Students failed to recognize their own particular skill levels.

Kwon's (2008) research, entitled "A Mixed-Methods Investigation of the Relationship Between Critical Thinking and Library Anxiety Among Undergraduate Students in their Information Search Process," focused heavily upon library anxiety and the research experience. The research drew from studies validating library anxiety as a prominent issue for college students. Findings associated high critical thinking skills with lower library anxiety levels. The researcher described anxiety as hampering critical thinking skills. Intellectual curiosity was indicated as an advantage to systematic research. Critical thinking skills strengthen information literacy skills and the two skill sets form a symbiotic relationship (ACRL, 2015). Kwon's (2008) work found students who spent time working on research in the library, experienced their library

perception become more positive. Student's perception of their own performance also improved. Large emotional challenges occurred as individuals indicated they were intimidated by the library; even information technology proficient users indicated this affective impression. The research underscores that cognitive, affective, and behavioral domains all play a significant role in research, inquiry, and critical thinking. The three domains are also active members in triggering anxiety. Library anxiety can negatively impact a researcher's performance (Kwon, 2008). The persistence of library anxiety may indicate that information literacy, if interpreted as "library work", inclines users to immediately associate the event with library anxiety scenarios. The connotations of library anxiety may serve as a de-motivator to students.

Gross and Latham's (2009) research project article "'Better Than Average': Information Literacy Skill Levels, Self-Estimates of Performance and Library Anxiety" examined user's skill levels with self-estimated performance assessments and anxiety levels. Skill and knowledge used in the library were compared with library anxiety levels (Gross & Latham, 2009). The research work did not find a relationship between information literacy skills and library anxiety scores. The research did identify students with information literacy illiteracy. This state of illiteracy often went unrecognized by the student who was oblivious to their own shortcomings. Low levels of library competence tended to produce self-evaluations that overrated the student's true competencies. Overinflated self-perceptions are typical of the Competency Theory. The exaggerated skills self-assessments carried over into other areas. This self-assessment inflation-gap proved to be a disadvantage to students with low library skill proficiencies, as the deficiencies appeared to go unrecognized and assistance was not sought. Gross and Latham (2009) described these false-positives of self-assessed library skills as furthering the student's negative opinions on library instruction. Research findings indicated that most of the students

were self-taught in library and research skills. The findings pointed to a strong subscale relationship between higher "knowledge of the library" with the presumption of "higher levels of information literacy" skills (Gross & Latham, 2009, p. 349). The misalignment between self-assessment and actual competencies may be indicative of other gaps. The association of high levels of student anxiety with the library, as a re-occurring theme, was restated and reinforced in this research.

In these research studies, as well as others reviewed, differing literacy assessment instruments were used. Few assessment instruments shared common uses across multiple research studies. None of the information literacy assessments were used consistently (Bandaranaike & Willison, 2010; Caravello et al., 2001; Fraillon et al., 2013; E. Marsh, 2018; Radcliff, 2019; Wang et al., 2018). The absence of a repeatedly used or standardized instrument creates difficulties in equating information literacy assessments between projects and potentially fosters inconsistencies across research.

The topics of over 1000 viewed resources had only a single element or small set of data pertaining to information literacy as a counterpart to college student anxiety. None of the research projects appeared to have addressed a specific relationship between college student anxiety and the student's information literacy competencies. The large body of generalized research is indicative of the interest and inquiry surrounding the independent topics of literacies and anxiety. The combination of the two topics appears to have encountered limited research. Even so, individually, both information literacy and anxiety are common student concerns (Auerbach et al., 2018; Bernal-Morales et al., 2015; DordiNejad et al., 2011; Elhai et al., 2018).

Information literacy in today's culture becomes a liberator (Correia, 2002; Doherty & Ketchner, 2005), as well a powerful partner to inquiry, activism, and imagination (Gray et al.,

2018). Information literacy is as encompassing as Bronfenbrenner's circles. This research draws parallels with Bronfenbrenner's concentric circumstances across time, cultural, and community significance, relationships and direct influences on the individual. These roles guided the research as it segmented into three areas relating to information literacy which are briefly probed and described as (a) timeframes and information literacy, (b) social and cultural ramifications, and (c) the individual (student).

Timeframes and Information Literacy. Information literacy skills impact people as a world-wide imperative (UNESCO, 2019). The World Economic Forum & The Boston Consulting Group (2016) defined six core literacies covering reading and writing, numeracy, scientific literacy, technology literacy, financial literacy and civic literacy. These core literacies form threshold concepts underpinning other literacies (Institute of Education Sciences [IES] & National Center for Education Statistics [NCES], n.d.; Snyder, 1993). Information literacy integrates all six core literacies through its applications in classrooms, at all levels (Bernnard et al., 2014; Horton, 2007). The drive behind literacy efforts spans cultural identities, communities, social status, economic castes, and the relationships of individuals (OECD, 2016). The skills of information literacy support and extend even the most basic of information through its conspicuous skills endorsing communication and interpretation (Eshet-Alkalai, 2004; Parker et al., 2019). Information literacy skills are fundamental to understanding and functioning in today's and tomorrow's social ecosystem (Onwuegbuzie et al., 2013). Literacy skills have developed from a human history of inquiry, discovery and curiosity surrounding information itself (Edmunds & Morris, 2000; Schein, 1996; Ward, 2006).

Understanding data and its intent are insights drawn from ethics and practices across time, culture, society and the individual (Kuhlthau, 1987; Lee, 2018; Martzoukou & Sayyad

Abdi, 2017). The experience of inquiry has value (Martz et al., 2017). Executing the systematic steps of acquire, make meaning, and transfer utilizes information, as a portal to knowledge and enlightenment (Portnoi et al., 2010; Shaffer et al., 2015). At the individual level, students discover techniques for information creation, its consumption and repurposing as they dabble in ethics applying their learning (Jenkins, 2006; Kanchev et al., 2016). Students who are actively learning, evolve in their proficiencies of applied practices over time.

Time also invents new tools. The literacy of working with a computer is merely a single piece in the set of prerequisites to information literacy (Bundy, 2004; Head & Eisenberg, 2010; Rainie & Anderson, 2017-a; Walsh & Borkowski, 2018). Computer skills are commonly referred to as digital literacy and measured with performance competencies (Kanchev et al., 2016; Mamedova et al., 2018). Without the skills of information literacy, technology is weak (Williams, 2009). Critically challenging and analyzing legacy concepts is important to maturation, developing ideation, and innovation (Dyer et al., 2009; Pisano, 2019). Often modern technology is needed to acquire, investigate and manipulate digital information (Soysal et al., 2019). Mastery of all tech-related skills (a massive assignment) is not required when a learner has keen inquiry skills. They can adapt. The skill requirements will change (Caravello et al., 2001; Lankshear et al., 2008; Malyn-Smith & Smith, 2013). Today's students should be capable of continuing with adaption throughout their lifetime process of learning.

Digital technologies are inherently impermanent (Bawden & Robinson, 2009). Technology's expression can be seen in the evolution of inquiry, learning, and development over time as device after device become developmental, but disposable, stepping stones for learning (Campbell et al., 2009; Morrison, 2014; Robarge, 2017). Consequently, learning has become a time sensitive initiative. The impermanent and time-bound nature challenges both teachers and

learners (Hallis, 2017; Soysal et al., 2019). The capability to find and assess data can be as fleeting, as the technologies that may disappear overnight (Colepicolo, 2015; PIAAC, 2015).

Regardless of the time period, technology has always been a linchpin securing a relationship between the student (or consumer) and information. The aptitudes needed to retrieve information are fused into America's desire for tools of discovery. Today's frequent use of applications has elevated devices, such as the smartphone, into the ranks of a common appliance (Perrin & Kumar, 2019; Smith, 2015). Technology navigates users through life's decisions, app by app, but the skills of information literacy are the key to interpreting and understanding (Kuhlthau, 1987).

In keeping pace with technology, the needs and wants of employers has changed over the decades (American Institutes for Research [AIR], 2016; Malyn-Smith & Smith, 2013; OECD, 2019). The skills of information literacy have become highly valued (CareerOneStop, n.d.; Symonds et al., 2011). Employers are seeking employees who are ready-to-work, with prefabricated information literacy skills (Adobe Systems Incorporated, 2014; PCRN, 2016). Remedial facts can be instantly Googled (H. Marsh, 2017; Walsh & Borkowski, 2018). Employers are seeking different, valued human attributes (Antosova & Csikosova, 2011; Google, 2015). An individual's value to the workforce today lies in their ability to form central ideas, extract concepts, perform inquiry, critically argue the information as well as effectively communicate (Howard et al., 2018; PCRN, 2016; Wilson & Peterson, 2006). The aggregation of an employee's aptitudes with information has become part of their monetary value in the workplace (G. S. Becker, n.d.; Boyd, 2019). The employee's interpretation of safety data, directives, comparisons, financials, problem solving, and equipment information relies directly upon digital information (Firestone & McElroy, 2005; Füllemann & Salmerón, 2016; Horodyski,

2011; MacQueen & Milstein, 1999). Literally, an individual's relationship with workplace information changes their professional economic value (Acker & Clement, 2019; G. S. Becker, n.d.; Google, 2015).

In addition to being a workplace requirement, information literacy helps strengthen worker's employment viability, options, and provide new levels of job security (Shivakumar, 2018). Information literacy forges a cognitive scaffolding for employees to use in constructing continual and lifelong learning (ACRL, 2015; Doyle, 1992). Literacies advance individuals as more valuable to employers (Neubert et al., 2015). Information literacy can enhance profitability in the workforce through expediency, fewer errors, reduced incidents and optimized workflows (Symonds et al., 2011; UNESCO, 2019). Innovative employers hunger for employees with strong information skills (Dyer et al., 2009). Information literacy competencies are compulsory for an individual in today's technical workforce (IBM, n.d.; PIAAC, 2015).

Online consumer data is a marketer's holy grail (Boyd, 2019). Its availability has given birth to a strategy of cradle-to-grave marketing that is indistinct from the habitual use of Amazon's one-click or Siri's advice (Harris, 2017; Zuboff, 2015). The financial potential of the market is attractive to retailers (Harris, 2017). In 2018, e-commerce retail sales reached $526 billion and the projected growth is estimated to hit $893.4 billion by 2022 (eMarketer, 2019). The consumer, spending their dollar, is left to critically assess and discern between authentic information and promotional advertising.

Cultural and Social Conventions. Citizens use information literacy skills to interpret and understand data related to their work (Antosova & Csikosova, 2011). These same skills facilitate interpreting the information of governing, civic responsibilities, rights, health, welfare, and factors influencing their lives (Bandaranaike & Willison, 2010; G. S. Becker, n.d.).

Constituents can invest these skills in understanding data being gathered about them and how to find specific information (Correia, 2002). A public with intellectual freedom depends on a public with information literacy competencies (Doherty & Ketchner, 2005; Wineburg et al., 2016). Today, more people get news information from social media than from newspapers (Mizrachi, 2015; PEW Research Center, 2019; Shearer & Matsa, 2018). The ability to understand differing philosophies and to develop critical thinking is a skill needed by organizations and individuals as well consumers and citizens, alike (Facione, 2000; Morrison, 2014). The ability to grasp alternate perspectives has become each individual's own obligation as society's definition of diversity evolves (Forster, 2016).

As epitomized by a simple online Google search, the grand scale of data indoctrinates the mind into thinking that all information is available, all the time, for all purposes (Nicholas, 2010; Zuboff, 2015). Students have come to know an Internet of unmoderated and unrestricted sources freely providing unauthenticated information (Kumar & Mondal, 2018). The sheer magnitude of data is alluring, but queries with unaccountable results, can be overwhelming and far less than productive (Nadler et al., 2018). The skills of information literacy can perform the task of moderator when searching the world (ACRL, 2015; Secker & Coonan, 2011).

Authentic data can be hard to identify. The phenomena of strategically manufactured ignorance, known as agnotology, routinely materializes on social media (Boyd, 2019). Understanding the distinguishing characteristics between authentic data, as well as its content and context is critical to its interpretation (Acker & Clement, 2019; Feather, 2006; Tobin et al., 2014). Inquiry examining pros and cons is fundamental to making decisions for society's members (United Nations General Assembly, 2019; Williams, 2009). Our nation's founding relied on active citizens performing research and questioning (Correia, 2002; Martzoukou &

Sayyad Abdi, 2017; Wallis, 2005; Ward, 2006). Recognizing alternatives and being able to develop those variations into applications is pivotal to nurturing innovation (Bernnard et al., 2014; Dewey, 1916). Information literacy can help society avoid a digital divide that threatens economic, social and health welfare (Anderson & Kumar, 2019; Bawden & Robinson, 2009; Jenkins, 2006). The digital divide grows anxiety (Soysal et al., 2019).

Addressing the digital divide might heed advice from our predecessors. Years ago, Dewey suggested that the informed citizen is a critical part of America's democracy (Dewey, 1916). Today, informing equates to educating (Bawden & Robinson, 2009; Nadler et al., 2018; Osbeck & Nersessian, 2011; Waddock, 2010). Education and lifelong learning is contingent upon the skills of information literacy (Badke, 2008). Using information literacy to evaluate the authority of information, its commercial and political positioning, ethics and legitimacy is growing in its significance as data is quickly and easily amassed, manipulated, bought and sold (Nicholas, 2010; Walsh & Borkowski, 2018). Respecting and upholding valued legal rights while merchandizing data will be critical in protecting intellectual property, the commerce of data and avoiding a breach of ethics (Lankshear et al., 2008).

The Individual and Information. The individual both generates and consumes data. Information literacy defines a streamlined process for attaining data, contemplating its context, forming meaning, developing new information and synthesizing wisdom through experiential practices (Bourgeois, 2014; Secker & Coonan, 2011; Tsai & Tang, 2017).

A college student's aptitude and agility in using information literacy, structures their relationship between digital information and technology (Wallis, 2005; Jenkins, 2006). Information literacy enables a range of student approaches to complex challenges embracing and

coping with their changing environment (Bailey et al., 2015). College students, as a population's segment, are critical to a country's development and economy (Auerbach et al., 2018).

Most Americans are online almost continuously (Perrin & Kumar, 2019). Social media has inaugurated a web-connected society where the line between truth and dare is barely visible (Anderson & Rainie, 2017; Boyd, 2019; Hobbs, 2017). Even authentic information, such as science and research, gets labeled as fake (Anderson & Rainie, 2018; Gray et al., 2018; Head et al., 2018; Nadler et al., 2018). Continual blurring between the factual and fake, incentivizes anxiety and demands information's critical evaluation as indispensable (Kanchev et al., 2016; Tewell, 2018).

The constant tug of questioning reality stimulates anxiety (Hassan, 2018). Self-doubt and anxiety develops low self-esteem and negatively impacts learners at all stages (James, 2003; James & Nightingale, 2005). Today's students' attitudes are swayed by their environment filled with anxiety-inducing consumerism, escapism, divided attention, and constant distractions (Hobbs, 2017; Taneja et al., 2015; Van Bockstaele et al., 2014; Westervelt, 2016). Quantifying the magnitude and measures of anxiety and information literacy have multiple, but less-than-consistent gauges.

Assessment Instruments

This researcher investigated assessment instruments for both information literacy and anxiety. Information literacy research uncovered many pieces related to developing exercises and assessments. Most of the materials were either not complete instruments, time consuming to assess, expensive or not aligned with the curricula or resources available. Several organizations shared helpful information (ACRL, 2015; Bruce et al., 2006; Fraillon et al., 2013; Macpherson,

2004; Secker & Coonan, 2011). As the research process increasingly uncovered snares in the information literacy pieces the need for developing a custom assessment became evident.

EBSCOhost provided multiple resources for anxiety assessment instruments using the database *Mental Measurements Yearbook*. Using several assessment characteristics the field of assessment instruments was narrowed. The anxiety assessment instrument needed to be a self-assessment that could be administered via an online survey tool. The instrument needed to be very low cost as there was no financial sponsor for the project. The instrument needed to be brief so participants would be more likely to complete the survey. The instrument's repeatability needed to be reasonably consistent and the validity should include some previous proven outcomes. Research on anxiety assessment instruments identified two primary options fitting for the needs for the anxiety self-survey. The Zung Self-Rating Anxiety Scale (SAS; Zung, 1971) and Generalized Anxiety Disorder-7 (GAD-7; Pfizer, n.d.) instruments were primary candidates. The unanticipated and lengthy process of isolating an appropriate anxiety assessment instrument became Stage 1 of the research project lasting approximately three months.

Anxiety Research

This researcher's students openly acknowledge their anxieties along with therapies and medications acting as their defense. These college students are not unique. Recent studies describe college student anxiety using a range of statistics. Penn State researchers identified anxiety as the top mental health concern heard from college students (Center for Collegiate Mental Health [CCMH], 2018). The National College Health Assessment (NCHA) fall survey identified almost one third of college students as experiencing overwhelming anxiety (ACHA, 2018). The APA documented 66% of college students reporting anxiety (Winerman, 2017). Anxiety impacts students' schoolwork and grades (Gharib et al., 2012; Stankovska et al., 2018).

Anxiety can be further exasperated by student identity issues, challenges from courses of study, and emotional reactions to endemic competition (Posselt & Lipson, 2016). Research activities, such as those requiring library inquiries, are often essential to academic success (Erfanmanesh et al., 2014). Yet, the library and library research has been identified as a significant source of student anxiety (Gross & Latham, 2009; Mizrachi, 2010; Vitasari et al., 2011). Repeatedly, circumstances provoke anxiety (Robinson et al., 2013). College students become familiar with many of these circumstances.

