Identification of Perceived 21st Century Graphic Design Skills, Content Knowledge, and Tools Needed in an Effective University-Level Graphic Design Program

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Abstract

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The purpose of this study was to identify 21st century skills, content knowledge, and tools needed in an effective university-level graphic design program. Inconsistencies in the graphic design curriculum, fueled by the increasingly large number of programs and concentrations and the inability to track graduates, were some of the issues that led to a need for this study.

This study was an expansion of a previous 2006 study conducted by Shyang-Yuh Wang, which took place in Kansas and Missouri. This current study used a modified Delphi Technique in which perceptions from university-level graphic design educators and industry professionals from North and South Carolina were collected. Data collection was both qualitative and quantitative in nature and consisted of four rounds of electronic surveying with the fourth round requesting participants to rank the top 20 skills, content knowledge, and tools. The final rounds resulted in a consensus among experts regarding the most desirable 21st century skills, content knowledge, and tools needed in an effective university-level graphic design program. The top five most needed competencies included apply the basic principles of graphic design aesthetics, including composition; perform graphic design creatively; apply the concepts of typography; exhibit interpersonal skills (problem solving, curiosity, motivation, innovation, conceptual thinking, communication); and write clearly, concisely, and correctly. The top five most needed tools as identified by experts included the Adobe Creative Suite, Microsoft Office, sketchbooks, Adobe Dreamweaver, and printers.

Based on findings, it can be concluded that results from Wang's (2006) study are consistent with findings from this current study. In addition, this study revealed that technology trends did not play a significant role in the identification of 21st century skills and content knowledge. To summarize, now that these specific competencies and tools have been uncovered, graphic design programs can evaluate their own curricula to determine if they are effective in terms of what educators and industry professionals indicate are most important.

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Chapter 1: Introduction

Statement of the Problem

In 2010, the United States Department of Labor reported that 279,200 graphic design jobs were present in the United States and projected that the number would rise approximately 13% over the next 10 years. The median salary at that time for a graphic designer was $43,500 per year or $20.92 per hour. A bachelor's degree is typically the minimum educational requirement (United States Department of Labor, n.d., Bureau of Labor Statistics). Measuring the number of university-level graphic design programs as well as the number of graduates in the field, however, is much more difficult to determine.

Davis (2012), a Professor of Graphic Design and Director of Graduate Programs in Graphic Design at North Carolina State University, reported that the National Association of Schools of Art and Design (NASAD) tracks accredited graphic design programs in the United States, but it does not take into account graphic design concentrations in programs such as mass communications, advertising, or media. Therefore, there is no single listing of all available university-level programs in the United States. It is important also to point out that according to the NASAD (2012) 2011-2012 handbook, membership to the accrediting organization is voluntary; therefore, university-level graphic design programs can continue to matriculate graphic design students regardless of whether or not the university is accredited. Davis also stated that it is impossible to determine, from what could possibly be 2,500 national programs, the number of students graduating each year. However, it is indisputable that the number of graduates far outweighs the number of available positions in the field of graphic design (Davis). Currently, as determined through independent data collection by the researcher, there are approximately 23 colleges and universities in North Carolina and 12 in South

Carolina offering bachelor of arts or science degrees in graphic design or concentrations in graphic design. It is important to point out that these degrees and concentrations are offered in varied academic programs such as art, mass communication, and technology. Appendix A provides a more detailed description of how this particular component of the research was conducted, as well as a breakdown of each North and South Carolina university offering graphic design programs.

The large number of university-level graphic design programs and concentrations and the inability to track graduates from those programs has led to inconsistencies in the curriculum (Heller, September 2005). Heller (2005) acknowledged the difficulty in proposing a formula that identifies a solid core curriculum and guidelines for how graphic design should be taught.

Another possible explanation for inconsistencies in curriculum among graphic design programs is a lack of consensus on what graphic design actually is. McCoy (1990a) raised the question "Is graphic design an art, science, business, craft, or language" (p. 1). She pointed out the multiple identities under which graphic design operates. She stated that the field is an "identity crisis," referring to the multiple titles in which graphic design is named, i.e., graphic design, visual art, visual communication (McCoy, p. 1). Appendix A exemplifies this fact because within the states of North and South Carolina, graphic design programs are referenced by various titles.

However, it is feasible to develop a listing of core competencies that all graphic design students should have, whether graduating from a graphic design program or a graphic design concentration. Currently, there is no single listing of core graphic design standards that universities are required to follow; however, significant competencies have been identified. Though NASAD is an accrediting body and provides both broad and

specific standards, it allows each individualized program to determine the curriculum and the extent to which foundation design principles and techniques are addressed (NASAD, 2012). Also, according to Davis (2000), the NASAD reviews the compliance of its accredited members every 10 years.

The broad competencies cited by the NASAD (2012) that graduating graphic design students from accredited design schools are required to meet include:

> The ability to solve communication problems, including the skills of problem identification, research and information gathering, analysis, generation of alternative solutions, prototyping and user testing, and evaluation of outcomes; the ability to describe and respond to the audiences and contexts which communication solutions must address, including recognition of the physical, cognitive, cultural, and social human factors that shape design decisions; the ability to create and develop visual form in response to communication problems, including an understanding of principles of visual organization/composition, information hierarchy, symbolic representation, typography, aesthetics, and the construction of meaningful images; an understanding of tools and technology, including their roles in the creation, reproduction, and distribution of visual messages, relevant tools and technologies include, but are not limited to, drawing, offset printing, photography, and time-based and interactive media (film, video, computer multimedia); an understanding of design history, theory, and criticism from a variety of perspectives, including those of art history, linguistics, communication and information theory, technology, and the social and cultural use of design objects; an understanding of basic business practices, including the ability to organize design projects and to work productively as a member of teams.

(p. 106).