Every human being experiences a range of emotions. Some emotions last longer than others and are labeled moods. A bad mood is not a disorder (Mayo Clinic, 2019). The *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5), is a longstanding desk reference for mental health professionals (American Psychiatric Association [APA], 2018). The book identifies an anxiety disorder as an emotion that is pervasive and "out of proportion to the actual danger or threat" and affects life's normal functioning (American Psychiatric Association [APA], 2018, p. 447). The most common category of psychopathology in the United States is anxiety disorders (Keough et al., 2010).

Anxiety itself, is a normal emotion (Mayo Clinic, 2019). Unfortunately, anxiety is becoming more frequent and inhibiting as a disorder particularly for students (Gooblar, 2018; Marano, 2015). While not definitive, the National Institute of Mental Health (NIMH) identifies numerous potential causalities behind rising student anxiety (McHugh, 2019). Changes in technology, language, locations, cultures, procedures, society, and even reality, are daily reminders of living in constant flux (Feather, 2006). Change is a factor associated with anxiety (Rose & Devine, 2014). Fear and Living in and with a highly technical and information-centric

society is cited as a significant factor in anxiety development (Anderson & Rainie, 2018; Edmunds & Morris, 2000; Kuhlthau, 1987).

Potential causes of anxiety range widely and many are unknown. Researchers suspect that genetics, the environment, physical health and emotional circumstances may exacerbate the risk of developing anxieties (Bullis, 2019; NIMH, 2017). The NIMH (2017) uses the factors that seem to induce anxiety to sub-categorize multiple anxiety afflictions. About one in three adults (over 18), will experience some type of anxiety. About 31.9% of adolescents (13-18 years old) experience anxiety, and about 22.2% of adolescents meet the criteria for identifying a mental disorder that includes severe impairments across their lifetime (Merikangas et al., 2010). The specific sub-category of General Anxiety as a Disorder (GAD), historically afflicts about 5% of the population. The GAD category exemplifies anxiety's generalized characteristics across many of its sub-categories (APA, 2018).

Researchers have documented a growing level of anxiety among college students, both in the United States and worldwide (Auerbach et al., 2018; Bernstein, 2016; Schry et al., 2012). These rising levels of student anxiety appear to be typical across most post-secondary institutions (Xiao et al., 2017). About 22% of college students seek therapy (Marano, 2015). Of those seeking therapy, over 62% identified "overwhelming anxiety" as their primary issue; a number that has risen from about 55% in 2013 (CCMH, 2018). Anxiety appears to occur at a higher rate in institutions with less selective admissions criteria (Posselt & Lipson, 2016). College's allure includes an environment of new freedoms, often with instabilities, changes, and major life transitions – all tied to anxiety (Auerbach et al., 2018).

Anxiety exists across institutions, races, courses of study, ages and grade levels. Angst knows no boundaries. Anxiety interferes with personal development and academic performance

(APA, 2018). Educational efforts to remove stigma from mental health counseling may be yielding benefits. University counseling centers have seen a 30% rise in appointments, although enrollment grew by only 5%, between 2009-10 and 2014-15 (Winerman, 2017). Anxiety has demonstrated responsiveness to Cognitive Behavioral Therapy (CBT; Kumara & Kumar, 2016; Morgan et al., 2017; Yusufov et al., 2019). Cognitive Behavioral Therapy is one type of psychotherapy that shares information literacy's technique of teaching diversity in thinking and behaviors and the therapy has produced positive results against anxiety triggers (NIMH, 2017). In parallel with the therapy, cognitive practices of information literacy, building self-affirmation and emotional intelligence in students as they venture, accomplish, and learn in their assigned tasks (Marzano, 1992). Instituting strategies that support students' critical analysis, research, and their ability to manipulate information, helps to build the individual (Grassian & Kaplowitz, 2001). These are powerful tools promoting academic success while at the same time inhibiting anxiousness (Belzer et al., 2002; Horton, 2007).

Issues such as academic performance pressures, student worries about jobs, and anxiety about life after college can accentuate student anxiety (Beiter et al., 2015; Wiseman, 2016). While failures and success are part of life and school, acclimating to that reality in college can be a shocking shift (Gnilka et al., 2019; McHugh, 2019; Winner & Nicholson, 2018). When a student's shortcomings have never been "my fault" it can be difficult for students to accept when fault is ascribed to that individual (Marano, 2015; Tompkins, 2016). Self-fault and self-deficits often instigate anxiety (Neziroglu et al., 1999).

Skills used to shield students from anxiety are actively called upon during the first year at college (Kneeland & Dovidio, 2020). The skills are also useful to fortify mental health, useful as cognitive therapy tools and helpful in finding assistance when needed (Eustis et al., 2018).

Discussion skills are essential to communication, self-expression, conversations, therapy, and in growing emotional intelligence (Thomas et al., 2017). Critically distinguishing between authentic and fabricated information is another important skill in defending against anxiety by growing emotional intelligence (Fischer & Silvern, 1985). Emotional intelligence can be a by-product of information literacy (Kumara & Kumar, 2016). Many situations, from tests to interviews, will benefit from this combined affective and cognitive strength (Rottweiler et al., 2018; Thomas et al., 2017).

Student populations are demonstrating a persistent rise in anxiety levels (Marano, 2015). Information literacy skills have the potential to be tools in developing effective communications. Effective communications and realistic interpretations of information while reducing self-sabotage can pacify some anxieties (Khoshlessan & Das, 2017; Kwon, 2008; Millett-Thompson, 2017). Student anxiety regarding computers, tests, libraries, and information can impede students' learning (Anderson & Rainie, 2018; Erfanmanesh et al., 2014; Herzer et al., 2014; Samoilova et al., 2017). Research has also suggested anxiety as a growth mechanism and some students can benefit from stretching (Rosen, 2008). Individuals have their anxiety limits and anxiety's tendency is to escalate into overwhelming (National College Health Assessment [NCHA], 2019). Overwhelming feelings at the loss of control - be it of devices or information - creates obstacles in personal ecosystems and cripples decision making (Cao & Yu, 2019; Fox & Jones, 2009).

There is evidence that mental health issues can be exacerbated by online social media and mixed messaging in digital media (Cao & Yu, 2019; Deer et al., 2018; McCord et al., 2014; Rosen et al., 2013). Conflicting data bites, validity insolvencies, and conflicts of interest, create a disruptive, uncomfortable and confusing information environment (Byerly & Brodie, 2005).

Social media-driven obsessive and addictive behaviors may manifest (Kumar & Mondal, 2018). The consumer feels anxiety in the information they cannot locate or understand (Nadler et al., 2018). At every level, learners need information literacy skills to help them construe clarity (Wineburg et al., 2016).

The intersection of today's masses of information is paired with the challenge of transforming information into knowledge and the experience seeds anxiety (Bawden & Robinson, 2009; Deer et al., 2018). The task of culling through volumes of information to assign merit, can be demoralizing (Martzoukou & Sayyad Abdi, 2017; Rosen et al., 2013). The daily density and intensity of information takes its toll, intellectually and emotionally (B.W. Becker, 2018; Feldman, 2019). Blatantly inaccurate and unreliable information that is published as strategic marketing promotions requires individuals to quickly evaluate content to avoid misguided intimidation and fear proliferation (United Nations General Assembly, 2019). Internet addiction afflicts habitual users (Kumar & Mondal, 2018). Losses of self-esteem due to social media propaganda can be damaging (James, 2003; Kumar & Mondal, 2018). Assorted applications, be it viewing an automobile's dashboard (run by computers) to interpreting a text message, constantly tests the skills of accessing, deriving meaning, and utilizing information. The ability to process and use information is a skill needed by every citizen today. Citizens with information propel society and commerce (E. Marsh, 2018). In today's information age, the absence of information literacy skills, even amidst all the Googling in the world, will still render it an exercise in gathering meaningless data creating futile anxiety (DeSilver, 2017).

Students can find it difficult to make sense of their experiences as they are soaking in a life of technology (Scheffler et al., 2018). Today's social and technical ecosystem is unlike any in the past (Wallis, 2005). The cognitive and affective noise caused by digital devices and their

superfluous information creates an environment of constant distraction (Schaffhauser, 2016; Westervelt, 2016). Distractions are obstacles to deciphering information and learning (Reed, 2016; Sana et al., 2013). Digital clamoring interferes with interpretations and is disruptive (Frick, 1987; Pisarik et al., 2017). The inability to examine the world or critically assess the *self* or distinguish fact from fiction, spurs anxiety (Bernstein, 2016). A timely illustration is Facebook's use of anonymity, effectively de-humanizing social media with the consequence of seeding anxiety (McCord et al., 2014; Rosen et al., 2013). Students live without pause. This deficiency of pause stifles internalization and mindfulness (Stewart et al., 2015). The deluge of data pushed toward consumers as continuous information streams disrupts focus and builds apprehensions. It purposefully fragments and instills agnotology (Boyd, 2019). The defense against the entourage of information requires a person equipped with information literacy skills (Boyd, 2019). Embracing curiosity and the wonders of information lets inquiry subvert anxiety and become a useful tool (Facione, 2000). From this perspective, information literacy becomes an instrument to thwart anxiety (Horton, 2007).

Information exists within each person's environment and is an individual interpretation (Lee et al., 2015; Tuominen et al., 2005). Capturing data is a first step, but transforming data into information for problem solving is a much bigger challenge to students (Gray et al., 2018). The challenge is complicated by the learner's experiences providing different contexts and an ecosystem encircling the physical and logical influences shaping their learning (Piaget, 1964; Rottweiler et al., 2018).

Chapter III: Methods and Procedures

This chapter summarizes the research questions, briefly reviews the foundations forming the research methodology, identifies the sample of participants and describes ethical considerations involved with the study. To pursue a statistically significant relationship, quantitative methodologies are used to examine the research questions as (1) measures identifying changes in students' assignment scores before and after feedback, (2) measures of anxiety levels before and after an assignment with anxiety agitators, and (3) comparisons of student anxiety scores with their information literacy scores. Qualitative information guiding interpretation of the abstract behaviors and concepts will be gained through interviews and participant comments. Data measuring, collection, and analysis are described, and the chapter concludes by identifying some research limitations and a brief summary.

Identifying and selecting instruments for measuring information literacy and student anxiety, was one of the first challenges. Selection became complex and time consuming. Due to these challenges, the research was broken into Stage 1and Stage 2. The first three-month stage took place prior to the second stage. Stage 1 researched, tested and selected an anxiety assessment instrument and created a deployable Qualtrics survey using the selected instrument. Stage 2 involved authoring an information literacy assessment, securing mentor volunteers, coordinating activities, developing an assignment, executing surveys and gathering data over a four-month period. The stages with their activities are summarized in Figure 2.

Figure 2

Sequential Research Activities with Primary Research Instruments Stages#1 & #2, 2019-2020

Sequential Research Activities with Instruments						
#	Sequenced Activities	Instrument Phase	RAAP Rubric	Dates 2019	Time Span	Notes
STAGE 1: Selecting Useful Anxiety Self-Survey Instrument						
1d	GAD-7 & Zung Preliminary Surveys	Development		April	3 Months	*Qualtrics™*
1e	Anxiety Survey Response Review			May		*Deployed 2 instrument survey*
1f	Selection of GAD-7 Survey Instrument			June		*7 Questions; 0-21 points*
STAGE 2: Information Literacy Assessment Development and Instrument Deployment						
2a	Develop Information Literacy RAAP Rubric		*Development*	Sept.	4 Months	*0-45 points*
2b	Develop Mentor Volunteer Form		*Development*	Oct.		*Qualtrics™*
2c	Mentor Recruitment		*Development*	Oct.-Nov.		*Emailed 300 Professionals for volunteers*
2d	Classroom Information Literacy Training			Oct.-Nov.		*Used CRAAP Worksheet*
2e	Discussed and emailed invite **GAD-7#1**	**Pre research**		Nov.		*96 Students Start Qualtrics™ 26 Responses*
2f	Assigned "Developing a Planning Aide"		*Intro RAAP*	Nov.		*45 Students Completed RAAP*
2g	Discussed and emailed invite **GAD-7#2**	**Post assignment**		Dec.		*33 Responses*
2h	Feedback from Peers In-class and Instructor		*RAAP (R1)*	Early Dec.		
2i	Stimulate Anxiety: Intro Revisions & Mentors			Dec.		
2j	Randomly Assigned Mentor-Student Pairs			Mid. Dec.		*18 Mentor Pairs Initiated*
2k	Discussed and emailed invite **GAD-7#3**	**Post feedback**		Dec.		*44 Responses*
2l	Concluded Classroom Portion of Assignment			Dec.		*18 Completed All 3 GAD-7 Surveys*
2m	Mentor Feedback Contributions			Dec.		*12 Active Mentor Pairs*
2n	Student Revision(s) to Mentor			Dec.		*100% Student Response to Mentors*
2o	Revision with Feedback Graded		*RAAP (R2)*	Dec.		*Student grades typically improved.*
2p	Sought Interview Volunteers (Requested 3x)			Dec.		*No Volunteers: Ø. Abandoned.*
2q	Optional Post-Class Feedback Question			Dec.		*Qualitative Data*
2r	Post-Research Data Review			Dec.-Jan.	2020	*Quantitative & Qualitative*

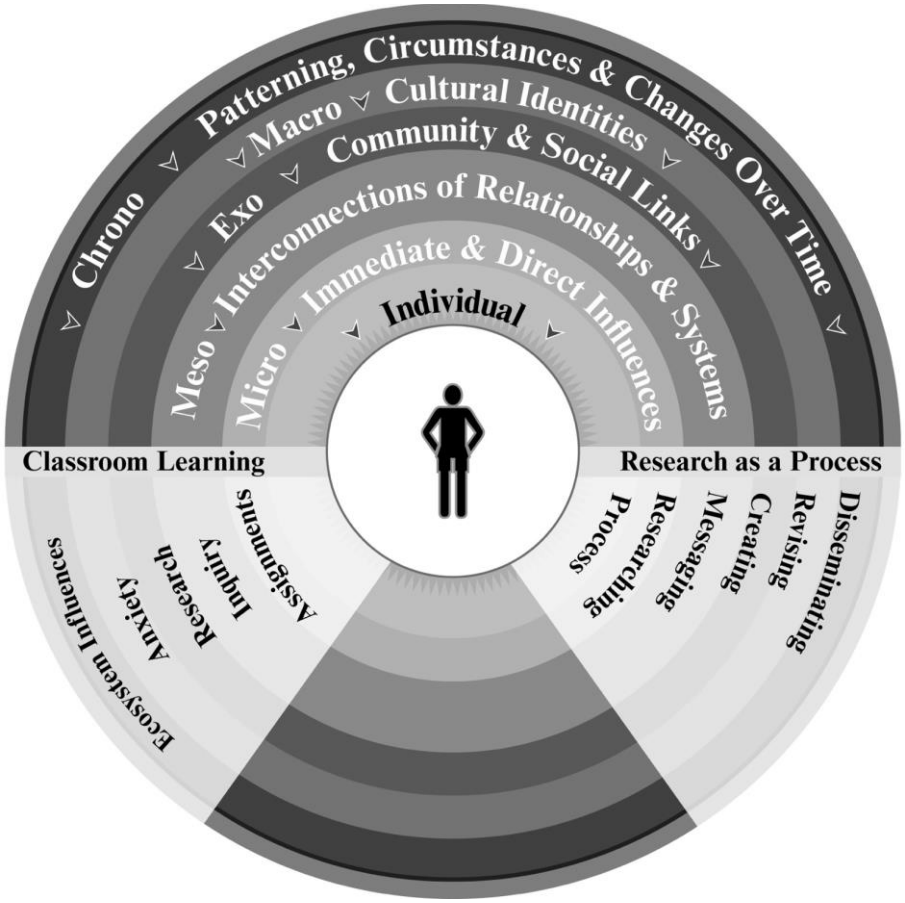
Research Methodology

Anxiety has been studied by psychologist and educational professionals using quantitative and qualitative approaches. A variety of research methodologies have been used by information literacy professionals, even as definitions and data analysis have been morphing alongside of technologies. Data, and the information growing from it, can be indicative of past behaviors. Using that information to predict future behaviors makes the risky assumption of data's linear trajectory. Veering from that linear path, this research acknowledges a human developmental ecosystem as described by Bronfenbrenner (1981). In his writings, development is described as anything but linear. Human development is characterized as a process of

aggregating variables that both build and disrupt cognitive, social, and emotional development. This researcher's work includes both cognitive and emotional aspects of college students as exemplified by information literacy and anxiety, respectively. The methodology's development relied upon the interwoven variables, as described by Bronfenbrenner, while blending with information literacy, its learning experience and the angst in today's college students. The cognitive facets of information literacy compare and contrast with the emotional turmoil embroiling anxiety. Figure 3 is intended to model the inter-relationship of the cognitive and emotional research variables impacting development, learning and anxiety while following Bronfenbrenner's ecosystem's diagramming style.

Figure 3

Bronfenbrenner's Concentric Circles of Human Development's Ecosystem Paired with Information Literacy Research and the Learning Experience



The aspects of this research requiring measurements implies a quantitative strategy. The cognitive and emotional human factors supporting learning and development suggests the use of qualitative instruments to provide insights. With both perspectives in mind, collecting quantitative data was identified as the primary strategy. Numerical indicators of anxiety and information literacy enabled statistical comparisons between groups and dates. Using numbers promoted matching the data against descriptive statistics, calculating correlations, examining trends and comparing outcomes. Numeric data can be tallied with relative ease utilizing some

automation in online surveys and a rubric instrument. The rubric's strength will be tested during its multiple applications.

Qualitative data was considered important in uncovering the prevalence and intensity of anxiety in college students. All of the surveys will contain an optional question with an essay-formatted response. This answer's data is intended to be qualitative. The search for richer insights prompted the planning of anonymous interviews. Anonymity would help students maintain confidentiality with their shared data. Student volunteers will be recruited after all three of the GAD-7 anxiety assessments have been completed. For the interview, a series of five brief anxiety-exploring questions have been approved for use by the IRB.

Subject Selection and Description

Participant selection was a convenience sampling (Patten & Bruce, 2009) assembled from willing students enrolled in the courses offered by this instructor/researcher. Stage 1 participants volunteered during the spring semester of 2019. Stage 2 participants volunteered during the fall semester of 2019. Both samples were typical of the instructor's student population during the 2019-2020 years.

Participant Selection Stage 1: Anxiety Assessment Instrument Inquiry

The Stage 1 participants were enrolled college students ranging from freshmen through senior level undergraduates. The sample was a combined pool of female (60%) and male (40%) students studying in a variety of degree-awarding disciplines. Ages of the participants ranged from 19 to 32 years old. Fifty students, were invited; however, the number of students actually completing the survey turned out to be 29 and a smaller number of only nine completed all questions for both instruments.

Participant Selection Stage 2: Anxiety and Information Literacy Assessments

Stage 2 participants were a convenience sampling from the college students enrolled in the researcher's classes. The pool of female (55%) and male (45%) students studying in a variety of degree-awarding disciplines composed the group. Ages of the participants ranged from 18 to 32 years old. Fifty students, were invited to participate. Participant numbers progressively diminished as a smaller number of students completed all components of the research assessments.

Instrumentation

The assessments for both anxiety and information literacy were fundamentally quantitative, enabling statistical comparison and analysis (Creswell & Creswell, 2018). Anxiety and information literacy competencies were both purposefully assigned quantitative scales, to characterize both variables as concrete, substantial, and distinctive (Patten & Bruce, 2009). The quantitative results lend themselves to specificity, statistical analysis, comparisons, and objective interpretation (Creswell & Creswell, 2018). Several different types of instruments were used and are described below.

The Instruments

The project's instrumentation included, (1) a comparison survey using established anxiety assessment instruments (Appendix C), (2) a GAD-7 survey used to gather student's anxiety data (Appendix A), (3) an authored rubric used to assess information literacy skills on an assignment (Appendix G), (4) an information gathering survey for potential mentors (Appendix D), (5) an email notifying the pairing of volunteer mentors with students and (6) a series of five interview questions (Appendix F). These instruments are summarized in Figure 4.

The anxiety assessments were deployed using Qualtrics surveys, the RAAP rubric used a PDF with automatic totaling, the volunteer form was a Qualtrics survey available online through an URL, the email messages were created using Microsoft Outlook and the interview questions were composed using Microsoft Word and delivered in a printed format for manual tallying.

Figure 4

Instruments Used in Research

Instrument Name	User	Purpose
GAD-7 vs. Zung SAS	Students	Compare Anxiety Instruments GAD-7 and Zung SAS
GAD-7	Students	Anxiety Assessment
Volunteer Form	Mentors	Collect Information from Mentor Participants
RAAP	Instructor/Students	Information Literacy Assessment
email	Researcher	Provide Mentors & Students with Pairing Information
Interview Questions	Interviewer	Qualitative Information Gathering on Student Anxiety

Stage 1 Instruments

In Stage 1, a Qualtrics survey was composed using the GAD-7 and Zung SAS questions. The informed consent statement as prescribed by the Institutional Review Board (IRB) was included as a preface to this survey. If students selected non-participation on a survey form, the survey immediately concluded with a thank you statement. All subjects were notified in the survey's informed consent statement that participation was optional and anyone could decline participation without any ramifications. The survey was deployed using email invitations with hypertext links to the Qualtrics survey. Screen captures of the Qualtrics GAD-7 & Zung SAS survey are included in Appendix B.

Stage 2 Instruments

Stage 2 used Qualtrics surveys to deploy the GAD-7 instrument on three specified occasions. Emails invited each individual student to participate at each deployment's initiation. A single reminder email was sent to non-responders after one week. Qualtrics recorded each data gathering event separately and isolated individual responses using anonymous numbers enabling the responses to be related to information literacy scores in a later analysis. An optional and voluntary essay-answer question was provided at the conclusion of each anxiety survey. This question was intended to gather qualitative information relative to student anxiety and any further input the participant wished to share.

The process of gathering volunteering mentors used a Qualtrics survey form to gather and record volunteer information and is viewable using Appendix D. The names, emails, work roles, and industries of volunteers were recorded in the survey so mentors could be paired with profession-appropriate students.

The information literacy assessment measures were individually scored by the instructor using a custom authored rubric called "research as a process" or RAAP. An assignment used the same RAAP rubric for two sequenced assessments. The RAAP rubric was authored using recommended practices from the ACRL's information literacy book series (2018) and specifically extracted objectives from volume four in the series, titled *Information Creation as a Process* (Oberlies & Mattson, 2018). The RAAP rubric was reviewed by multiple information literacy professionals. Aubrey Huff, a trained information literacy librarian, contributed to the instrument and participated in its review (personal communication, October 18, 2019).

An email was used to simultaneously send to both the student and mentor volunteer a notification of their pairing. The student's submitted assignment was attached to the email. A

request that the mentor provide feedback and at least two points for improvement was included in a brief statement of expectations.

A third party, an unidentified work-study student, agreed to conduct the anonymous interviews. Five questions were composed and approved by the IRB for use in exploring student participants' anxiety experiences and perceptions during the interview. Extra credit points were used as an incentive to encourage student participation. The interview's intent was to collect qualitative data.

Stage 1: Anxiety Assessment Instrument Selection

A tool to score anxiety was the first quantitative instrument pursued. Anxiety assessments exist in a variety of formats and have been used across the mental health and research fields for a number of years (Meades & Ayers, 2011; Pfizer, n.d.). Many are self-assessment instruments (Erford & Lutz, 2015; Hermans et al., 2011; O'Donnell, 2017; Wang et al., 2019). This researcher does not have formal psychiatric training nor experience interpreting anxiety assessments. Considering that deficiency, the selection of a well-documented, self-assessment instrument was intended to minimize bias and maximize reliability from the anxiety instrument. Additionally, isolating anxiety to a specific category such as library anxiety (Gross & Latham, 2007) or a defined discipline of academic study (Posselt & Lipson, 2016) was not the aim of the research and, consequently, a general anxiety self-assessment was sought.

Care was taken to steer toward a general anxiety assessment and not tilt toward specificity. Instrument selection criteria included: considering cost-effectiveness, brevity, a self-assessment format, a numeric scale, documentation and an existing legacy of research demonstrating a strong level of the instruments' reliability and validity (Ruiz et al., 2011). Two instruments contended for the final selection and they were the (1) Zung Self-Rating Anxiety

Scale and the (2) Generalized Anxiety Disorder seven-question instrument (examples in Appendix B). To assist with instrument selection two questions were asked. First, when surveying an individual college student, are the scores between the GAD-7 and Zung SAS the same or similar between the instruments and their evaluated outcomes? Second, are there any factors making the Zung SAS or GAD-7 a preferred instrument for surveying college student anxiety in this research? The answers became evident to the researcher after both instruments were deployed using a Qualtrics survey in Stage 1's autumn semester of 2019.

The Zung Self-Rating Anxiety Scale (SAS) was designed by William Zung M.D (McDowell, 2006). An example rendition of the Zung form is pictured in Appendix B and the comparative survey used in this research is pictured in Appendix C. The SAS instrument was part of Zung's research while a professor of Psychiatry at Duke University (Zung, 1971). The 20-question survey produces a score that uses a look-up table to indicate the subject's relationship with an anxiety level, and the assessment has proven to be a reliable indicator of anxiety (Lambert et al., 1996). The instrument's validity and reliability consistently scores in the high range (McDowell, 2006,).

The Generalized Anxiety Disorder seven question instrument (GAD-7) was created for the pharmaceutical company Pfizer by the research team of Spitzer, Kroenke, Williams & Löwe in 2006 (Pfizer, n.d.). An example rendition of the GAD-7 form is pictured in Appendix B and the comparative survey used for instrument selection in this research is pictured in Appendix C. The deployed GAD-7 used in this research is pictured in Appendix A. The GAD-7 is an anxiety self-assessment tool commonly used by today's health practitioners (Jain, 2019). The assessment instrument has a history of demonstrated reliability and validity (Tiirikainen et al., 2019). It has been used in many anxiety research studies, and the GAD-7 is considered statistically effective in

representing general anxiety (Ingólfsdóttir, 2014; Kroenke et al., 2009; Löwe et al., 2008; Morgan et al., 2017).

Both self-assessment tools met the initial criteria for use in this research project. A single instrument needed to be selected and the anxiety instrument selection process defined Stage 1 of this research. A single, composited Qualtrics online survey was composed to compare the instruments. The individual GAD-7 and Zung SAS survey samples that were contenders, are pictured in Appendix B. The Stage 1 deployed Qualtrics instrument included the content of both the GAD-7 and Zung SAS assessments as two distinct parts of the survey. A Likert-type scale was used for answering each question. There were seven GAD-7 questions and 20 Zung SAS questions totaling 27 questions on the instrument. The Qualtrics survey that aggregated both instruments is pictured in Appendix C. Subjects were emailed a link and logged into the confidential Qualtrics anxiety survey.

Using the resulting data from the Qualtrics anxiety instrument survey comparing the GAD-7 and the Zung SAS instrument, statistical analysis was performed. A Spearman's Rho correlation was run between the students' Zung anxiety assessment scores and their GAD-7 scores (Stangroom, 2019). Due to a lack of survey question completions, multiple student data was excluded from the calculation, leaving only nine subjects with complete data from the original 50 survey candidates. The completion numbers were not an original consideration, but these numbers proved to provide valuable insight indicating that survey length was a factor in attaining survey completions. This was important to the instrument selection and the research's success.

Using the total group that took the survey, the Spearman's Rho correlation relationship between the GAD-7 and Zung instruments did calculate a statistically significant relationship.

The rho correlation coefficient was expressed as ($r_s = 0.56$). The Pearson Correlation Coefficient test was also performed calculating R at 0.60 with a p-value of .0006 significant at $p < .05$ [$r(27) = .60$, $p = .00$]. The test scores indicated a statistical significance, but the small number of participants completing the surveys suggests a low level of validity and reliability for this particular instance.

The GAD-7 instrument (Spitzer et al., 2006; Pfizer, n.d.) emerged as an appropriate fit for this research situation. Many students did not complete the Zung survey or skipped multiple questions in its 20-question series. The low finish rate and frequency of incomplete data led this researcher to dismiss the Zung SAS instrument. The brief seven-question format of GAD-7 demonstrated a more useful student completion rate. A Qualtrics survey of the GAD-7 was constructed for use in this research's three upcoming anxiety assessment deployments.

Stage 2: Authoring and Using Instruments

The GAD-7 anxiety self-assessment instrument was selected and formatted as a Qualtrics survey in Stage 1. Stage 2 involved a greater number of tasks and a tighter timeline. Stage 2's activities are described in general by the topics listed below. Each topic required instrumentation and multiple activities to execute. Visuals of the instruments are included in the appendices.

- Deployed GAD-7 Instrument (Appendix A)
- Mentor Recruitment (Appendix D)
- The Information Literacy CRAAP Worksheet (Appendix E)
- Interview and Feedback Questions (Appendix F)
- RAAP Rubric Development (for information literacy assessment) (Appendix G)
- *Developing a Planning Aide Assignment* (Appendix H)
- *Using Feedback for Revisions Assignment* (Appendix I)

Deployed GAD-7 Instrument (Appendix A). The GAD-7 instrument was used in three events. The initial GAD-7#1 deployment was intended to serve as a baseline of each student's anxiety score and be delivered before any research formally began. The GAD-7#2 was deployed in parallel with the *Developing a Planning Aide* assignment. The GAD-7#3 was administered a third and final time, after students have been given the assignment *Using Feedback for Revisions* and informed that they may be assigned a mentor to provide additional feedback for their revisioning.

The IRB informed consent statement is included on each GAD-7 survey. Each student was emailed an invitation with a link to the survey. In the email, and in class, a request will be made of all students to complete the "anxiety survey". No student compensation is offered for the initial GAD-7 survey. The first GAD-7 survey is scheduled one week prior to the students' week-long school break. The second and third deployments of the GAD-7 may offer incentives. Extra credit points in exchange for completing the anxiety survey may be an incentive.

The GAD-7 response scale ranges from zero to three in whole number increments, for each of the seven questions. For each question on the GAD-7 anxiety self-assessment survey, the participant selects a rating number from a Likert-type scale, of zero through three, in whole number increments, to indicate their response of low anxiety through high anxiety, respectively.

The resulting data from the GAD-7 anxiety self-assessment, were downloaded from Qualtrics as a Microsoft Excel™ readable spreadsheet comma separated values (.csv) format. Each participant is represented by a record entry with fields representing each of the seven GAD-7 question responses, their associated score and the summation. A text entry question is available at the end of each survey to accommodate any participant input. A total between 0-21 possible points is recorded from each respondent. The last question, #8, exclusively on the third GAD-7 survey asks for a numeric response

regarding participants' anxiety level at having to contact a mentor. This number was not used in the GAD-7 anxiety assessment calculations to prevent skewing or inaccurate interpretations of student anxiety levels.

Pfizer's interpretation guide to the GAD-7 scale, categorizes levels of anxiety by numeric ranges (Gliatto, 2000). Any actions or interpretations of the testing results, beyond this research, requires consultation from a mental health-care professional and is beyond the scope of this researcher.

Mentor Recruitment (Appendix D). Assembling a team of mentors required planning ahead of the research execution. An instrument to collect data on mentor qualifications, the industry they worked with, email addresses and volunteer names was required. The mentor data collection instrument was available to volunteers as a Qualtrics survey. Volunteers were driven to the survey instrument by an emailed URL address or a QR code link. The volunteer survey instrument for mentors is included in Appendix D.

Partnering with *Women Who Print* and its director, Fern Peterson (personal communication, 2019), 300 invitations were emailed to professionals in the print, graphics and imaging industries. From that mailing, there were 27 respondents to the survey and 18 volunteers who continued with the process after the initial volunteering. The volunteer rate was lower than anticipated.

Using the Information Literacy CRAAP Worksheet (Appendix E). The CRAAP acronym comes from a set of benchmarks used in a worksheet by Blakeslee (2010). The worksheet uses these attributes to test information based upon its currency, relevance, authority, accuracy and purpose (CRAAP). The worksheet is valuable in teaching information literacy concepts used to evaluate found resources. The CRAAP worksheet that was used is displayed in

Appendix E. The intervention of information literacy training was delivered in the classroom prior to the delivery of the research-related assignment and before any of the anxiety assessments were mentioned. While isolated as a separate training module and delivered in a different timeframe, the training specifically aimed at content aligning with the, “research as a process”, RAAP assessment. The instruction included a class session meeting in the library with a librarian leading the discussion of, how to identify document dates, evaluating relevance, identifying the authority behind an article, assessing accuracy, and establishing the value-proposition of a published piece and its purpose. A basic class assignment was associated with the classroom training but it was not included as part of this research.

Interview and Feedback Questions (Appendix F). A set of five interview questions that were approved by the IRB are included in Appendix F. The last question in each deployed survey also offered an option for participants to freely provide any comments or input. The survey questions and the interview questions were planned as vehicles gathering qualitative data. The interview was not intended to be lengthy. The interview was designed to be confidential. The discrete location of a room and time was planned to help students avoid “having to be seen” in the interview. Participants were emailed an anonymous contact so the instructor was not directly involved. This was an opportunity to listen to the students’ perceptions of anxiety and its prevalence in an authentic context.

Authored RAAP (Information Literacy) Assessment Instrument (Appendix G). The assessment instrument for information literacy was needed early in Stage 2. The instrument served several purposes. It defined information literacy’s evaluation criteria, critical activities and opportunities for anxiety injections and assessments. From *Volume 4: Information Creation as a Process*, the researcher extracted several major categories used for assessment (Oberlies &

Mattson, 2018). Stemming from this research, the phrase “research as a process” was used and picked up as an acronym. (Creswell & Creswell, 2018; Head & Eisenberg, 2010). The phrase’s acronym “RAAP” serves as the name for the RAAP rubric used in assessing information literacy.

The RAAP rubric’s design was tailored to the assignment entitled *Developing a Planning Aide.* The assignment included tasks applying students’ research skills, using research processes from the student’s information literacy training and the creation of a student-developed outcome in the form of a planning instrument. The rubric’s structured criteria relied upon the ACRL’s framework to identify critical activities as keystones. Later in the research, the rubric assisted the mentors in becoming more aware of their student’s knowledge levels and information literacy backgrounds.