A 2006 study by Wang, conducted in Kansas and Missouri, also identified significant competencies in graphic design as perceived by graphic design educators and industry professionals. The study identified 66 significant competencies and 63 desirable competencies. Participants also identified the 20 most needed competencies for employment in the graphic design industry. The 20 competencies identified by experts include:

> Perform graphic design creatively, apply the principles of graphic design, apply the concepts of problem solving, apply design concepts, apply the techniques of page layout and publishing software, apply the concepts of typography, perform clear and concise verbal and written communications, desire to improve and clarify, apply the basics of graphic design for print production, perform conceptual thinking and ability, apply the techniques of image editing software, and be able to learn and comprehend. (Wang, 2006, p. 68)

Competencies identified as most needed for employment in the graphic design industry include:

> Apply the principles of graphic design, apply the basics of graphic design for print production, apply the techniques of page layout and publishing software, be able to learn and comprehend, apply the basics of graphic design for webpage development, apply the concepts of problem solving, apply the concepts of typography, perform graphic design creatively, perform conceptual thinking and ability, determine the costs associated with graphic design and other creative service, perform clear and concise verbal and written communications, apply design concepts, comprehend the terms used in graphic communications, apply

> the techniques of image editing software, desire to improve and clarify, be able to teach or convey an idea, feeling and belief, apply the basics of graphic design multimedia, apply the basics of photography for graphic design purposes, prepare digital documents, and apply the techniques of color management. (Wang, 2006, p. 70)

This current study determines whether those previously-identified standards and competencies continue to be considered as requirements for current university-level graphic design programs in the specified regions.

Due to the constantly changing technology and consumer preferences, Wang (2006) recommended building upon his research in order to ensure appropriate curriculum is available. It was also recommended that the study be conducted in various geographic regions. Wang (2006) stated, "Additional research and confirmation of these results could eventually impact the supply of well-educated workers, advance numerous careers, and provide students with high-quality education and potential for employment" (Dissertation, p. 81). This study is an expansion of Wang's (2006) study and uses a modified Delphi Technique as the research method.

Delphi Technique

The Delphi Technique, as defined by Yousuf (2007), is a "group process involving an interaction between the researcher and a group of identified experts on a specified topic, usually through a series of questionnaires" (p. 1). Since its development in the 1950s, the Delphi has been used to collect a consensus among groups of individuals regarding future trends or projections. This research method is especially useful when the purpose of the study is to gather judgments or opinions. It is also useful when it is not feasible to gather all necessary data during one meeting (Yousef, 2007).

Thorough examination of the Delphi Technique is included in Chapter 2: Literature Review.

According to Wang (2006), the graphic design emphasis within the area of higher education is fairly new, which could account for the lack of research that has been conducted regarding required competencies and required curricula. On the other hand, Davis (2005) stated that graphic design programs have been in existence on college campuses since the 1950s, which leads one to question why more research has not been done in various areas of graphic design. Ellmers (2006) pointed out that much research has been conducted in design pedagogy but very little has been done in graphic design pedagogy. Logan (2006) also stated that, aside from Schenk's (1991) study on graphic design process, very little domain-based research has been done. She also suggested that few studies have focused on the professional aspects of graphic design. Therefore, there is a significant need to fill the gap and identify perceived competencies and tools needed in a successful 21st century university-level graphic design program.

To summarize, the inability to track graduates, the varied disciplines under which graphic design courses are taught, the inconsistencies in curriculum, the lack of a required graphic design accreditation body, the graphic design *identity crisis*, the lack of required graphic design standards university-level programs are expected to teach, the lack of research, and the changes in consumer preferences and technology have all led to a need for this study. It is important to arrive at a consensus regarding graphic design skills, content knowledge, and tools needed to be successful in a university-level graphic design program in order to adequately prepare students for the industry.

Setting

Based on Wang's (2006) recommendations for expanding his research to other

geographic areas in the United States, the setting for this research study was in North and South Carolina. The researcher requested participation from university-level graphic design educators and industry professionals representing various regions of the states.

Audience

Numerous stakeholders will have an interest in the results of this study. However, the main target audience is that of university-level graphic design educators. The recommendations and suggestions evolving from the study may potentially have an impact on the future development of graphic design curriculum, as well as aid in the identification of weaknesses and/or gaps in the current curriculum. Therefore, graphic design students, who will be on the receiving end of any curriculum decisions, may also be affected by the conclusions of the study.

The desire is for students to obtain a more clear understanding of graphic design and its requirements. Heller (September, 2005) pointed out that many students have very little knowledge about the field of graphic design prior to entering a program other than "it pays better than fine art" (para. 12). It is anticipated that this study may assist students in their selection of which appropriate university-level graphic design program to attend. It is expected that those hiring graphic design students may have an interest in this study as well. Industry professionals have a vested interest in graphic design curricula because courses taught should be aligned with workplace requirements. Otherwise, educators are doing an injustice to students and employers by not preparing students for the graphic design industry.

Purpose of the Study

The purpose of this study was to identify perceived 21st century graphic design skills, content knowledge, and tools needed in a successful university-level graphic

design program.

Research Questions

In order to accurately identify the previously-mentioned areas, the following research questions were developed:

Research Question 1: What are 21st century graphic design skills as perceived by university-level educators and industry professionals?

Research Question 2: What are 21st century graphic design content knowledge areas as perceived by university-level graphic design educators and industry professionals?

Research Question 3: What are 21st century graphic design tools as perceived by university-level graphic design educators and industry professionals?

Research Question 4: How do findings from this current study compare to those of Wang's (2006) study conducted in Kansas and Missouri?

To address these research questions, the following terms must first be defined: graphic design, 21st century skills, disposition, content knowledge, and tools.

Definition of Terms

Graphic design. Numerous definitions of graphic design are available, and the definition has evolved as the industry has changed. According to the American Institute of Graphic Arts (AIGA), an organization founded in 1914, graphic design is defined as:

> A creative process that combines art and technology to communicate ideas. The designer works with a variety of communication tools in order to convey a message from a client to a particular audience. The main tools are image and typography (AIGA, 1993, para. 3).