Assessments can be time consuming and rely on subjective interpretations. There are defined standards and guidelines for information literacy, but the assessment of the standards varies widely (Belanger et al., 2015; Fraillon et al., 2013; IES & NCES, n.d.; National Assessment of Educational Progress [NAEP], 2014; Secker & Coonan, 2011). Several information literacy assessment tools are available commercially with various options for their implementation, but they proved too costly for this situation (Belanger et al., 2015; Horton, 2013; Lee et al., 2015; Radcliff, 2019). This researcher’s assessment needed to be quickly executed with an anticipated 100 students, and at the same time, effectively and objectively evaluate specific activities associated with information literacy skills. The ability to use a single instrument with little complexity that was serviceable across multiple courses and students was important to the instruments’ usefulness with this research.

To that end, the final RAAP rubric takes advantage of the dispositions described in *Volume 4: Information Creation as a Process* (Oberlies & Mattson, 2018). The rubric

incorporates four general keystone activities. The ACRL book identifies these keystones as the critical iterative activities supporting information creation as a process. The activities were (1) researching and exploring the (2) messaging related to information, along with appropriate medium used in (3) creation and revisioning to create (4) an outcome as an instrument or artifact. These four activities construct the keystone topics used with the assignment and on the rubric. One page of the rubric was dedicated to each keystone category. Within each keystone category, three or four individual items were identified as assessment tasks with points totaling 15 items in all. Individual items in the rubric were assessed at three levels, (1) beginning, (2) developing and (3) accomplished. This ranking style was adapted from the Rubric Assessment of Informational Literacy Skills (RAILS) that used this eloquently simple assessment strategy (Belanger et al., 2015). The total of 15 items created an evaluation potential total score of 45 points.

Develop a Planning Aide Assignment (Appendix H). The assignment was drafted and reviewed by several instructors and revised several times (A. Huff, personal communication, October 10, 2019). The assignment was focused on students using information literacy skills that aligned with the ACRL knowledge practices and dispositions as used in the RAAP rubric development. The assignment for students to *Develop a Planning Aide* has several stages involving the ACRL activities that are identified here as keystones.

In the assignment, students first identify their professional role or ideal job and research the tools that professionals would typically use for planning their work or project. This involves keystone number one. Next, using the skills from keystone two, the student reflects on their found materials, dives deeper into the pieces they value and constructs the information, messaging and medium they select to use. With keystone three, students transfer their information into multiple techniques and construct an instrument, outcome or artifact. That

artifact or instrument is presented to their peers and instructor to complete all four keystones. At the presentation's conclusion, peer students provide feedback on the instrument. Peers are encouraged to provide feedback aligning with the RAAP rubric and information literacy keystones of (1) iterative researching, (2) messaging and media, (3) creation and revisioning and (4) the outcome instrument itself. The instructor contributes feedback during the presentation as well as feedback with written comments in the scoring documentation. The RAAP rubric was used to score the student's work. The GAD-7#2 will deploy after the assignment is given to the class. The assignment itself may induce anxiety and the second GAD-7 is intended to measure any changes in student anxiety.

Using Feedback for Revisions Assignment (Appendix I). By this point in the research, students have completed all four of the keystone tasks but the reality of revisioning persists. The assignment to revise the planning aide is intended to reinforce the importance of revisioning and adapting information as well as serve as an anxiety generation opportunity. The revision was not announced to the students with the original assignment. The revision assignment was purposefully broad. The description statement will read, "use the feedback you have or will receive to improve your project" and submit the revision for re-assessment using the RAAP rubric. The addition of a mentor from industry was a surprise introduced at this point in the project. The students were notified that the mentor was a current and practicing industry professional. The mentor supplied additional feedback and the student was expected to fulfill the request for improvements. This created an unexpected influx of additional work for these students. The surprise factor is common to both college and industry and performs as a realistic gauge. Unanticipated factors often feed anxiety. Taking advantage of this opportunity, the third

GAD-7 anxiety assessment was deployed to coincide with the new event and its potential anxiety.

Data Collection Procedures

Qualtrics, the preferred questionnaire tool of the institution, was used to generate the online survey instruments following recommended guidelines (Isaacson & Greene, 2015). Subjects were provided a Qualtrics web address to log into the site and confidentially complete the survey. The online introduction to the survey included the approved Institutional Review Board (IRB) documentation with contact information, risk advisement and a confidentiality statement.

Data Analysis

Two variables were measured, multiple times, using two different instruments. The measures included:

1. The subject's anxiety level scored using three separate deployments of the GAD-7 self-assessment survey.
2. The subject's information literacy skills scored using the RAAP rubric with an assignment on two successive occasions with the intervention of feedback occurring between the two.

To answer each of the research questions in Stage 2, several different statistical tests were planned using the calculators from the web site Social Science Statistics (Stangroom, 2019). The research questions are stated as:

1. Is there a difference in students' original information literacy scores, assessed using the RAAP rubric, and students' RAAP scores after feedback has been provided by peers and their instructor?

2. Is there a statistically significant change between the GAD-7 anxiety scores when comparing the deployments between GAD-7#1, 2 or 3?
3. Is there a statistically significant relationship between students' anxiety scores assessed with the GAD-7 and their information literacy scores assessed using the RAAP rubric?

Research question #1 investigated changes in the RAAP rubric scores before and after feedback. The scores from the RAAP rubric first score session (R1) and second score session (R2) were compared. Comparing the averages from each group, R1 and R2 should be a quick indicator of the results. To test for a statistically significant relationship, the parametric t-test for Dependent Means or the non-parametric Wilcoxon Signed Rank test would be used.

Research question #2 asked about a statistically significant change in anxiety between the GAD-7 deployment scores as GAD-7 #1, #2, and #3. The averages of each deployment could, potentially act as a fast indicator of a relationship. To check for a statistically significant change each of the score sets from the GAD-7 deployments used a parametric One-way Repeated Measures ANOVA or the non-parametric Friedman Test for Repeated Measures.

Research question #3 examined the potential for a correlation between the GAD-7 scores and the RAAP rubric scores as a comparison of anxiety levels with information literacy skill levels. To examine the potential for a statistically significant correlation, the parametric Pearson Correlation Coefficient or the non-parametric Spearman's Rho Rank Order Correlation was selected.

In addition to the quantitative results, there are a few pieces of qualitative data to be examined. Each GAD-7 survey had an optional question enabling participants to make comments. Question #8 on the last GAD-7 deployment was added as a quantitative question to

investigate students' anxiety related to their assigned mentor interaction task. Question 8 read: "How much 'more' anxiety did the idea of sharing your assignment with an industry professional cause you (if any)?" The question has the same answer scale as the other GAD-7 questions, 0-3.

Limitations

A number of limitations impacted this research. The small sample size threatened the reliability and applicability of this research. Other factors such as environmental influences, the maturation of subjects, the instrumentation itself, the sample selection and the mortality of participants failing to complete the project may have impacted the results of this research (Wiersma & Jurs, 2009). The short time span of less than four months in Stage 2 may not have been sufficient to produce realistic results. Bias, variation in information literacy backgrounds and differences in the subject's research training experiences may compromise results. The student group is an intact group from a convenience sampling and may not represent a random sample. Confounding factors potentially impact the subjects and their results. These may include uncontrollable factors such as family, medications, and work issues. The RAAP rubric, composed as an assessment for information literacy, may be skewed or otherwise flawed. The inability to attain a large sample, manifested as a frustration in the research, overall.

Summary

The instruments used to measure both anxiety and information literacy have proven to be challenges. The first steps into the research of anxiety made it clear that a brief and succinct tool was needed for anxiety assessment. Breaking the project into Stage 1 and Stage 2 was a direct result of complications with the anxiety assessment instruments. Without an efficient assessment, there was little assurance that students would participate or complete surveys. The GAD-7 filled

the self-assessment need. Even with the brief instrument, some questions were left unanswered. This further reduced the usable data and was an unanticipated variable.

The ACRL's information literacy framework provides a good start into recognizing and assessing student information literacy skills, but its implementation is complex and fraught with interpretations that may easily shift toward bias. The authoring of assessment instrumentation is time consuming and testing instruments takes even longer. While many factors have been considered, there are still many confounding variables that prevent causation from being clear.

Chapter IV: Presentation of the Findings

This chapter profiles the findings in this anxiety and information literacy research project. Stage 1 research activities took place prior to Stage 2. Research work in Stage 1 focused on anxiety assessment instruments and their selection. The anxiety assessment instrument selection process was described in Chapter 3 and the respective instruments are included in Appendix B and Appendix C. Chapter 3 focused on the methodologies involved with both Stage 1 and Stage 2. This second stage of research included the preparation of instruments, execution, data gathering, and analysis. The data gathering included using the General Anxiety Disorder seven question self-assessment survey (GAD-7; Spitzer et al., 2006) and the "Research As A Process" (RAAP) rubric to score information literacy. The sample, research questions, null hypothesis, processes and research findings are described herein. The chapter begins with a description of the samples.

Demographics

The researcher had access to a convenience sample of 100 students enrolled in graphic communications-related courses. The participant numbers were impacted by multiple factors. Students who had previous information literacy training by the researcher were excluded to negate potential bias and the inclusion of advantaged students. Some students declined to participate in one or more GAD-7 surveys. The first GAD-7 survey deployment resulted in 50 responses; 60 participants responded to the second; 62 students responded to the third deployment of the GAD-7 survey. Some participants skipped specific questions in one or more GAD-7 surveys and that data was excluded. Thirty students did not complete one or more of the components of the course assignments related to this study including the opportunity for assignment revision or respond to the anxiety assessment series. The data for these participants

was disqualified from the study results. The data from 49 out of the 100 students was used for analysis and will be referenced as the "Large Group" (LG). Unfortunately, not all 49 students completed the GAD-7 series of anxiety assessments. A "Small Group" (SG) subset of these 49 viable participants was formed by the 18 individuals who did complete the GAD-7 series of assessments and will be referenced as the "Small Group" (SG). The SG included participants who completed all phases of the research activities, anxiety assessments and completed the activities involved with being paired with volunteer business mentors. Non-parametric data analysis was used for statistical calculations with this smaller subset of study participants.

Stage 2 study participants represented a class grouping from a typical Midwestern University in 2019-2020. Participants ranged between 19 and 28 years old. The years of schooling varied with six freshmen, 23 sophomores, 14 juniors and six seniors. Students were enrolled in an assortment of four-year degree programs. The sample of 49 students, included 22 males and 27 females who were given the in-class assignment *Developing a Planning Aide* which is included in Appendix H.

The number of participants that completed all research tasks involved with the assignment along with the three GAD-7 self-survey anxiety assessments, was 18. Seven of the 18 were male and 11 were females. One freshman, 12 sophomores, three juniors and two seniors engaged in all three anxiety assessments as well as the *Developing a Planning Aide* and *Using Feedback for Revisions* assignments.

If participants did not complete all three GAD-7 surveys across the duration of its six-week availability, the anxiety data was omitted from anxiety analysis. Non-completions also excluded students from the mentor participation option. Data was omitted from students who did not complete the information literacy *Developing a Planning Aide* and *Using Feedback for*

Revisions assignments. As observed by the instructor, the participants displayed no overt signs of unusual anxiety.

In recognition of the possibility that the SG sample was not normally distributed the normality of the sample was tested. This researcher checked for a normal distribution of anxiety scores among the smaller group (SG) of participants using the Kolmogorov-Smirnov Test of Normality from the web site titled Social Science Statistics (Stangroom, 2019). The results illustrated in Table 1 with a negative Kurtosis (-.63) is evidence of a flat or wide distribution of the scores. The positive skew (.21) suggests scores in the low anxiety range and suggests relatively low anxiety levels. From the test, as represented in Table 1, the sample data has only a 12% deviation from normalcy. All three GAD-7 deployment samples generated the same kind of statistical indicators when using the Kolmogorov-Smirnov Test of Normality.

Table 1

Kolmogorov-Smirnov Test of Normality on GAD-7#1 Small Group (SG)

GAD-7	*M*	*SD*	*Skewness*	*Kurtosis*	*D*[a]	*p*
SG#1	9.39	5.42	.21	-.63	.12	.91

n = 18.

[a]. The value of the K-S test statistic (D) is .12443.

Individuals, in this Small Group of 18 students, were paired with industry experts who served as volunteer mentors. This provided students with rich and professional feedback. The pairing relied upon the student having completed all three GAD-7 anxiety assessments, the *Developing a Planning Aide* assignment and the *Using Feedback for Revisions* assignment. Participant numbers were constricted by the lack of task completion on the part of some students. Two students declined to participate with mentors. The success of the pairing was also dependent

upon the mentor actively participating in providing feedback to students. The mentor volunteering had a smaller number of participants than anticipated with only 27 volunteers out of 300 requests. Some mentors had unforeseen obligations and could not participate. For unknown reasons, two mentor volunteers did not respond. Consequently, the mentor-paired sample narrowed to 18 students and mentors. This did not negate the Small Group of 18 participants from completing all other tasks and generating data for statistical analysis. The 18 students exchanged active feedback with their mentors. To their credit, all 18 students had an ongoing dialog with their mentor for two weeks or more.

Item Analysis

Stage 1 in this study was aimed at the selection of an anxiety assessment instrument. Chapter three addressed this selection process. This chapter four focuses on research questions one, two and three. Each of the three research questions is presented with its null hypothesis statement. The null hypothesis is followed by a profile of the statistical tests performed and the resulting data used to reject or accept the null hypothesis. An alpha level of 0.05 was specified and used as the significance level for this study. Due to the small sample size, both parametric and non-parametric tests were calculated. Microsoft Excel was used to total, sort, and calculate basic descriptive statistics such as mean, median and mode. The rest of the statistical tests were performed using the calculators on the web site titled Social Science Statistics (Stangroom, 2019).

Research Questions

Stage 2 of this research study addressed the three research questions listed.

1. Is there a difference in students' original information literacy scores, assessed using the RAAP rubric, and students' RAAP scores after feedback has been provided by peers and their instructor?
2. Is there a significant statistical relationship between the GAD-7 anxiety scores when comparing the deployments between GAD-7#1, 2 and 3?
3. Is there a relationship between students' anxiety scores assessed with the GAD-7 and their information literacy scores assessed using the RAAP rubric?

Research Question 1

Is there a statistically significant difference in students' original information literacy scores, assessed using the RAAP rubric (R1), and students' RAAP scores after a revision using feedback provided by peers and their instructor (R2)?

Null Hypothesis H_1. There is no statistically significant difference in students' original information literacy scores assessed using the RAAP rubric (R1) and students' RAAP scores after assignment revision using feedback provided by peers and their instructor (R2).

The RAAP rubric was provided to students with the assignment *Developing a Planning Aide*. Students' initial assignment submissions were scored using RAAP rubric (R1) and scores entered for each student. Data from the RAAP rubric use is available for both the Large Group (LG) and Small Group (SG). After students received feedback and made revisions as the assignment *Using Feedback for Revisions* it was re-scored using the same RAAP rubric and these scores are identified as the second RAAP rubric scoring (R2). Table 2 documents the means and standard deviations for the Small Group scores on the initial assignment submission (R1) and the scores on the revised (R2) assignment.

Table 2

RAAP#1 (R1) and RAAP#2 (R2) for the Small Group (SG)

Score	*M*	*SD*
R1	16.61	8.33
R2	38.17	3.67

n = 18

Table 2 shows the mean scores and standard deviation for the 18 students who completed all phases in the research project and qualified for mentor feedback, known as the Small Group (SG). The mean of scores more than doubled between the initial *Developing a Planning Aide* and the post-feedback submission of the *Using Feedback for Revisions* assignment. Average RAAP assessment scores from students in the Small Group rose from 16.61 points to 38.17 points after students received feedback and re-scoring using the RAAP assessment. The standard deviation dropped from 8.33 to 3.67 from pre-feedback to post-feedback assignment submissions using the RAAP rubric. The data indicates that the feedback in combination with an opportunity to revise the assignment improved scores and decreased the variance for participants in the Small Group.

The 45 students participating in both the initial and revision phases of the assignment using the RAAP rubric are reflected in Table 3. For this Larger Group, the mean of the RAAP rubric scores rose between the first RAAP assessment (R1), pre-feedback assignment submission and the second post-feedback RAAP assessment (R2). Students' RAAP scores' mean rose from 17.42 points to 36.16 points after students received feedback. The standard deviation for the large group decreased from 7.64 to 7.27. The data indicates that feedback to the students resulted in average scores more than doubling while the standard deviation decreased slightly. The differences in the scores, from both groups, indicates that feedback and assignment revision

resulted in a measurable shift in information literacy skill scores. This researcher did further data analysis to determine if the differences reached statistical significance.

Table 3

Descriptive Statistics for RAAP#1 (R1) and RAAP#2 (R2) with the Large Group (LG)

Score	*M*	*SD*
R1	17.42	7.64
R2	36.16	7.27

n = 45.

A paired samples t-test was used to compare RAAP scores for the Large Group between their pre- and post-test condition. A *t*-test for dependent means was performed using the calculators on the web site titled Social Science Statistics (Stangroom, 2019). Table 4 displays the *t*-test calculation results. The t-test results for both groups indicated a statistically significant change in the scores between the first RAAP score (R1) and second RAAP (R2) scoring.

Table 4

t-test for Dependent Means using RAAP#1 (r1) and RAAP#2 (R2)

Scores Compared	*n*	*M*	*SD*	*t*	*p*
SG-R1	18	17.50	9.08	11.27	< .01
SG-R2	18	38.50	3.54		
LG-R1	45	17.42	7.64	15.61	< .01
LG-R2	45	36.16	7.27		

The t-test results for both the small and large groups indicated a statistically significant change in the scores in the *Using Feedback for Revisions* assignment using the RAAP rubric scoring. The average assignment scores increased between participants' first and second submission at a statistically significant level (Small, $p < .001$; Large, $p < .001$) Therefore, the null

hypothesis must be rejected. There is a statistically significant change in students' RAAP scores from participants' initial assignment submission as compared to the participants submission after the assignment's revision with feedback and re-scoring. This indicated that peer and teacher feedback, combined with a chance for assignment revision, impacts student performance. The *Developing a Planning Aide* assignment was re-assessed as the assignment *Using Feedback for Revisions* and generated a statistically significant score improvement.

This researcher acknowledges that the sample size for the SG is relatively small thus potentially violating assumptions related to analyzing data related to parametric statistics. The researcher chose to run the non-parametric Wilcoxson-Signed Rank test on data from the SG of 18 participants. The data from this analysis is shown in Table 5. The test was performed using the calculators from the web site titled Social Science Statistics (Stangroom, 2019). The results indicated that $Z = -3.72$ with a $p < .001$ This non-parametric test reaffirms that the higher scores on the RAAP assessment from the pre-test to the post-test condition did reach statistical significance.

Table 5

Wilcoxon Signed-Rank Test for RAAP#1 (R1) and RAAP#2 (R2)

Group 1 Results Group 2 Results	*n* *N*	*Z*-value *W*-value	*p* Critical Value of *W*
R1 & R2	18.00	-3.72	.0002
	18.00	0.00	40.00

Research Question 2

Do individuals' anxiety scores change between the first, second and third deployments of the GAD-7? The student's anxiety and the directional shifts of students' anxiety over the duration

were unknowns. For this reason, a preliminary GAD-7 assessment, measuring student anxiety, was deployed prior to introducing the research experience, *Developing a Planning Aide* assignment as the assignment had the potential to induce anxiety.

The first GAD-7 deployed prior to research interventions is identified as GAD-7#1. The second deployment occurred after assigning *Developing a Planning Aide* and is identified as GAD-7#2. The third deployment, identified as GAD-7#3, was the last anxiety survey. GAD-7#3 was made available just after participants were notified of mentor pairing, additional feedback from their mentor and the assignment to revise their work with the assignment *Using Feedback for Revisions*.

Null Hypothesis H_2. There is no statistically significant change in student anxiety scores across the duration of the research project, as indicated by the scores from three deployments of the GAD-7 anxiety self-assessment survey.

Table 6 shows the descriptive statistics for the GAD-7 scores from all of the participants who completed each of the three surveys. The initial survey, GAD-7#1, showed the lowest average score of participant anxiety at 8.90. All of the three GAD-7 assessment calculated means that fell within two points of each other, between 8.90-10.15. All of the mean scores were within one point of the most extreme mean measurement. The mean tended to be slightly higher between the first and second deployment. The mean fell slightly between the second and third deployment. The movement of the mean scores was small. This is indicative of very little movement by individual's scores as well as the calculated averages.

Table 6

Descriptive Statistics for Large Group Scores on GAD-7 Deployments #1, #2, and #3

Deployment	*n*	*M*	*SD*
GAD-7#1	21	8.90	5.14
GAD-7#2	27	10.15	4.99
GAD-7#3	36	9.22	5.11

Table 7 shows the descriptive statistics for anxiety scores from the small group of 18 participants who completed all of the assignment tasks as well as finishing all three of the GAD-7 surveys. Although a smaller sample, this Small Group data represents the data for participants who completed all three GAD-7 deployments as well as both of the assignments and their assessments, *Developing a Planning Aide* (RAAP#1) and *Using Feedback for Revisions* (RAAP#2). The SG data provides a way to track anxiety relative to the assignment deployment, assessment, and feedback over time with a fixed set of participants. The standard deviation from this Small Group of 18 participants (5.42-6.12) is consistently larger that of the Larger Group (4.99-5.14). The average anxiety score in the SG creeps up slightly (.94 points) between the first and last GAD-7 deployment. The mean anxiety score of the second deployment was lower than the mean value of either the first or last deployment. This was unexpected. There was little demonstrated movement in anxiety scores between GAD-7 deployments #1, #2 or #3.

Table 7

Descriptive Statistics for Small Group (SG) and GAD-7 Deployments #1, #2, and #3

Deployment	*M*	*SD*
GAD-7#1	9.39	5.42
GAD-7#2	9.28	5.65
GAD-7#3	10.33	6.12

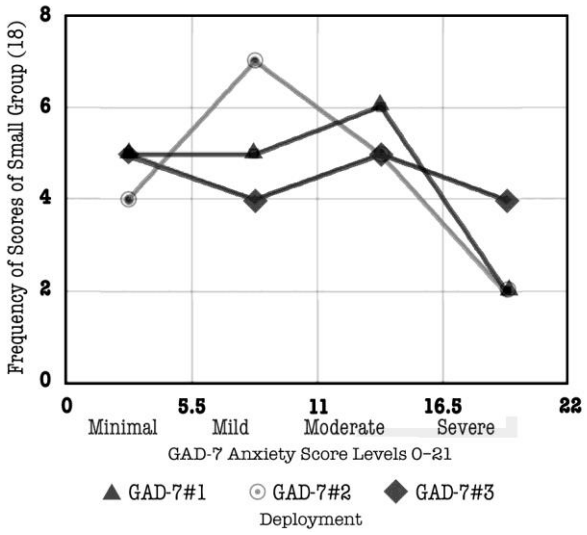
n = 18.

Figure 5, uses the frequency of anxiety scores on the Y axis and the anxiety score values on the X axis. The X axis includes an indication of each of the five levels that corresponds with the GAD-7 authors' recommended interpretation of the scores ranging from minimal to severe (Pfizer, n.d.). The scores change slightly with each deployment.

The first deployment, GAD-7#1, displays a baseline range of scores for this sample. The deployment of GAD-7#2 illustrates scores that are not exceptionally low or high as compared with the previous assessment. GAD-7#3 shows another set of scores that does not display extraordinarily different scores. The intent of Figure 5 is to help identify the results from each of the three GAD-7 deployments and provide an overlaid perspective of the data.

Figure 5

GAD-7 Frequency Scores for Deployments #1, #2 and #3



Due to the small number of participants, this researcher used the non-parametric Friedman Test for Repeated Measures. The Friedman test uses matched samples, consequently only the Small Group of 18 was used in the calculation. Table 8 displays the results performed using the calculators on the site titled Social Science Statistics (Stangroom, 2019). The Friedman test did not indicate statistically significant changes in participants' anxiety scores between the three GAD-7 assessments. The second deployment occurring after the assignment of *Developing a Planning Aide*, and the last anxiety survey made available after assigning *Using Feedback for Revisions*, did not act as a statistically significant accelerant on student anxiety.

Table 8

Friedman Test for Repeated Measures Comparing Deployments GAD-7 #1, #2 and #3

GAD-7 Scores	*n*	X^2_r statistic[a]	*p*
#1 : #2 : #3	18	.44	.80

[a] The X^2_r statistic is 0.4444 (2, N = 18).

The Friedman test calculations did not identify a statistically significant change in scores between the three separate deployments of the GAD-7 self-assessment anxiety survey. The null hypothesis is not rejected. The data indicates that student anxiety levels, on average, did not exhibit a statistically significant change over the course of the research project. The mean scores in each GAD-7 deployment varied by less than two points. Despite efforts to spur anxiety through the addition of assignments, tasks, and assessments, there was not a shift in anxiety that reached statistical significance. There is no evidence that participant anxiety was statistically significantly impacted by the classroom assignments *Developing a Planning Aide*, *Using Feedback for Revisions*, classroom activities nor the associated mentor activities. Thus, the null hypothesis is not rejected.

Research Question 3

Is there a relationship between a college student's GAD-7 anxiety scores and that same student's information literacy scores as assessed by the RAAP rubric? The information literacy scores are compared with the student's anxiety scores. The RAAP rubric was used to assess the information literacy scores and the GAD-7 self-assessment survey assessed anxiety.

Null Hypothesis H_3. There is no statistically significant correlation between students' anxiety scores, as measured by the GAD-7, and their information literacy scores as measured by the RAAP rubric. From the Small Group, the RAAP#1 and GAD-7#2 scores were paired and the set of RAAP#2 and GAD-7#3 scores were paired to look for a correlation between anxiety and information literacy.

The non-parametric Spearman's Rho Rank Order Correlation test was used to analyze the relationship between students' RAAP rubric scores and their related GAD-7 scores. Table 9

illustrates the paired correlation test from the Spearman's Rho Rank Order test performed using the calculators from the site titled Social Science Statistics (Stangroom, 2019).

Table 9

Spearman's Rho Rank Order Correlation of Score Pairs of RAAP (R#) to Anxiety (GAD-7#)

Pairing	r_s	p
SG-R1 SG-GAD-7#2	.03	.89
SG-R2 SG-GAD-7#3	-.30	.23

Using the Spearman's Rho Rank Order Correlation test results, the null hypothesis is not rejected. The paired outcomes from the RAAP rubric scores and GAD-7 scores do not indicate a statistically significant correlation. The small r_s values indicate a weak (.03) or (-.30) strength in the RAAP and GAD-7 correlation. A very strong correlation approaches an absolute value of one (Pallant, 2005). The first set of samples, SG-R1 and GAD-7#2 has an 89% random chance of occurrence. The second set, SG-R2 and GAD-7#3, calculated a 23% random chance of occurring and therefore a 77% chance of being influenced by the research project activities. The lower p values suggest interpreting the interjection of peer and mentor feedback as impacting students' RAAP rubric scores as well as their anxiety levels. The connotations of this activity may have a positive influence in the classroom and provide a practical application even where the statistical significance is weak. Considering this potential, a larger sample may be able to demonstrate more significance in a correlation.

Qualitative Analysis

Two different test strategies were used to look for relationships in the data. Parametric and non-parametric statistical tests were used in the data analysis and in drawing conclusions

relative to anxiety and information literacy skills. Beyond the quantitative data, this researcher indicated qualitative data would be collected.

The initial plan was to interview GAD-7 participants regarding their anxiety levels, as described in chapter 3. A qualitative approach incorporating interviews was intended to extend research insights. A more thorough illustration about college student anxiety was planned by using interview data. Subjects agreeing to participate in the interview were not forthcoming. The planned interviews were abandoned due to a lack of volunteers. The effort to collect qualitative information was not forsaken.

An additional and optional question was added to the final exam for students, most of whom had participated with the RAAP rubric and GAD-7 assessments. Only comments from those students participating in the research activities were considered pertinent to the research project. The question, “Please provide me with any constructive feedback you think would help improve this course” was broad to encompass all students and enable attaining extra points for any student. There were a total of 48 responses that covered topics including textbook reading assignments, laboratory issues, comments on quizzes, group projects, and the classroom. The comments were vetted down to several students who were very specific in their comments applying to the planning aide (also referred to as a creative brief in some comments). It appears that the rubric itself was not positively received by a small number (3/48 or 8.33%) of students. These three comments related to this research project:

> S- “The one assignment I got hung up on was the creative brief. It was probably just me overthinking the entire project because everyone else in the class did it correctly, but for some reason, the instructions for that project didn't click for me.”

C- “The planning aide presentation and assignment was confusing.”

L- “... change the evaluation form” (re; rubric)

On the GAD-7 surveys there were four to five comments returning from each deployment. The comments tended to self-justify the participants anxiety level. The shared comments imitated this comment; “I am always very anxious. The inability to escape from things that make me nervous certainly play a role in it.” Some comments informed the researcher of their diagnosed or medicated anxiety and included statements such as “I am already diagnosed with moderate anxiety.” The comments did not delve into other areas of personal or student-centric anxiety.

The last GAD-7#3 included an additional question which was numerically scored using the same scale as the other GAD-7 questions (0-3). The question explored if the added activities across the assignments, revisions, and mentor feedback had changed the student’s anxiety level. All 68 responses to this question indicated that little, if any, additional anxiety was caused by adding the mentor’s input and additional revisioning. The average response to this question was a value of one.

Summary

A statistically significant change in RAAP rubric scores occurred when feedback was introduced after an initial assessment on *Develop a Planning Aide* and its follow-up *Feedback for Revisions* assignment. Using peer, instructor, and mentor feedback with the opportunity for assignment revisions produced higher scores and higher averages of scores. Feedback provided during the research project significantly and positively impacted student scores on the *Feedback for Revisions* assignment. The RAAP rubric was used in both the assessment and re-assessment of the assignments *Develop a Planning Aide* and *Using Feedback for Revisions*.

Student anxiety levels did not change significantly across the duration of the research. The frequency of scores in each anxiety score range remained relatively consistent throughout the research. Anxiety scores did not vary widely when considering the class workloads, assignments, internal (peer) feedback, and external (mentor) feedback. Feedback from others, even unknown others, did not indicate the development of, nor alleviation of anxiety. Feedback may impact the academic scores evaluated by using the RAAP rubric and associated with information literacy skills. Additional assignments, tasks, and assessments did not impact anxiety with either increases or decreases in student anxiety levels at a statistically significant level

Information literacy as measured by the RAAP rubric did not statistically correlate with the anxiety levels of participating college students. There is no statistically significant correlation, positive or negative, between the scores from the GAD-7 anxiety assessments and the associated information literacy RAAP rubric assessments. Participant's anxiety levels did not demonstrate consistently nor reliably higher or lower or scores at different stages of the research. At the same time, the use of information literacy skills to calm students' anxiety may hold practical significance. Using information literacy skills with feedback in the classroom may prove to have academic, cognitive, and affective advantages for students.

Chapter V: Discussion, Conclusion and Recommendation

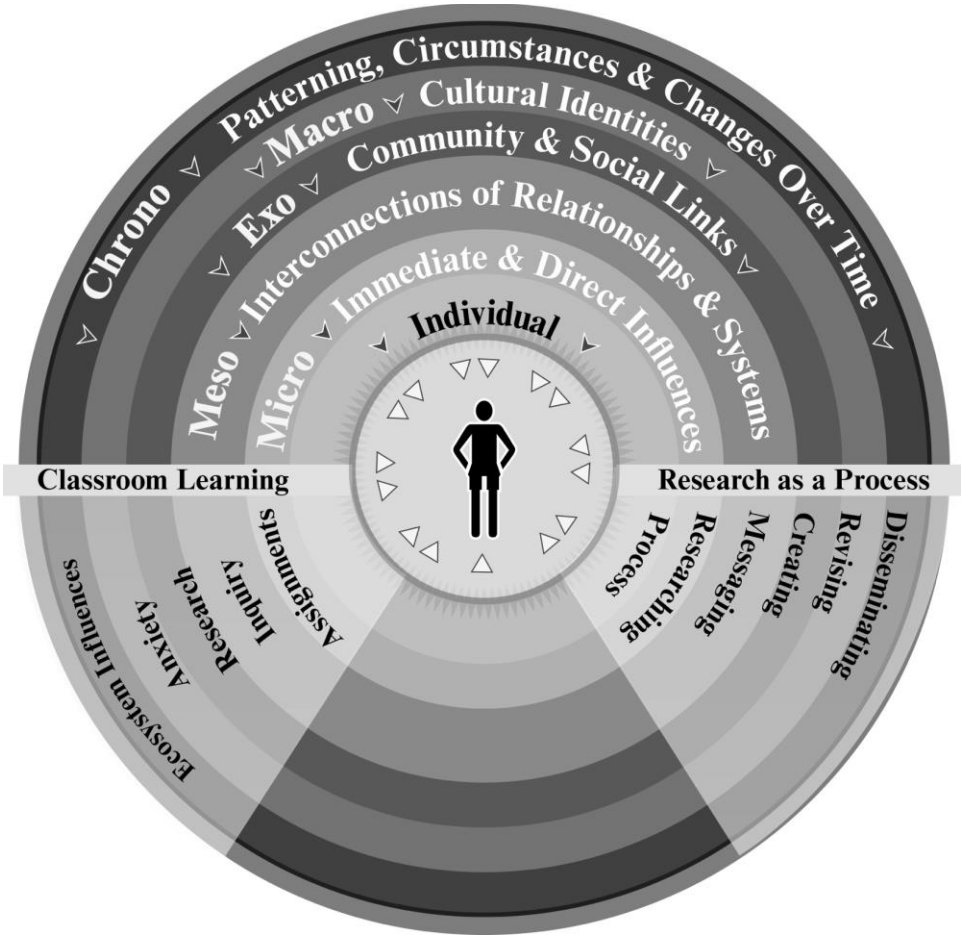
This research project was initiated by the juncture of information literacy, as cognitive skills useful in schooling, and student anxiety that manifests in the affective domain driven by attitudes and emotions. The potential relationship between information literacy skills and anxiety was explored. The discovery process involved uncovering information literacy skills, their development, and assessment. Recognizing the legacy and currency of anxiety in the college student as well as acknowledging the obscure relationship between the two, helped to begin framing the journey. Lest it be lost, the journey's purpose was to help students learn.