21st century skills. The National Education Association (NEA, n.d.) defined

21st century skills as "skills students need to succeed in work, school, and life" (para. 5, Statement of Principles: 21st Century Skill and a Reauthorization of NCLB/ESEA). These skills consist of core subjects; 21st century content such as global awareness, civic literacy, and health and wellness awareness; learning and thinking skills, including critical thinking and problem solving, communication skills, creativity and innovation skills, collaboration skills; information and communication technology literacy; and life skills such as leadership, ethics, accountability, adaptability, personal productivity, personal responsibility, people skills, self-direction, and social responsibility (NEA, n.d.). One of the goals of this research was to identify 21st century skills within the context of graphic design.

Disposition. The term disposition is broadly defined by Merriam-Webster as "a prevailing, tendency, mood, or inclination," more specifically "the tendency of something to act in a certain manner under given circumstances" (Merriam-Webster, n.d.). Wang (2006) also referred to disposition as being "soft-skilled competencies," which he described as those skills "related to how people interact with each other. They include: teamwork, interpersonal skills, communication, leadership, creativity, and problem solving" (p. 7). For this current study, all identified *soft skills* are referred to as disposition.

Content knowledge. Davis (2012), in a presentation at the AIGA Educators Conference, categorized content knowledge as consisting of three levels. The first being those things to be familiar with—things seen, heard, or read—which have temporary relevance. The second level of content knowledge is theories, concepts, and skills which are more stable than the first level but are subject to change. The third level is an enduring understanding at the core of the discipline including metacognition, empathy,

holding a perspective, application, interpretation, and explanation. The third level of content knowledge is the most stable level and is the desired level that all graphic design students should achieve (Davis, n.d.).

Tools. Merriam-Webster (n.d.) defined a tool as "something (an instrument or apparatus) used in performing an operation or necessary in the practice of a vocation or profession" or "an element of a computer program (as a graphics application) that activates and controls a particular function." This study identifies those tools that are necessary for graphic designers to complete required tasks.

The following literature review examines current research related to the identification of university-level graphic design competencies. The purpose is to develop a better understanding of the field as well as identify gaps in the research.

Chapter 2: Literature Review

Introduction

As previously noted, the inability to track graduates, the varied disciplines under which graphic design courses are taught, the inconsistencies in curriculum, the lack of a required graphic design accreditation body, the graphic design identity crisis, the lack of required graphic design standards university-level programs are expected to teach, and the changes in consumer preferences and technology have all led to a need for this study. Also, there is a significant need to build upon the limited research that is currently available related to graphic design competencies. The intent of this study is to identify perceived 21st century skills, content knowledge, and tools required for a successful university-level graphic design program.

The purpose of this literature review is to examine the current research that is available related to the field of graphic design in order to gain a better understanding of the discipline and identify gaps in the research. Areas to be addressed include the history of graphic design, current trends, graphic design in higher education, the relationship of academics and the industry, previously-identified skills, content knowledge and tools, and 21st century skills. The literature review will also examine the proposed research method, the Delphi Technique. In order to fully understand the graphic design field, one must first have knowledge of its origin.

History of Graphic Design

In Golec's (2004) article, *The History of Graphic Design and Its Audiences*, it was stated that no consensus has ever been reached regarding what the history of graphic design really is or what it should be. According to Golec, due to the lack of agreement among professionals, "no scholar studying the subject should commit to any one way of

researching, writing, and teaching" (para. 1). Based on Golec's recommendation, this literature review gives a brief overview of graphic design milestones, but predominantly covers the history of graphic design in the educational setting and establishes its place in a university-level graphic design program.

According to Glaser (2008), graphic design history could begin with the creator of identity programs and the coordinator of graphic and industrial design activities, Peter Behrens, or one could consider the invention of graphic design as beginning with the first cave paintings. No matter where one begins, specific milestones cannot be overlooked. Heller (1998) referred to Meggs as the "pioneer of the graphic design history movement" (Golec, 2004, para. 2) and for that reason *Meggs' History of Graphic Design* will be used as the primary reference for identifying such milestones.

Meggs and Purvis (2006) identified writing as the first major invention related to the field of graphic design, beginning with the cave painting at Lascaux circa 15,000-10,000 BCE, which was important because people were able to maintain a record of experiences sequentially. The next major event came with the invention of the alphabets in circa 2000 BCE, which allowed for the visual representation of words and sounds from the human mouth. Meggs and Purvis also acknowledged the Asian contributions in writing, such as Chinese calligraphy circa 1000 CE, which is referred to by Meggs and Purvis as a "purely visual language" (p. 31). The next milestone came with the invention of illuminated manuscripts generated from the use of gold leaf in handwritten books, which gave the appearance of illumination when light reflected off of the gold leaf leading to the use of "visual embellishment" in written books (Meggs & Purvis, p. 42). The arrival of printing and typography in Europe and the German Illustrated Book in 1460 marked the next great milestones of graphic design. Meggs and Purvis stated that

typography ranks very high as one of the most important advances in civilization because it allowed for “economical and multiple production of alphabet communication” (p. 64). Around the year 1450, Johann Gutenberg made it possible for the first typographic book, the Bible, to be printed by creating movable type. The German Illustrated Book marked the beginning of more illustrations contained in literature and its popularity led to the opening of more printing centers.

The Industrial Revolution and Art Noveau were the next major historical events and trends related to the evolution of graphic design. The Industrial Revolution created a shift in the role of typographic communication by generating more fast-paced, rapid printing, such as posters and advertisements, thus meeting the demands of a more industrialized society. The Art Noveau period, which occurred during the late 19th century, was a result of increased communication between Asia and Europe. Meggs and Purvis (2006) stated that the use of space, color, subject matter, and drawing which Asian artists demonstrated to European artists led to a revitalization of graphic design in the western world. The influence of modern art in America, which consisted of cubism, futurism, Dada, and surrealism, directly related to present-day architecture and painting. In the early 20th century came the Modern Movement in America, which was largely protested in its initial stages but later gained in popularity with its use in book and magazine design.