Enabling the experience of learning taxes the learner as well as the influential environment. The learning environment is not only part of the classroom, but also formed from the ecosystem Bronfenbrenner described. Figure 6 restates the Bronfenbrenner model overlapped by information literacy considerations. Often obscured by their own magnitude, the chrono, macro, and exo systems' influences converge on the individual from a worldly orbit that cannot help but dominate and coerce development. The circumstances brought by time, literacies, the identities of culture, social connections, and the individual, build society through the individual's perception that becomes learning. This is the insight Bronfenbrenner offered.

Any learner is a conglomerate of many mediators. A student's family, peers, professional ties, and social endeavors, become systematic compulsions that can help or hurt an individual's psyche and learning. When the emotional baggage becomes weighty and cumbersome, intellectual and cognitive tools can be of service. Recognizing those service tools, such as the skills of information literacy, is precious learning.

Figure 6

Bronfenbrenner's Concentric Circles of Human Development's Ecosystem Paired with Information Literacy Research and the Learning Experience



The information literacy framework describes research as a process (ACRL, 2015). Expanded upon by Bronfenbrenner (1986; Bronfenbrenner & Evans, 2000), the research process is surrounded by a dynamic ecosystem and impacts cognitive and affective development (Wertsch, 2005). That ecosystem was evident in this research complete with all the pressures from influences at all angles. Students were given an assignment with evaluation criteria (RAAP rubric). They completed their research, constructed their instrument and presented the product to their classroom peers. This task, in itself, might generate anxiety. Continuing with pressuring

factors, feedback was provided by peers and their instructor. Compounding the project even further, mentor volunteers were added to provide additional feedback to students. The mentor/outsider might be seen as threatening, yet anxiety did not significantly increase and RAAP rubric scores did improve.

The much broader implications of information literacy's *research as a process* denotes that lifelong learning is a process; a process that is experientially learned. The information literacy process involving research, messaging, creating, revising, and disseminating information is fundamental to lifelong learning and teaching. Both teacher and learner must remain cognizant that theory and practice are warring partners in the same endeavor. Learning is a product of duality that takes advantage of humanity's cognitive and affective domains. Each is a smaller piece of the same ecosystem that is simultaneously complementary and contrary. It is the instructor's challenge to mimic harmony amongst this personified chaos.

This research project cast the students as subjects. Interestingly, both student's willingness and ability to participate in the process of research appeared to mirror their relationship with learning. As the researcher observed from afar, curious-minded individuals willingly jumped into the experience. It would be an intriguing research project to discover if the unabated joy of the eager learner is inherent, ephemeral or adapted. In any case, curious learners appeared to be self-perpetuating. Their ability to seek out learning and thrive from learning seemingly creates a cycle that is socially, culturally, and immemorially advantageous. It seems to reinforce Bronfenbrenner's suggestion that, in order to develop, the individual must invest in active participation with progressively escalating complexities (Bronfenbrenner, 1999).

Academic researchers would do well to wonder at what threshold does student anxiety turn into a motivator or demotivator. Information literacy may be a catalyst of motivation (Small

et al., 2004). As students deal with anxiety, their differences in their own sense of cognition, intense anxiety, self-conceptualization, and self-esteem might provide alternative paths for student development and learning. Motivation itself might be related to curiosity and both may be connected with anxiety or its dissipation (Pisano, 2019).

Discussion

Information literacy has a wide breadth of definitions and interpretations. The flexibility in the definitions of specific information literacy skills are valuable to teaching skills and selecting a skill suited to the module being taught. The consequence of the built-in flexibility is in creating an instrument that evaluates information literacy skills as it may take many forms. Skills and talents are hard to isolate. Students may be able to fulfill their performance competencies merely due to practiced rote work. Assessment criteria may be dependent on specific instructor or discipline approaches and more biased than obvious. The many definitions of literacy and what specifically constitutes information literacy continues in debate. The exclusion of "literacy" factors may invalidate a student's success or failure or that of a particular assessment instrument. Individual instructors and students may have very different definitions of competency. The discord creates assessments with pitfalls. The inability to assess learning with a common gauge damages the value of instruction and information literacy's assessment.

Understanding and interpreting outcomes may be a contingency point when assigning grade values. A gap exists between students' interpretations of assignments, understanding directions, assessment criteria, and the instructor's expectations. The gap may have formed from weak competencies with information literacy skills, but there are other possibilities. A rupture in communications may have become habitual after students experience class after class of inconsistency. Imprecise directions may have created a fissure the outer sphere in the ecosystem.

Other factors could be leaking in. The reworking, alone, of an assignment may offer a chance to reinterpret directions or reassess the desired outcomes. Reworking further delves into the teacher and student interaction and may add communication clarity that was previously absent. This could prove advantageous to the student's learning and scoring.

The student's ability to accomplish the desired outcomes may be dependent upon student's interpretation of the assignment's ecosystem. Students with a better understanding of the desired outcome can achieve a better grade. Perhaps students with better communication skills develop a faster and more effective comprehension of the instructor's rubric requests. Maybe students executing on their strengths in communication skills can agilely redefine their own expectations. Expectation of an individual's self-capabilities may be realigned with the student's external expectations. The ecosystem may support a philosophy of expect more and get more.

Students have verbalized their anxiety surrounding school and school-work. Students routinely share the sentiment that assignments and expectations make them anxious. The closer reality may be that students are continually anxious even though the intensity of angst may fluctuate. The actions in the classroom may be, essentially, inconsequential. Although there were some anxiety score shifts, the score changes were significantly smaller than one might have anticipated from college students. Most scores from a particular individual did not vary more than one or two points across all three GAD-7 surveys. The expectations of how a student will perform can come from many perspectives and the vantage point may become self-fulfilling.

Pandering to the acknowledgement of anxiety may actually exasperate anxiety (Gliatto, 2000; Taneja et al., 2015). If the instructor refuses the preconceived notion of weak skills, the option may be unavailable to the student as well. While a perspective worthy of exploration, the

path of high expectations is also a labor intensive and time-consuming path. The pragmatist may find this option impractical.

The largest surprise to the researcher was the low level of students' participation. It could be symptomatic of student's low engagement in classwork, weak motivation, or a lackluster interest in the topic of anxiety. Students seemed ambivalent toward research (Mason et al., 2019; Facione, 2000; Parker et al, 2019). The injudicious sentiment may stem from society's trend toward devaluing scientific research (Donald, 2016; Head, 2016; Nadler et al., 2018). To the researcher, students treated research as irrelevant. Several students stated verbally that if there was no overt benefit to them, there was no need to participate in research. Motivation to participate was low. A few students were purely curious. The curious mind offers intriguing suggestions (Gruber et al., 2014). The *curious* student may have an innate advantage. Illiterate, anxious or not, curiosity may be a differentiator (Belzer et al., 2002; Facione, 2000).

The dynamic experiences and intensity behind student anxiety seems to be unique to each student. The nature of anxiety's impact upon the individual as well as its level of intensity, seems to vary. Anxiety arrives with a different appearance to each individual. Some students and instructors may expect anxiety to be stifling. Others may be disparaged by anxiety and still others completely ignore anxiety's grievous tone.

The naming of anxiety borders on being "too commonplace". For today's college students, the abstractness of identifying anxiety, such as "that makes me so anxious" may have dulled the definition of anxiety. The trite treatment reduces its connotations leaving only a light residue of anxiousness for students to identify with. As an illustration, some students in the research dealt with seemingly intimidating factors playing against them, and scored in the lower anxiety ranges. At the same time some students with seemingly "little to be anxious about"

scored at relatively high anxiety levels. Even with efforts to spark anxiety, some students easily rode the wave while others were frozen by anxiety before they began. The catalysts behind an individual's high and low levels of anxiety remain obscured. It is an opportunity awaiting more fascinating research.

Conclusions

Stage 2 of the research project lasted about four months. Over that time, testing scores and student feedback seemed to demonstrate little change regarding the individual student's anxiety. The addition of an assignment, the addition of feedback and the addition of an outside party's input did not seem to significantly shift an individual's anxiety score.

The assignment that received feedback, was reworked by the student, reassessed, and did improve the score. These results suggests that anxiety is independent of school, schoolwork or feedback. It also advocates that schoolwork scores can be positively impacted by feedback from the instructor, peers or other would-be evaluators. The integration of other feedback mechanisms, such as interjecting other's assessments or reworking assignments, may help students better interpret feedback and improve their work (Bryk, 2015).

This research did not find a relationship between information literacy and anxiety. While unfounded as an anxiety relationship, the ramifications of information literacy competencies should not be discounted. Students' need for knowledge, research and its skills are indispensable capabilities. A student needs a minimal level of competence to be able to accomplish the criteria listed in college assignment rubrics. Assignment execution is subject to the situation enveloping the student and having the skills to take advantage of every opportunity is important to success. As Bronfenbrenner alluded to, emotional, physical or intellectual; the individual student composites their own portrait.

This research did not see a statistically significant rise or drop in anxiety scores across the span of the research. A status quo was not identified relative to an appropriate level of student anxiety. This, in itself, is interesting. Perhaps, anxiety is a moving target unique to each individual. The normalcy of anxiety may be in its oscillation.

Recommendations

Some practices could have enhanced this research and made for broader interpretations. Using an established instrument for anxiety assessment helped to frame scores. Using multiple assessment instruments might provide other kinds of insights and details in the levels distinguishing students' anxiety. Coordinating a particular instrument with other research, past, present or future, could make for broader research interpretations. Delivering some surveys or questions in-person might change responses and improve completion rates.

While using mentors in the feedback loop appeared to be a rich input option supporting experiential student learning, the work behind recruiting, coordinating and managing student and mentor relationships, was all-consuming. Even with the small sample size, the time investment to attain mentor feedback was disproportionate. Interviews would have consumed more time, but it was a disappointment that the interviews failed to materialize. Hearing from students about their anxiety would have provided interesting qualitative context and supplied another level of authenticity. The limited sample and short timeline of this research only hints at the value of discovering more about learning, skill competencies and anxiety.

In further research, specific skills could be called out and tested against student anxiety. Skills in reading, spelling, logic, and procedural problem solving might provide interesting comparisons with information literacy skills and anxiety scores. First-year students might be isolated as a sample for research comparing information literacy skills with anxiety levels over a

four-year college experience. Securing a larger and more diverse sample might have represented a broader spectrum of students. Performing similar research at different times of the year is another research opportunity. Studying students with different financial backgrounds, with multi-lingual talents, comparing high achieving students and students with unusual anxiety levels, all might have some interesting outcomes. More research would benefit this topic area.

The questions raised exceed the questions answered. The questions range across topics. Do language literacy skills confound information literacy skills? Would stronger learners be better at information literacy? Would findings be repeatable with a different and larger sample? Would the standard deviations be greater or smaller with a more culturally diverse group? Is there a particular kind or level of feedback that is most helpful to the learner? Was the mere ability to rework an assignment, regardless of feedback, a swaying factor? Will a feedback mechanism be effective for online learning? Can specific trends in data be identified? Do other research projects identify similar trends? Answering these questions can help us begin to expand our comprehensions of the ecosystem surrounding teaching, students and learning.

We learn so much in a single day that it is easy to overlook the invaluable event that is in even the smallest piece of learning. Each piece of our learning compounds as a threshold concept to another. Perhaps learning and anxiety are partners of necessity; they need each other to exist. The seeming contradiction of anxiety and learning may begin with the need for intellectual and emotional stimulation that is presented in a *challenge*. There is no doubt that humans' ecosystem provokes anxiety. Still, human beings have an insatiable appetite for learning. The truest jeopardy is relinquishing learning's status. Mistaking anxiety as a culprit and diminishing into intellectual and emotional apathy is negligence to the essence of humanity which is continuous learning.

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Appendix A

Deployed GAD-7 Instrument

A1 ▼

College Student Anxiety and Information Literacy.

Welcome. ***This survey examines Student Anxiety for the purpose of research supporting an EdD project.***

This research explores **college student anxiety** and its relationship to **information literacy**. I am asking for your voluntary participation in responding to this set of confidential research surveys. This is the third of three surveys (7-8 questions). This survey inquires about ***your anxiety***.

This survey, like all research comes with some inherent level of risk. Unpleasant memories and anxious thoughts are plausible. If you need supplemental emotional support, please contact or visit
Stout's Counseling Center:
410 Bowman Hall • **counseling@uwstout.edu** •
715-232-2468 or **http://www.uwstout.edu/counsel/index.cfm**

This research has the potential to help both students and instructors improve the understanding of anxiety and information literacy. Mitigating anxiety obstacles limiting students' learning progress, is a goal. The possibilities of reducing anxiety and improving information literacy are the motivators behind this research project.

Individual personal information such as scores, tests and assignments are *not intended for public access*. All project **data is confidential**. All data will be compressed and kept in password protected folders or media.

Collected data is used for academic informational research. The project's focus is to use data for a doctoral dissertation. Portions of the research may be published or presented publicly; but, participant identities will remain private and confidential. The data may help with further research.

The survey of 7-8 questions should take less than 10 minutes to
Your participation in this study is entirely **voluntary**.
You may choose not to participate without any adverse consequences to you.
You have the right to stop the survey at any time. However, should you choose to participate and later wish to withdraw from the study, there is no way to identify your anonymous document after it has been turned into the investigator. If you are participating in an anonymous on-line survey, once you submit your response, the data cannot be linked to you and cannot be withdrawn.

This study has been reviewed and approved by The University of Wisconsin-Stout's Institutional Review Board (IRB). The IRB has determined that this study meets the ethical obligations required by federal law and University policies. If you have questions or concerns regarding this study, please contact the Investigator or their Advisor. If you have any questions or concerns regarding your rights as a research subject, please contact the IRB Administrator.

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By clicking the **"I consent"** button below, you acknowledge that ***your participation in the study is voluntary***, you are at least 18 years old, and that you are aware that you may choose to terminate your participation in the study at any time and for any reason. You are consenting to the confidential use of survey data for the purpose of research. The use of course assignments and submitted materials may be used, confidentially, for research purposes.

After making your selection below, ***CLICK*** *the arrow -> (at bottom right) to continue with the survey.*

I consent. Begin the survey.

I do not consent, I do not wish to participate (Survey will conclude).

College Student Anxiety and Information Literacy.

Survey.

Below, seven feelings are described.

Please **click to move the slider,** between **0-3,**

to indicate the frequency of your feelings occurring over the most recent 5-7 day period.

Not At All (0)	Several Days (1)	More than Half of Days (2)	Nearly Every Day (3)
0	1	2	3

1) **Feeling nervous, anxious, or on edge**

2) **Not being able to stop or control worrying**

3) **Worrying too much about different things**

4) **Trouble relaxing**

5) **Being so restless that it's hard to sit still**

6) **Becoming easily annoyed or irritable**

7) **Feeling afraid as if something awful might happen**

College Student Anxiety and Information Literacy.

Feedback. You may write in any other information or comments you wish to share.
This information is ***Not Required***.

→

Q6.
After completing your assignment to research and construct a tool to help you plan and communicate in the job of your choice, you were asked to share that assignment with an industry Mentor.

How much anxiety did being confronted with sharing your assignment with an industry professional cause you?

No additional anxiety (0)	Spent several days thinking about the situation (1)	Was anxious about it for more than half of the days (2)	Was anxious about it nearly every day (3)
0	1	2	3

How much "more" anxiety did the idea of sharing your assignment with an industry professional cause you (if any)?

→

Powered by

College Student Anxiety and Information Literacy.

Your survey results have been submitted.

Thank you
for taking the time and thoughtfulness
to, either, consider or complete this research survey.
I appreciate your contributions to the research
and wish you a comfortable
level of anxiety.

You may close this window or click the links below.

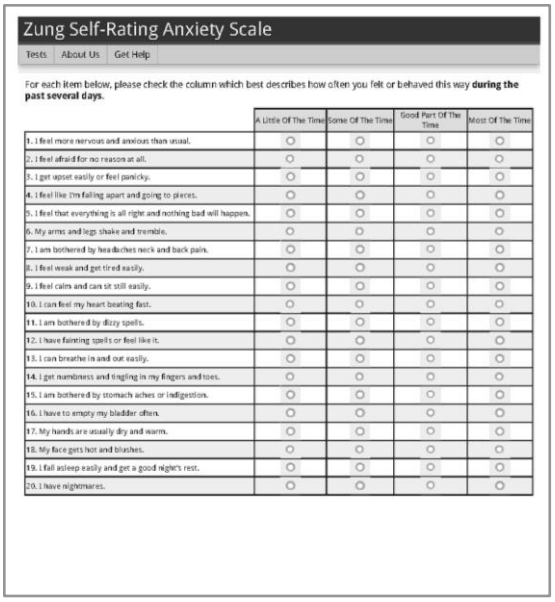
https://www.uwstout.edu/gcom

▲ A2

Appendix B

Examples of Zung SAS and GAD-7 Instruments

B1 Zung SAS Example



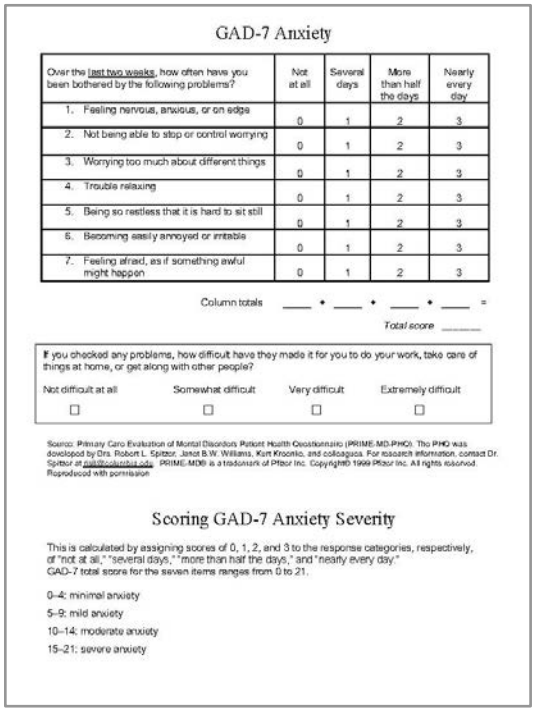
Zung Self-Rating Anxiety Scale

Tests | About Us | Get Help

For each item below, please check the column which best describes how often you felt or behaved this way **during the past several days**.