The Age of Information of the 1950s led to the social acceptance and usefulness of graphic design as an important field. The final major milestone to date is that of the Digital Revolution, which forever changed the landscape of the graphic design field, specifically with the development of computer hardware and software and the Internet, which gave designers more control and greater creative capabilities.

Though numerous historical events have impacted the field of graphic design, many graphic design historians believe the Bauhaus Movement is the single-most influential event in the history of graphic design. McCoy (1990a) stated that the "Bauhaus unified art, craft and design in a coherent philosophy and sense of identity" (p. 4). The Bauhaus was the result of the merging of two schools, the Weimar Arts and Crafts School and the Weimar Art Academy. The new school, the Das Staatliche Bauhaus opened in Germany in 1919 (Meggs & Purvis, 2006). The Bauhaus faculty used geometric elements to analyze form and believed that in doing so it would be understandable to everyone. Faculty maintained this humanistic point of view through the use of new media and technology (Lupton & Phillips, 2008). Meggs and Purvis (2006) pointed out that the ideas from the Bauhaus influenced 20th century furniture design, architecture, environmental spaces, and typography. It was through this movement that a "modernist approach to visual education was developed, and the faculty's class-preparation and teaching methods made a major contribution to visual theory" (Meggs & Purvis, p. 318). Each historical event helped to shape the present-day graphic design field and will continue to shape its future. The question then becomes, is the history of graphic design a relevant topic that should be included in a university-level graphic design program? The results of this study identify whether or not graphic design history is considered to be a requirement in the area of content knowledge.

Heller (2005) recognized that one of the biggest voids in graphic design education is that of graphic design history. By understanding the past, Heller believed it will help understand the future. Heller recognized that courses in graphic design history are not a priority in most design programs. History courses are becoming overshadowed by studio and technology courses where application is emphasized. He also pointed out that most

programs do not even offer history courses in graphic design. Heller concluded by recognizing that a graphic design curriculum cannot be completely effective unless it covers the numerous areas relating to graphic design history, such as a historical timeline, ability to apply historical knowledge, ability to discuss and critique historical data, and the ability to integrate historical concepts into modern practice.

Hollis (2005) discussed in his essay the belief that knowledge of the history of graphic design gives students the confidence to think and discuss their work. Hollis also pointed out that history helps graphic designers establish values and address questions related to design style. To conclude, Meggs was quoted in an interview with Heller as stating, "I've always believed the purpose of teaching design history is to strengthen studio education and professional practice" (Golec, 2004, para. 2). In order to gain a better understanding of the professional practice of graphic design, it is important to have knowledge of the field in general.

Overview of Graphic Design Field

The Occupational Outlook Handbook produced by the United States Bureau of Labor Statistics (n.d.) stated:

> Graphic designers create visual concepts, by hand or using computer software, to communicate ideas that inspire, inform, or captivate consumers. They help make an organization recognizable by selecting color, images, or logo designs that represent a particular idea or identity to be used in advertising and promotions. (para. 1)

Most graphic designers are employed by specialized design services, publishing, advertising, public relations, or other related services. It was reported in 2010 that approximately 29% of graphic designers were self-employed. Job requirements usually

include a bachelor's degree as well as a creative, innovative portfolio showcasing the individual's best works.

TopTenReviews.com reported that the highest paid graphic designers live in San Francisco and San Jose, California. The largest concentration of designers live in New York City, New York. Currently 200,000 individuals work in the field with 124,800 jobs expected to open within the next 10 years. The job outlook for graphic designers is promising; however, senior design positions are highly competitive. It could be argued, as suggested by Meredith Davis (2012), that the number of graduates far outweighs available positions, including those classified as entry-level. As a result, additional pressures are placed on university-level graphic design programs by students and the industry to produce highly qualified graduates that can be competitive among the other thousands seeking employment in the field. University-level programs are also feeling the pressure to stay current on all of the latest trends relevant to graphic design.

Current Trends

Fiell and Fiell (2002) profoundly addressed the state of graphic design today as being one where pixels had replaced print, and software has become a substitute for the pen and paper. This statement describes the world of graphic design as we now know it, one where technology has become the standard tool for completing relatively all tasks. In no other discipline has there been such a dramatic shift where "computer technology has had such a transforming impact" (Fiell & Fiell, Introduction). The Internet is one component of technology that has had a tremendous impact on the field. Since its inclusion, collaboration among designers has increased as well as greater print capabilities (Fiell & Fiell). Fiell and Fiell also reported that a shift in audience expectations has forced graphic designers to develop more thought-provoking, visually

captivating designs. Graphic design is trending toward digital technologies where the traditional requirements of graduating graphic design students is not as clear-cut. Graphic design is beginning to overlap into other disciplines, forcing university-level design programs to adjust, add to, and/or realign the curriculum.

Fiell and Fiell (2002) also mentioned current concerns and themes mentioned by graphic designers working in the industry today, which are:

> Blurring of boundaries between disciplines; the importance of content; the impact of advanced technology; the desire for emotional connections; the creative constraints imposed by commercial software; the distrust of commercialism; the increasing quantity, complexity, and acceleration of information; the need for simplification; and the necessity for ethical relevance. (Introduction)

The authors concluded with a recommendation for all graphic designers—the "need to acknowledge that they have a special responsibility not just to the needs of the clients, but also to those of society as a whole" (Fiell & Fiell, Introduction). It is then up to graphic design educators and university-level programs to ensure that students have an understanding of those responsibilities.

Graphic Design in Higher Education

Swanson (2004) stated that the Bauhaus provided the framework for many modern graphic design programs. In the United States, László Moholy-Nagy established the New Bauhaus in 1937 in Chicago, which is now the Institute of Design at the Illinois Institute of Technology. He carried on one of the original ideas from the Bauhaus Movement, which was to bring in experts from other disciplines, thus fostering the liberal arts education.

In her essay entitled *Raising the Bar for Higher Education,* Davis (2005) stated

that in previous years expectations regarding graphic design education were relatively clear, but over the last few decades conditions have changed (Heller, 2005). Davis pointed out that graphic design professors used to educate graphic design students in problem solving in "principles and visual composition, technical understanding of typesetting and printing, and presentation skills" (Heller, 2005, p. 14). The rapid development of technology, along with economic and social factors, has forced educators to reevaluate what is taught in the university-level classroom. Davis went on to state that most undergraduate graphic design programs have the same mission, which is to "produce fully-prepared, entry-level design professional" (Heller, 2005, p. 14). Davis mentioned that due to ease of accessibility of various graphic design software programs, quality design is now based on whatever individuals deem as satisfactory; therefore, it no longer suffices to educate students in solely eye-pleasing design and production. As the debate continues regarding what is to be taught in a successful university-level graphic design program, the question addressing the place of liberal arts in graphic design also has been raised.

Baseman (2005) mentioned in his writing *Liberal Arts Is Old News* that during the 2003 AIGA National Design Conference, Jessica Helfand raised the question "Where does this come from—this notion that thinking and making are separate acts? That graphic design must be inherently anti-intellectual because it is a creative enterprise" (p. 19). Baseman recommended that though form-making is a major component of the design curriculum, conceptual thinking, idea generation, and communication must also be addressed (Heller, 2005). Baseman also emphasized that graphic designers must be somewhat knowledgeable in other disciplines, and that a liberal arts education could provide this by aiding students in acquiring communication and research skills (Heller,

2005). Baseman mentioned that writing also should be a major component in the education of the graphic design student. Though computers and other technology tools have drastically changed the face of the practice in general, the "basic educational issues are the same" (Heller, 2005, p. 20). Baseman concluded by encouraging the inclusion of the liberal arts into the graphic design curriculum so that design students would also become thinkers, developing into leaders of the graphic design profession in the future (Heller, 2005).

Swanson (2004) also encouraged graphic design education as a liberal art. He suggested that the lack of specificity in graphic design allows it to be connected to various other disciplines. He argued that university-level graphic design educators should be teaching the "basics of form and communication, but are, by teaching what they were taught, teaching the graphic designers of the twenty-first century how to be mid-twentieth century graphic designers" (Swanson, p. 8). Due to this fact, Swanson believed that the greatest skills educators can teach students are how to be adaptable. Swanson believed that design is an "integrative field" that should include communication, expression, interaction, and cognition (p. 9). He cautioned, however, that graphic design's lack of specific subject matter makes it difficult to identify a model for its inclusion into the liberal arts. The most challenging issue, then, is to "find a balance between skills training and a general understanding that will benefit students, the field of graphic design, and working professionals" (Swanson, p. 11).

In Butler's 1995 study entitled *A Process for Effective Graphic Design Curriculum Development*, the author sought to identify those factors leading to an effective graphic design curriculum development, specifically questions related to a definition of graphic design, meeting the needs of graphic design students and employers,

identifying effective graphic design curriculum components, the role of the graphic design industry in education, and identifying schools that are providing an effective graphic design education to students. The descriptive research method was used as the methodology, and the primary means of data collection was through nine in-depth interviews conducted with leading experts in the field of graphic design.

At the conclusion of the study, Butler (1995) developed a definition of graphic design through what he termed as the "lowest common denominator synthesis that the graphic design professional community could live with" (p. 78). Butler stated that in order for a graphic design project and the process for completing the piece to be qualified as graphic design, all components of the definition must be met. Butler's definition was as follows:

> Graphic design is the conceptualization, production, and communication of a visual message. It involves problem identification, problem solving, and the utilization of basic art, and/or craft, and/or technological skill. It includes the designer, the client, and the message recipient. The graphic design product is producible and reproducible practically and competitively within the current production environment. (p.79)

Butler (1995) also concluded that, for the most part, graphic design programs were not currently successful in meeting the needs of students and graphic design employers. One factor is that there are simply too many graphic design programs. Another reason is that graphic design educators are not staying up to date on cultural changes. Lastly, graphic design programs are not successfully meeting the needs of students because of a lack of qualified teaching faculty as well as a lack of degree requirements for students to receive an adequate education.

Butler's (1995) study also identified several categories that were identified as essential to an effective graphic design education. Those categories included instruction in graphic design fundamentals, problem solving, technology, communication, liberal arts, and business. The findings regarding the relationship of the graphic design industry and education ranged from communication to partnerships. Lastly, when asked to identify current effective graphic design programs, many experts stated that they were not qualified to answer that question; however, most did respond. Some identified programs including North Carolina State University, Rhode Island School of Design, Virginia Commonwealth University, University of Cincinnati, and California Institute of Art and Design.

In McCoy's (1990b) article entitled *Professional Design Education: An Opinion and a Proposal,* it was suggested that the objective for most undergraduate design programs was to teach skills-based courses to prepare students for entry-level employment. She stated that though the industry desires students who possess these skills-based competencies, it is the duty of the educator to impart more long-term skills required for students to be successful in life. McCoy referenced an alarming fact that many graduates from 4-year design programs cannot effectively read and write. She proposed a new, more structured model for design education similar to those of pre-med and pre-law. This model would encompass educating students in a liberal arts and sciences environment with courses focusing on art and design history and design ethics and theory with some skills-based design experiences. McCoy proposed that students could then go on to attend a 3- to 4-year graduate program where more real-world skills would be acquired, such as internships. The model also suggested doctoral-level study in which design research and experimentation would be emphasized. McCoy's view can be

summed up in her statement: “We must do more than train; we must educate” (p. 21). In order to maintain a balance regarding curriculum within the graphic design field, it is important for educators and industry professionals to work together.