	A Little Of The Time	Some Of The Time	Good Part Of The Time	Most Of The Time
1. I feel more nervous and anxious than usual.	○	○	○	○
2. I feel afraid for no reason at all.	○	○	○	○
3. I get upset easily or feel panicky.	○	○	○	○
4. I feel like I'm falling apart and going to pieces.	○	○	○	○
5. I feel that everything is all right and nothing bad will happen.	○	○	○	○
6. My arms and legs shake and tremble.	○	○	○	○
7. I am bothered by headaches neck and back pain.	○	○	○	○
8. I feel weak and get tired easily.	○	○	○	○
9. I feel calm and can sit still easily.	○	○	○	○
10. I can feel my heart beating fast.	○	○	○	○
11. I am bothered by dizzy spells.	○	○	○	○
12. I have fainting spells or feel like it.	○	○	○	○
13. I can breathe in and out easily.	○	○	○	○
14. I get numbness and tingling in my fingers and toes.	○	○	○	○
15. I am bothered by stomach aches or indigestion.	○	○	○	○
16. I have to empty my bladder often.	○	○	○	○
17. My hands are usually dry and warm.	○	○	○	○
18. My face gets hot and blushes.	○	○	○	○
19. I fall asleep easily and get a good night's rest.	○	○	○	○
20. I have nightmares.	○	○	○	○

B2 GAD-7 Example



GAD-7 Anxiety

Over the last two weeks, how often have you been bothered by the following problems?	Not at all	Several days	More than half the days	Nearly every day
1. Feeling nervous, anxious, or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it is hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid, as if something awful might happen	0	1	2	3

Column totals ____ + ____ + ____ + ____ =

Total score _____

If you checked any problems, how difficult have they made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all ☐ Somewhat difficult ☐ Very difficult ☐ Extremely difficult ☐

Source: Primary Care Evaluation of Mental Disorders Patient Health Questionnaire (PRIME-MD-PHQ). The PHQ was developed by Drs. Robert L. Spitzer, Janet B.W. Williams, Kurt Kroenke, and colleagues. For research information, contact Dr. Spitzer at rls8@columbia.edu. PRIME-MD® is a trademark of Pfizer Inc. Copyright© 1999 Pfizer Inc. All rights reserved. Reproduced with permission

Scoring GAD-7 Anxiety Severity

This is calculated by assigning scores of 0, 1, 2, and 3 to the response categories, respectively, of "not at all," "several days," "more than half the days," and "nearly every day."
GAD-7 total score for the seven items ranges from 0 to 21.

0–4: minimal anxiety

5–9: mild anxiety

10–14: moderate anxiety

15–21: severe anxiety

Appendix C

Deployed Zung SAS and GAD-7 Survey

C1 ▼ (Broken into sections for display purposes, only.)

UNIVERSITY OF WISCONSIN
STOUT

WISCONSIN'S POLYTECHNIC UNIVERSITY

English

Welcome to the Student Anxiety research Survey!

We are interested in understanding college student anxiety and its relationship to information literacy. This survey inquires about your anxiety related to your research work as part of your college courses.

All research comes with some inherent level of risk. Unpleasant memories and anxious thoughts are plausible. If you need supplemental emotional support, please contact or visit **Stout's Counseling Center:**
410 Bowman Hall • counseling@uwstout.edu •
715-232-2468 or http://www.uwstout.edu/counsel/index.cfm

This research has the potential to help both students and instructors. Improving our understanding of anxiety and information literacy may mitigate obstacles limiting students' progress. The possibilities of reducing anxiety and improving information literacy, is in itself, strong motivation to move this project forward.

Individual personal information such as scores, tests and assignments are not intended for public access. No association between the individual participant and graded, ranked or categorized data is retained. All project data is confidential. All data will be compressed and kept in locked folders.

Collected data is used for informational research. The project's focus is to use the data in composing a doctoral dissertation. Portions of the research may be published or presented publicly; although, participant identities will remain confidential. Collected data may be a tool spurring further research.

The survey of 28 questions should take about 15 minutes to complete.

Your participation in this study is entirely **voluntary**.
You may choose not to participate without any adverse consequences to you.
You have the right to stop the survey at any time. However, should you choose to participate and later wish to withdraw from the study, there is no way to identify your anonymous document after it has been turned into the investigator. If you are participating in an anonymous on-line survey, once you submit your response, the data cannot be linked to you and cannot be withdrawn.

This study has been reviewed and approved by The University of Wisconsin-Stout's Institutional Review Board (IRB). The IRB has determined that this study meets the ethical obligations required by federal law and University policies. If you have questions or concerns regarding this study, please contact the Investigator or Advisor. If you have any questions, concerns, or reports regarding your rights as a research subject, please contact the IRB Administrator.

IRB Administrator: Elizabeth Buchanan
Office of Research and Sponsored Programs
152 Vocational Rehabilitation Bldg.
UW-Stout, Menomonie, WI 54751
715.232.2477
Buchanane@uwstout.edu

Researcher: Barbara Bear
Bearb@uwstout.edu

Advisor: Dr. Sylvia Tiala
715-232-5619 office
Tialas@uwstout.edu

By clicking the **"I consent"** button below, you acknowledge that ***your participation in the study is voluntary***, you are 18 years of age, and that you are aware that you may choose to terminate your participation in the study at any time and for any reason. You are consenting to the confidential use of survey data for the purpose of research. Also kept confidential, course assignments may be used as reference materials associated with research.

Please note that this survey will be best displayed on a laptop or desktop computer. Some features may be less compatible for use on a mobile device.

I consent, begin the study

I do not consent, I do not wish to participate

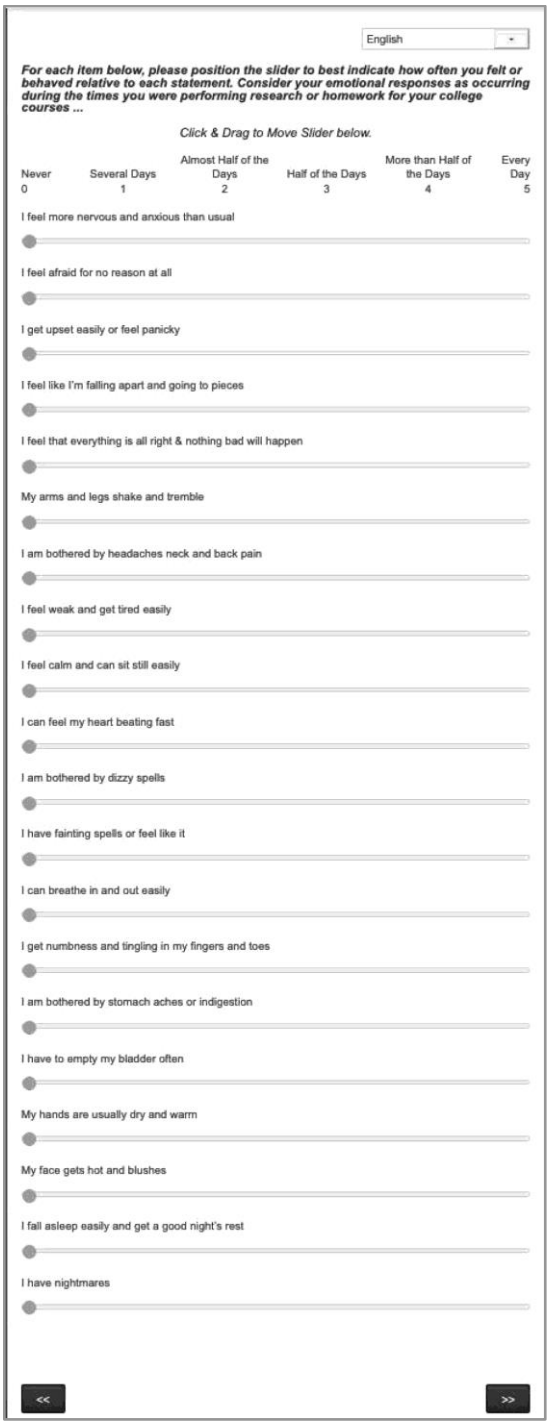
>>

Student Anxiety & Information Literacy
https://www.uwstout.edu/

▼ **C2**


UNIVERSITY OF WISCONSIN
STOUT
WISCONSIN'S POLYTECHNIC UNIVERSITY
English
Think about the research you completed as a part of your studies while in college. As you worked on research, please describe the frequency with which you experienced each of the described emotional states...
Click & Drag to Move Slider below.
Never 0
Several Days 1
Almost Half of the Days 2
Half of the Days 3
Over Half of the Days 4
Every Day 5
Feeling nervous, anxious, or on edge
Not being able to stop or control worrying
Worrying too much about different things
Trouble relaxing
Being so restless that it's hard to sit still
Becoming easily annoyed or irritable
Feeling afraid as if something awful might happen
<<
>>
Student Anxiety & Information Literacy
https://www.uwstout.edu/

C3



English

For each item below, please position the slider to best indicate how often you felt or behaved relative to each statement. Consider your emotional responses as occurring during the times you were performing research or homework for your college courses ...

Click & Drag to Move Slider below.

Never	Several Days	Almost Half of the Days	Half of the Days	More than Half of the Days	Every Day
0	1	2	3	4	5

I feel more nervous and anxious than usual

I feel afraid for no reason at all

I get upset easily or feel panicky

I feel like I'm falling apart and going to pieces

I feel that everything is all right & nothing bad will happen

My arms and legs shake and tremble

I am bothered by headaches neck and back pain

I feel weak and get tired easily

I feel calm and can sit still easily

I can feel my heart beating fast

I am bothered by dizzy spells

I have fainting spells or feel like it

I can breathe in and out easily

I get numbness and tingling in my fingers and toes

I am bothered by stomach aches or indigestion

I have to empty my bladder often

My hands are usually dry and warm

My face gets hot and blushes

I fall asleep easily and get a good night's rest

I have nightmares

<< >>

C4


UNIVERSITY OF WISCONSIN
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WISCONSIN'S POLYTECHNIC UNIVERSITY
Thank you
for taking the time & thoughtfulness
to consider or complete this research survey.
We appreciate your contributions to research.
We wish you a comfortable
level of anxiety.
https://www.uwstout.edu/
Student Anxiety & Information Literacy
https://www.uwstout.edu/

Appendix D

Mentor Recruitment Survey

▼ D1

STOUT

WISCONSIN'S POLYTECHNIC UNIVERSITY

Information Literacy & Student Anxiety

English

Welcome!

We are interested in understanding **Information Literacy** and its potential relationship with **college student anxiety**. We are inviting you to participate as a mentor in this research project.

We are asking you to serve as a **mentor** for **a single college student** and **a single assignment** related to project planning in graphic communications.
Students are studying in a variety of majors including print design, web design, user interface design, premedia, print production, marketing, education and packaging.
We will try to pair students' professional interests with your professional interests or roles.

There are **two items** needing your action:

1. Please share your **email contact** information (appropriate for the student to use in contacting you). The email address will be used by a single student to email you a sample of their project planning aide assignment.
2. When you receive the assignment, please provide some **feedback** in an email, within a week, so they (student) can revise or improve their project.

Background
Students have been researching creative briefs, project planning, job tickets and planning diagrams. They will construct and send you a draft of their concept of a professional lanning aide. Each student will use the mentor's provided feedback to revise or construct a new planning aide they (the student) will use as a tool in their workplace project planning.

If you would like to participate, but would like to participate anonymously, please fill in the last question, only, *with your title, name and contact information. We will setup a Qualtrics survey, like this, for anonymous exchanges.*

- The student will email you their project planning tool (that they have constructed) for your review.
- We ask you to provide the student with *at least* **two points** of **feedback** for change or improvement.
- We will provide you with a PDF of the rubric used for their classroom assessment (for the planning aide as it specifically relates to research, inquiry and information literacy).
- The students will use their own mentor's feedback to revise their planning aide.
- After revisions, all projects will be shared with the class.
- Students will complete an anxiety survey.

* Responses that are submitted confidentially, will be kept confidential. Emailed responses and feedback are subject to the security of email systems.

Data used for research is intended for use in composing a doctoral dissertation. Portions of the research may be published or presented publicly. The data collected may be used as foundational for further research. During further research, publication or presentation, **individual identities of participants will not be shared**.

Your participation in this study is entirely voluntary. You may choose not to participate without any adverse consequences to you. You have the right to stop this survey at any time. You have the right to withdraw participation at any time.

This study has been reviewed and approved by The University of Wisconsin-Stout's Institutional Review Board (IRB). The IRB has determined that this study meets the ethical obligations required by federal law and University policies.

Involvement in the entire study, both stages of participation, is estimated to take a combined time commitment **between 15-45 minutes** to complete.

Your participation in this research is voluntary. You have the right to withdraw at any point during the study, for any reason, and without any prejudice.
If you have questions or concerns regarding this study, please contact the Investigator or Advisor.
Investigator: Barbara Bear
bearb@uwstout.edu

Advisor: Dr. Sylvia Tiala
715-232-5619 office
Tialas@uwstout.edu

If you have any questions, concerns, or reports regarding your rights as a research subject, please contact the IRB Administrator.
IRB ADMINISTRATOR: Elizabeth Buchanan
Office of Research and Sponsored Programs
152 Vocational Rehabilitation Bldg.
UW-Stout, Menomonie, WI 54751
715.232.2477
Buchanane@uwstout.edu

By clicking the button below, you acknowledge that your participation in the study is voluntary, you are 18 years of age, and that you are aware that you may choose to terminate your participation in the study at any time and for any reason.

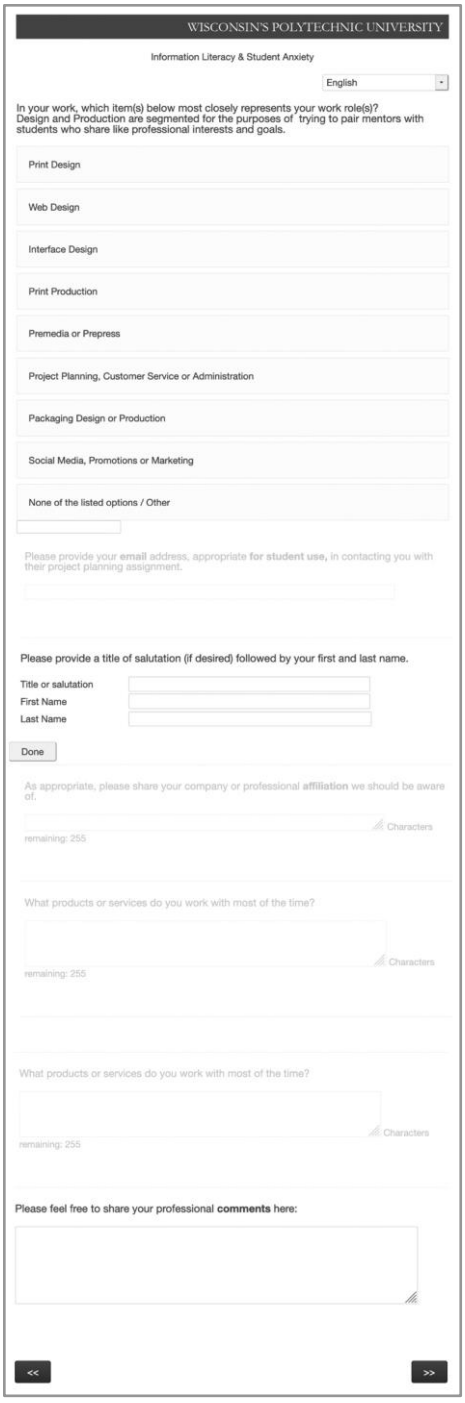
Please note that this survey will be best displayed on a laptop or desktop computer.
Some features may be less compatible for use on a mobile device.

I consent to participate and share my data for research as described above, including the confidential use of survey data for the purpose of research on information literacy and anxiety.

I do not consent, I do not wish to participate

<< >>

D2 ▼



WISCONSIN'S POLYTECHNIC UNIVERSITY

Information Literacy & Student Anxiety

English

In your work, which item(s) below most closely represents your work role(s)?
Design and Production are segmented for the purposes of trying to pair mentors with students who share like professional interests and goals.

Print Design

Web Design

Interface Design

Print Production

Premedia or Prepress

Project Planning, Customer Service or Administration

Packaging Design or Production

Social Media, Promotions or Marketing

None of the listed options / Other

Please provide your **email** address, appropriate **for student use,** in contacting you with their project planning assignment.