Relationship of Academics and Industry

The relationship of higher education and the business industry has long been in existence in all disciplines, though that relationship has been complicated (Latham, 2012). Many agree that business leaders have been instrumental in education on many levels, including providing internships, providing educational programs, teaching courses, and providing financial support. Conversely, higher education has provided the industry with professional training of employees as well as basic and applied research. However, both sectors agree that many students are entering the workforce ill-prepared and lacking adequate knowledge and skills to be productive in the industry. The underachievement of students in the workforce has created a shaky relationship among educators and industry leaders (Lapin, 1982).

In the graphic design industry specifically, education and business have formed relationships through such things as design workshops, design competitions, student and faculty on-site opportunities, employment and/or internship opportunities, professional conferences and organizations, and advisory boards (Roberts, 2007). New models for encouraging collaboration among education and business are currently being developed. Some suggestions for education include bringing the real world into the classroom or vice versa, requiring students to study internationally, exploring research opportunities, maintaining a connection to the industry, and encouraging other academic communities to become involved. Recommendations for the industry include creating more opportunities for educators and students, building lasting relationships with students, and

re-examining funding for education. Suggestions for the two sectors together include expanding the collaboration, clarifying of the role of design, expanding diversity, creating rewards that encourage collaboration, and collaborating among corporate-sponsored and interdisciplinary courses (Roberts, 2007).

Levy (1990) found in his article *Design Education: A Time to Reflect* that collaboration among universities and industry is more widespread than ever. However, Levy suggested that universities should not seek legitimacy from the design industry. He cited four points as to why this should be the case. The first reason being that learning may be compromised if industry views have too much influence. Also, too much involvement from the industry may force a shift in teaching more skills-based knowledge that eventually could be acquired in the industry, rather than fundamental design concepts. His third point for excluding industry involvement from design education was that it is not the responsibility of a university to serve the interests of specific groups, and failure to do so could result in a university losing its niche. Finally, Levy noted that boundaries set in place by the industry could restrict the ability of education to evolve and maintain relevancy.

Levy (1990) concluded by suggesting several minimum requirements needed for design education, set apart from the design industry, to have respect and dignity in a scientific community. Levy stated that an individual graduating from the type of program he proposed "would be a carrier of value constructs, ethical ideals, technical and scientific know-how, social and political concerns, economic imperatives, environmental awareness, historical consciousness, and cultural responsibility" (p. 52). He stated that graduates who do not possess some of the suggested qualities would not be considered valuable to society or the industry. In order to appreciate the collaborative efforts that

have already taken place among graphic design educators and industry professionals, examination of previously identified competencies is needed.

Previously Identified Skills, Content Knowledge, and Tools

In Wang's (2006) study entitled *Identification of the Significant Competencies in Graphic Design,* the author sought to gain a consensus from experts regarding the necessary competencies for the graphic design field. The experts in the study included graphic design educators and industry professionals. Wang utilized the Delphi Technique as the primary research method and administered four separate questionnaires to be completed by the experts; each questionnaire building upon answers received from the previous.

Wang's (2006) study concluded that graphic design experts perceived several competencies as being significant, thus requiring their inclusion into the graphic design curriculum. The study found that six of the 12 significant competencies were design-oriented. According to Wang, design-oriented competencies are those related to graphic design principles, page layout, typography, webpage design, and creativity. Soft skills-related competencies, defined by Wang as those competencies relating to how individuals work with each other, ranked in the top 12 out of 20 most desirable competencies. The three least significant competencies identified included photography skills, digital document preparation, and color management, which are categorized by Wang as technical- and computer-related competencies. Based on his findings, Wang concluded that design-oriented competencies are the most significant for employment and should be included in the graphic design curriculum. Soft skills-related competencies are only slightly less desirable and should be considered as essential for those in the graphic design industry. Additionally, the study identified technical- and computer-related

competencies as defined by Wang as those skills learned by hands-on instruction and skills related to the use of computer software to produce art work as being among the lowest scoring significant competencies.

As previously noted in Chapter 1, NASAD has identified broad competencies which design students must attain; however, in conjunction with AIGA, they also have more specifically defined competencies for more specialized graphic design programs. Those competencies include:

> For graphic design programs with a special emphasis in advertising, design experiences should include the application of communication theory, planning of campaigns, audience/user evaluation, market testing, branding, art direction, and copyrighting, as well as the formal and technical aspects of design and production; for graphic design programs with a special emphasis in design planning and strategy, design experiences should include working in interdisciplinary teams, systems-level analysis and problem solving, writing for business, and the application of management, communication, and information theories; for graphic design programs with a special emphasis in time-based or interactive media, design experiences should include storyboarding, computer scripting, sound-editing, and issues related to interface design, as well as the formal and technical aspects of design and production for digital media. (NASAD, 2012, p. 106)

Davis (2000), in her article *A Curriculum Statement: Designing Experiments, Not Objects,* pointed out that the NASAD reviews compliance of its members every 10 years based on general standards. She acknowledged that graphic design standards specifically occupy "one 5½ x 8 inch" page in the handbook (Davis, p. 1). Due to this lack of

standards, AIGA became affiliated with NASAD to rewrite the standards. As a result, the following learning objectives for a curriculum in experience design were developed. Those learning objectives included:

> Students will understand the difference between designing objects and designing experiences; students will analyze and synthesize the relevant aspects of meaningful human interactions in the networked economy; students will explore the technological mediation of experience in terms of representing/simulating, visualizing/transforming, structuring and positioning information/managing complexity, responding/clarifying/providing feedback, validating/empowering; students will master the tools used to create interactive experiences including visual, audio, temporal and kinesthetic elements and principle of design, language structures, technological affordances. (Davis, pp. 4-5)

Davis also pointed out that graphic design competencies cannot be based on technology or software, which are continuously changing. Davis stated that "Instead, they must focus on those aspects of design that will transcend any given invention and that are fundamental to communication problem solving" (p. 1). The standards and competencies presented in the preceding overviews exemplify the inconsistencies present among educators, industry professionals, and design-affiliated organizations.

The research questions in this current study attempt to reach a consensus among educators and industry professionals regarding 21st century skills, content knowledge, and tools needed in an effective university-level graphic design program. Again, the research questions are as follows:

> **Research Question 1:** What are 21st century graphic design skills as perceived by university-level educators and industry professionals?

Research Question 2: What are 21st century graphic design content knowledge areas as perceived by university-level graphic design educators and industry professionals?

Research Question 3: What are 21st century graphic design tools as perceived by university-level graphic design educators and industry professionals?

Research Question 4: How do findings from this current study compare to those of Wang's (2006) study conducted in Kansas and Missouri?

Since the research questions emphasize the 21st century, it is important to gain a more clear understanding of 21st century concepts.

21st Century Skills

A recent study conducted by AIGA identified 13 competencies that would be required of the 2015 graphic designer. The study utilized an online survey as the primary data collection method. Identified competencies are:

> Ability to create and develop visual response to communication problems, including understanding of hierarchy, typography, aesthetics, composition and construction of meaningful images; ability to solve communication problems including identifying the problem, researching, analysis, solution generating, prototyping, user testing and outcome evaluation; broad understanding of issues related to the cognitive, social, cultural, technological and economic contexts for design; ability to respond to audience contexts recognized physical, cognitive, cultural, and social human factors that shape design decisions; understanding of and ability to utilize tools and technology; ability to be flexible, nimble and dynamic in practice; management and communication skills necessary to function productively in large interdisciplinary teams and "flat" organizational structures;

> understanding of how systems behave and aspects that contribute to sustainable products, strategies and practices; ability to construct verbal arguments for solutions that address diverse users/audiences, lifespan issues, and business/organizational operations; ability to work in a global environment with understanding of cultural preservation; ability to collaborate productively in large interdisciplinary teams; understanding of ethics in practice; understanding of nested items including cause and effect, ability to develop project evaluation criteria that account for audience and context. (AIGA, n.d.b, para. 2)

It is important to note that the AIGA has recognized that it may not be feasible for all competencies to be acquired by graphic designers, but the listing serves as a range of desired competencies for the future. AIGA (n.d.b) also pointed out that this listing exemplifies the challenge faced by university-level graphic design programs in meeting the needs and demands of the future. This study identifies the possible future trends of the field, yet there is still a need to identify current significant 21st century skills and disposition, content knowledge, and tools required in today's university-level graphic design programs.

Problem solving is one 21st century skill mentioned by both the NEA and AIGA. Lasky (2005), in her essay entitled *The Problem with Problem Solving*, argued that the design process itself is analytical. She stated that the constraints and rules set forth by the very nature of the field require problem-solving skills. When educators assign classroom problems, students are receiving training for real-world situations that will require those skills, such as working within the constraints of a budget. Lasky cautioned designers not to define a "problem too broadly or narrowly and solving it too hastily" (p. 146). This is one challenge that graphic design educators are facing: assigning students projects which

cultivate real problem solving, not problem solving in the context of fitting text on a page.

Technology literacy is another requirement of the 21st century student. Lupton and Phillips (2008) recognized the convenience and freedom new technologies provide, but they cautioned that these technologies are interfering with student creativity and experimentation. They pointed out the tendency of the design student to go directly to the computer, impairing deeper thinking and research. The second challenge, then, is for educators to find a means for incorporating technology while fostering critical thinking and conceptual analysis. However, as mentioned previously, Fiell and Fiell (2002) recognized the tremendous advances technology has provided to the graphic design industry. The ability to collaborate with other designers as well as the innovative design solutions made possible by digital technology cannot be dismissed. The graphic design field will continue to evolve as technology evolves, and the two will forever be linked (Fiell & Fiell).

Critical-thinking skills are another requirement of the 21st century learner. Ciampa (2010) discussed the ways in which graphic design and critical thinking merge. Those examples include collaboration; decision making; and identifying client needs, the problem, and the audience. She went on to question why critical thinking is not then a larger focus in the graphic design curriculum, and attributed this problem to a lack of standardization from program to program. Recommendations for fostering design creativity and critical thinking include graphic design instructors coming together and forming a consensus regarding the integration of the two. Real-world experiences would allow students to take responsibility for their own learning and also be exposed to the fact that learning takes place outside of the classroom. The critique process is also a means for encouraging critical-thinking skills. Student critiques provide a means for students to

give feedback to each other regarding their work. Ciampa cited that the problem with critiques is that they are often "surface-related, meaning that it refers only to visual elements and technical design details" (p. 3). She recommended that educators encourage deeper thinking and questioning during critiques. The essay concludes with the author expressing that the most valuable ability graphic design educators can impart to students is the ability to become motivated, life-long thinkers and learners.

In order to reach a consensus among experts regarding the previously discussed 21st century skills within the field of graphic design, it was important to select a research method conducive to establishing such a consensus. For that reason, the Delphi research method was selected.

Delphi Technique

The Delphi method of research was first introduced in the 1950s by the Rand Corporation in California (Goodman, 1987). The corporation was involved in a U.S. Air Force project in which the aim was to apply expert opinion from a Soviet strategic planner in order to predict the effects and policy implications of an atomic bombing in America (Goodman, 1987; Rowe & Wright, 1999). The name of the technique was derived from the Greek god Apollo Pythios, master of Delphi, known for his ability to predict the future (Goodman, 1987). Dalkey and Helmer are recognized as being "pioneers of Delphi research" (Andrews & Allen, 2002, p. 2). The two were hired by the Rand Corporation and described the technique as the "most reliable consensus of opinion of a group of experts" (Andrews & Allen, 2002, p. 2). The Delphi method is most often used in the health care, education, engineering, transportation, and information system industries (Rowe & Wright, 1999).