Please provide a title of salutation (if desired) followed by your first and last name.

Title or salutation
First Name
Last Name

Done

As appropriate, please share your company or professional **affiliation** we should be aware of.

Characters

remaining: 255

What products or services do you work with most of the time?

Characters

remaining: 255

What products or services do you work with most of the time?

Characters

remaining: 255

Please feel free to share your professional **comments** here:

<< >>

D3

Information Literacy & Student Anxiety

English

Q1.
In your work, which item(s) below most closely represents your work role(s)?
Design and Production are segmented for the purposes of trying to pair mentors with students who share like professional interests and goals.

- Print Design
- Web Design
- Interface Design
- Print Production
- Premedia or Prepress
- Project Planning, Customer Service or Administration
- Packaging Design or Production
- Social Media, Promotions or Marketing
- None of the listed options / Other

Q3. Please provide a title or salutation (if desired) followed by your first and last name.

Title or salutation
First Name
Last Name

Q4. As appropriate, please share your company or professional **affiliation** we should be aware of.

Characters remaining: 255

Q5. What products or services do you work with most of the time?

Characters remaining: 255

Q6. Please feel free to share your professional **comments** here:

← Click for Next>>

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WISCONSIN'S POLYTECHNIC UNIVERSITY

Information Literacy & Student Anxiety

Thank you for participating!

We appreciate your willingness to contribute
to our Graphic Communications students and their learning experience.
Your survey results have been submitted.

Best wishes,
Barb.

https://www.uwstout.edu/gcom

Appendix E

CRAAP Worksheet

CRAAP • *Evaluating Information: Testing Using the CRAAP Questions*

Use Adobe **Acrobat** Pro, Adobe Acrobat Reader or Acrobat DC (free)

*Is this information **good**? When you search, you're going to find lots of information... but is it valid & reliable information? These CRAAP questions help you evaluate information.*

Criteria

Currency: *The timeliness of the information.*

- *When was the information published/posted?* ☐
- *Has the information been updated?* ☐
- *Does your topic require current information; will older sources work?* ☐
- *Are the links functional?* ☐

Relevance: *The importance of the information for your needs.*

- *Does the information relate to your topic or answer your question?* ☐
- *Who is the intended audience?* ☐
- *Is the information at an appropriate level - not too elementary or advanced?* ☐
- *Have you looked at a variety of sources before determining this is the one you will use?* ☐
- *Would you be comfortable citing this source in your research paper?* ☐

Authority: *The source of the information.*

- *Who is the author/publisher/source/sponsor?* ☐
- *What are the author's credentials or organizational affiliations?* ☐
- *Is the author qualified to write on the topic?* ☐
- *Is there contact information, such as a publisher or email address?* ☐
- *What does the URL reveal about the author or source (e.g.: .com .edu .gov .org .net)?* ☐

Accuracy: *The reliability, truthfulness and correctness of the content.*

- *Where does the information come from?* ☐
- *Is the information supported by evidence?* ☐
- *Has the information been reviewed or refereed?* ☐
- *Can you verify any of the information in another source or from personal knowledge?* ☐
- *Does the language or tone seem unbiased and free of emotion?* ☐
- *Are there spelling, grammar or typographical errors?* ☐

Purpose: *The reason the information exists.*

- *What is the purpose of the information?* ☐
- *Is it to inform, teach, sell, entertain or persuade?* ☐
- *Do the authors/sponsors make their intentions or purpose clear?* ☐
- *Is the information fact, opinion or propaganda?* ☐
- *Does the point of view appear objective and impartial?* ☐
- *Are there political, ideological, cultural, religious, institutional or personal biases?* ☐

2019 • **Original worksheet concept adapted from:** *https://library.csuchico.edu/sites/default/files/craap-test.pdf*

Appendix F

Approved Interview Questions

Anxiety Interview Questions Approved IRB 12/2019

Please document **Date, Start Time, End Time** and Interviewee **Name**.

Thank you for participating in the anxiety surveys and especially for agreeing to be interviewed!

- This interview's information is confidential.
- Your name will not be published or associated with your responses in any way.
- You may choose to not answer a question.
- You may stop the interview at any time.

Anxiety is a complex issue. Your input about your experiences of dealing with anxiety are very important because this research aims to gain a greater understanding into Stout Students' anxiety.

To help us get a clearer picture of anxiety, we would like to ask you a few questions. Again, I want to remind you, that you may choose to not answer a question and you may stop the interview at any time.

1) What does **your personal experience with anxiety feel** like?
   Please be as descriptive as you can, feel free to provide a couple of illustrative examples.

   If they did not address these in their first answer, then ask:
   a) How **long have** you experienced anxiety?

   b) Do you know when an **onset** is coming?

2) **How often** and to **what depth** does your anxiety occur?

3) How does anxiety **impact your daily living** as a Stout Student?

4) What **have you found helpful** in dealing with your anxiety?

5) Is there **anything else** you'd like to share that would help us better understand your anxiety?

Bearb@uwstout.edu 12/9/2019

Appendix G

Authored RAAP Assessment Instrument

G1 ▾

Assessing Information Creation as a Process ☼ Your Project Planning & Management Tools			
Points Assigned. ▶ / ▼ Categories & Descriptions.	Beginner (1 point)	Developing (2)	Accomplished (3)
1. Researching - The ability to find useful resources and appropriate information. Often, there is more than one answer and perhaps multiple communication methods. Resources may include other professionals or companies you worked with. Research and locate a professional tool/instrument/document/aide to help you plan and execute your professional work.			
a. Multiple sources are vetted and checked. User seeks out information from multiple authorities such as academic, professional, industry, commercial and governmental institutions. Sources' vetting includes criteria from the CRAAP test.	Limited number of sources. Some effort. Sources have little credibility or examination applied.	At least two vetted sources. Used at least a single search tool. Some criteria from CRAAP test has been applied to distinguish at least one source.	Located & described 4 > distinct sources. All sources pass CRAAP test. Sources are authentic & on-topic. Extra effort is evident.
	◯ 1 pt.	◯ 2 pts.	◯ 3 pts.
b. The search and its found information are relevant to the need. User recognizes that choices in the search process impact outcomes. Seeks out information beyond "pushed" information. Recognizes and identifies information that can be biased.	Relevance of information is weak and not correlated to topic; Potential bias exists; Some effort is evident.	Information has mainly relevant findings. Biased or pushed sources are questioned & checked.	Information specifically targets the topic. Legitimate fit of information with need/question are evident. Effort is evident.
	◯ 1 pt.	◯ 2 pts.	◯ 3 pts.
c. Seeking is not isolated to a single media or format. Ongoing attention given to updating search strategies by updating key search terms and search engines. Recognizes potential in content and can extrapolate its use and concepts.	A single keyword & One or fewer search engines. Limited concepts expressed in searches & findings.	More than one search term used. Concepts show growth & development. More than one search engine used.	3 or > formats of information. 4 or > search terms. Key concepts clearly identified. Information demonstrates building of related concepts.
	◯ 1 pt.	◯ 2 pts.	◯ 3 pts.
d. Reflective and critical consideration given to sources, the exploration, searching and the process of evaluating artifacts. Justification given for the item(s) selected for use. Citations of all sources are included.	Little critical analysis of limited resource materials.	Profiled at least two distinct sources. Both positive & negative aspects described. More than 1 citation.	Critically analyzed 4 or > information sources and related findings. Selection justification included. Effort is evident
	◯ 1 pt.	◯ 2 pts.	◯ 3 pts.

G2 ▾

Assessing Information Creation as a Process ☼ Your Project Planning & Management Tools			
▼ Categories & Descriptions. Points Assigned. ►	Beginner (1 point)	Developing (2)	Accomplished (3)
2. Messaging - Information formatted to convey a message; Media, methodology, clarity, accuracy, discipline appropriate. Identify key points with appropriate & essential messaging (e.g.; client name)			
a. The information's message is thorough as related to the target topic.	General & ambiguous information / message	Some specific information. 6 > items listed for planning. Some descriptions of details.	Clear, concise descriptions of information. 12 > relevant items and messages, listed and their needs described; visuals applied appropriately; appealing.
	◯ 1 pt.	◯ 2 pts.	◯ 3 pts.
b. The message conveys the professional intent. Professional terminology, explanations, illustrations, charts & formats (e.g.; date/time) used; Clearly stated or expressed concepts. "Your" average client would understand the information presented and requested.	Ambiguous terms used. Vague or obscure outcomes, time lines, requirements or deliverables.	Complex terms or concepts include descriptive information; 1> definitive outcome(s) or deliverable(s).	Clear, concrete concepts; precise requests of client & data or resources; conclusion or outcomes are definitive.
	◯ 1 pt.	◯ 2 pts.	◯ 3 pts.
c. Increments, units, terms, times, costs and informational detail is accurate and appropriate to discipline or industry. Increments or units are described or defined clearly. Identify the value of clarifying information with a description or definition (e.g.; Pantone #, dimensions, time frames, hours, days, months, deadlines...).	No definitive units, increments, dates, times, etc. are included.	A single increment or unit is used with a definition, description or reference.	All information is clearly defined. Dates and times are labeled; Increments are described or defined; schedule unit is identified. Significance of clarity described
	◯ 1 pt.	◯ 2 pts.	◯ 3 pts.
d. Visual impact fits with the messaging intent and application. Messaging is free of typographical, grammatical or other errors.	Multiple typographical, grammatical or other errors. Minimal visual care or impact.	1 < errors. Some attention given to visual appeal.	Free of errors. Visually appealing presentation of message. Care is evident.
	◯ 1 pt.	◯ 2 pts.	◯ 3 pts.

G3 ▾

Assessing Information Creation as a Process ☼ Your Project Planning & Management Tools			
Points Assigned. ▶ / ▼ Categories & Descriptions.	Beginner (1 point)	Developing (2)	Accomplished (3)
3. Creation & Revisioning - Author makes edits; Match information products with information needs; Critical evaluation, edits as improvements and part of progressive development.			
a. The researched and found material is useful and utilized in re-creating or revising information. Revision is a process with more than a single edit. Revision content maintains authenticity and appropriate fit.	Minimal revisions to original.	Some addition of content. Bias or irrelevance is not introduced. More than a single edit.	Significant elaboration and enhancement of content with multiple, 3> edits.
	◯ 1 pt.	◯ 2 pts.	◯ 3 pts.
b. Suggested alterations, improvements and changes are appropriate and helpful. Changes improve the tool/aide's usefulness or effectiveness. Multiple resources build legitimate edits in the improvement process. The integrity of the message is preserved.	Some improvement.	Multiple suggestions for improvements. Multiple resources used.	The tool/aide is enhanced with integrity in its changes. The tool/aide is useful and effective with the legitimate changes.
	◯ 1 pt.	◯ 2 pts.	◯ 3 pts.
c. Limitations or issues are described. Critical review enhances clarity of the message. The significance, relevance and application of the tool/aide to your working situation is evident with details of its use as applied to the work scenario.	No limitations or issues are modified or described.	Multiple limitations are improved upon.	Limitations are largely dissolved through significant editing & enhancements apply to your working scenario.
	◯ 1 pt.	◯ 2 pts.	◯ 3 pts.
d. Revisions or enhancements to the messaging formatting is appropriate and matches the professional intent of the topic or target content and context. Changes are a complement to the message.	One or fewer format changes or edits.	Format has multiple enhancements demonstrating strengthening the message and mode through editing.	Author has thoughtfully formatted multiple changes supporting the content and context of the message. Conveying the message has been improved.
	◯ 1 pt.	◯ 2 pts.	◯ 3 pts.

G4 ▾

Assessing Information Creation as a Process ☼ Your Project Planning & Management Tools			
▼ Categories & Descriptions. Points Assigned. ►	Beginner (1 point)	Developing (2)	Accomplished (3)
4. Resulting instrument/artifact/aide - Information as different products, with varying usefulness & formats			
a. The use of the tool/aide is described with details. Features benefiting the user are described.	No feature benefits are described.	Use is described. More than one benefit described.	Multiple uses are described as applied to work scenarios.
	◯ 1 pt.	◯ 2 pts.	◯ 3 pts.
b. The student describes their knowledge gains and/or learning from the process of researching, creating and revising information into a new format or tool.	No learning or knowledge gains are identified.	At least two learning points or knowledge gains are described.	Four or more learning points or knowledge development opportunities are described.
	◯ 1 pt.	◯ 2 pts.	◯ 3 pts.
c. Multiple strategies,methodologies and content pieces assembled to aggregate representation of researched and found information. The outcome is useful and valuable.	No evidence of compiling information from, or combining multiple resources.	At least one other resource used to extract more detail or depth in a message or concept.	More than two strategies for using information are described. 3> sources used in aggregating useful information in the document/ aide.
	◯ 1 pt.	◯ 2 pts.	◯ 3 pts.
d. Other uses or implementations of the information can be imagined and described.	Product is described as finite without opportunity for expansion.	At least one other work scenario is described that takes advantage of found information.	Multiple (3>) applications of concepts, key terminology or processes are described and related to work scenarios.
	◯ 1 pt.	◯ 2 pts.	◯ 3 pts.

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Clear ALL

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Appendix H

Developing a Planning Aide Assignment

Graphic Communications

In this class, we have researched a number of issues related to your future employment. During this process, you have been asked to identify a key role or job you are interested in. You will be using that information. In this assignment, there are four main parts to the project. Each part of the assignment, encourages the use of your resources and knowledge developed in this class.

Part 1:

a. Identify the **job or role** you have selected.

b. Locate a **planning aide** or tool to help you plan and communicate your production projects.
Hint: Use the research tools discussed in our library class session.

Part 2:

Draw upon your background information and resources to **reflect** upon and self-assess your work. **Reformat** the information to fit your professional needs and describe how you revised, enhanced or improved the aide to facilitate its use in your job. Use one or more of your resources from class.

c. Use the **CRAAP** test (worksheet) criteria to test your resource selections.

d. Refer to the Project Management Institutes' (**https://www.pmi.org/**) guides for assistance.

e. Use the worksheet from class: **Planning for Creative Project Management**.

f. Re-view the accompanying reference video assigned in class:
https://www.linkedin.com/learning/running-a-design-business-creative-briefs/what-is-a-creative-brief?u=42313033

g. Refer to the assigned reading, Handoff Checklist (p. 181) from:
Lawler, B. (2006). *The Official Adobe Print Publishing Guide: The Essential Resource for Design, Production, and Prepress.* (Lawler, Ed.) (Second Edi.). Berkeley, CA: Adobe Press, Pearson Education.

h. Refer to the assigned reading in Appendix F (p. 372) from:
Flexographic Technical Association (FTA), *Flexographic Image Reproduction Specifications and Tolerances 5.0*
ISBN: 9780989437448

i. Refer to the Project Management **PMBOK** for planning guidelines, strategies and procedure suggestions.

j. Deliberate on your impressions and conclusions from the experience. Prepare a **reflection** paper on your experience with the planning aide.

k. Use **APA citation** formatting to identify all resources and examples you found and used.
The Purdue Online Writing Lab (OWL) has APA formatting guidelines at:
https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/general_format.html

l. **Self-**assess your work using the attached rubric: **Assessing Information Creation as a Process ☼ Your Project Planning & Management Tools. Submit** the (1) reflection and (2) self-assessment.

Part 3:

m. Contemplate your experiences on the project with a retrospective **presentation** of 5 minutes or less, to the class.

Part 4:

Using the resources, to be assigned **after your presentation**;

n. Write a **request** for professional feedback relative to your selected job or role.

o. Attain feedback.

p. Using the feedback as input, **revise** the planning aide.

q. Write a **reflection** on the feedback and revision experience. Include information on how and why improvements were or were not feasible. Ponder why change was suggested. Use APA formatting for citations.

r. **Post** the final version of your planning aide with the reflection paper on the white board in the classroom for all to view. Describe potential alternatives you or "the advice" considered. (8.5 x 11" paper; use multiple pages stapled together if needed).

Appendix I

Using Feedback for Revisions Assignment

Using Feedback for Revisions

You have done a nice job on researching and developing your planning aide.
Now it is time for a new stage.
As in the workplace, there are often revisions. Revisions help us to improve and gather input from different viewpoints.

I have asked professionals from the graphic communications industry to help us. There will be a random assignment (drawing numbers from a randomizer) to assign students with business professionals who have volunteered to act as mentors. They will make comments, suggestions and provide insights into the planning process and the planning tools they use in the workplace.This is a great opportunity to work with potential employers.

Stage 4:

Using your resources complete the following;

a. Write a professional **request** for your mentor's input. Let them know about the job role or planning aide you have selected to work on feedback relative to your selected job or role.

b. Attain feedback. I will be copying you and your mentor on a letter of request. This will help the mentors know that you are the student I have spoken with them about mentoring. Using the mentor's feedback as input, **revise** your planning aide. See if your can stretch your creative implementations of their suggestions. Please be polite and be sure to respond to your mentor. Let them know you value their time and input!

c. Write a **reflection** on the feedback and revision experience. Include information on how and why improvements were or were not feasible. Ponder why change was suggested. Use APA formatting for citations.

d. **Post** the final version of your planning aide with the reflection paper on the white board in the classroom for all to view. Describe potential alternatives you or "the advice" considered. (8.5 x 11" paper; staple multiple pages as needed).

e. The planning aide's revisions will be graded with the same RAAP rubric that was used to assess your first planning aide.

I can't wait to see what you come up with !