Yousuf (2007) discussed the development of the Delphi according to Rieger's

five stages. The first stage, secrecy and obscurity, lasted from the 1950s to the 1960s. During this time the military had classified the technique in order to protect the sensitivity of a specific problem. Stage two, novelty, was used as a forecasting tool by corporations and lasted from the mid to late 1960s. Popularity, the third stage, describes the increased use and interest in the Delphi Technique as a research method. This stage occurred during the 1960s through the mid-1970s and numerous articles, reports, papers, and dissertations addressed and/or utilized the Delphi. The fourth stage began in 1975 and was referenced as the scrutiny stage. During this time, Sackman (1975) criticized the method for its inability to "measure up to the psychometric standards of the American Psychological Association" and the "indiscriminate execution of Delphi studies" (Yousuf, p. 81). The final stage, continuity, is the stage of development that the Delphi is currently experiencing. Rieger noted its increased use in dissertations and reported it had been used 441 times between 1980 and 1984 (Yousuf).

As mentioned earlier, the Delphi Technique can be useful in educational research. More specifically, Judd (1972), in his article *Use of Delphi Methods in Higher Education,* described the concentrated areas in which the Delphi can be employed. Some of those areas include goals and objectives in education, curriculum planning and development, and evaluation. He noted two university-level studies in which the Delphi method had been used to identify goals and objectives. The first was conducted at the University of Virginia and included over 400 participants ranging from faculty and students from the School of Education; university leaders; off-campus educators teaching within the state; influential members of society in Virginia not involved in education; influential political leaders; influential newspaper, labor, and business individuals; and other nationally-recognized educators. The questionnaire distributed to the participants asked the question

"In the next decade the School of Education at the University of Virginia should concentrate its energies and resources on" (Judd, p. 176).

The second university-level study to be conducted was the Governors State University Needs Assessment Survey. The study was conducted by Norton and targeted participation from 1,185 individuals; however, the response rate was 27.4%, resulting in the lowest response rate in any study in higher education utilizing the Delphi Technique (Judd, 1972).

Judd (1972) mentioned a third study conducted in the area of curriculum development. The study took place in the late 1960s. The goal was to provide administration with a consensus of suggestions among faculty regarding the desired direction, curriculum changes, and organizational changes within the university. The conclusions of the study resulted in substantial changes. A study conducted at East Tennessee State University utilized the Delphi for teacher evaluations. The study asked university educators to evaluate a list of 19 teacher characteristics. Based on feedback from respondents, the characteristics were placed in order based on importance related to successful university-level teaching (Judd). Though the methodology has been successfully used in numerous research studies, it has also been criticized.

Delphi Critique

Goodman (1987) noted that numerous studies do not adhere to the basic principles or rigorous analyses of the traditional Delphi Technique, thus results may "appear more dramatic than may be the case" (p. 731). However, Lunkenheimer (2002) recognized that those things requiring the most care when using the Delphi include the selection of respondents who are experts in the field, the number of participants, the survey instrument, and the number of required rounds. A second criticism presented by

Goodman (1987) involved the selection of so-called *experts*. She argued that the use of experts, rather than those deemed as non-experts, required justification and that the question of how to classify one as an expert is generally unresolved. Conversely, Stitt-Gohdes and Crews (2004) referenced a study by Gibbs, Graves, and Bernas (2001) in which criteria were established for determining how to select participants. Those criteria included participants who had published articles related to the study in the last 5 years, participants who had taught courses in the area of interest, or participants who were employed in the area of interest. This study utilized participants who are currently teaching full-time in university-level graphic design programs and industry experts currently employed in the field of graphic design.

Hsu and Sanford (2007) also addressed some criticisms of the Delphi method. The first dealing with the large consumption of time required. The rounds of questionnaires used in the Delphi can slow the data gathering process, and the analysis of data can substantially slow the process as several days or weeks may pass in between the rounds. However, Hsu and Sanford went on to state that, though time consuming, the iteration of feedback provided through the rounds of questionnaires improves the accuracy of results. One other concern addressed by Hsu and Sanford (2007) dealt with the assumption that participants are equal with regards to knowledge and experience, which may not necessarily be the case. They went on to caution that this may be an issue especially in disciplines with a prevalent technology emphasis. Hsu and Sanford cautioned that the outcome of this potential weakness is that general statements may be identified rather than an "in-depth exposition of the topic" (p. 5). Regardless of its criticisms, the Delphi Technique continues to provide those "interested in engaging in research, evaluation, fact-finding, issue exploration, or discovering what is actually

known or not known about a specific topic a flexible and adaptable tool to gather and analyze the needed data" (Hsu & Sandford, p. 5).

The following chapter discusses in detail the methodology used to conduct the study. Proposed participants, research method, instrumentation, procedures, and limitations are identified.

Chapter 3: Methodology

Introduction

As previously discussed, numerous reasons have led to a need for this research. As the progression into the 21st century continues, it is important to ensure that university-level graphic design programs are adequately preparing graduates for the industry. Currently, there are no standards that all graphic design programs are required to meet, which has led to inconsistencies in several areas. Some graduating students are prepared for the industry while some are not. The intent of this study is to identify 21st century skills, content knowledge, and tools needed for a successful university-level graphic design program. Though, as previously mentioned, standards and competencies have been identified, reevaluation is important for ensuring that those standards and competencies are up-to-date and consistent across various geographic regions throughout the United States.

Participants

Stitt-Gohdes and Crews (2004) discussed in their article *The Delphi Technique: A Research Strategy for Career and Technical Education* the need for careful selection of panel experts to be used in a Delphi study. As previously mentioned, the authors referenced a 2001 study by Gibbs et al. (2001) in which criteria were established for determining how to select participants. Those criteria, again, included participants who had published articles related to the study in the last 5 years, participants who had taught courses in the area of interest, or participants who were employed in the area of interest. Participant response rates are one of the difficulties in utilizing the Delphi Technique. Stitt-Gohdes and Crews recommended that in order to encourage participation throughout the duration of the study, experts need to understand the goal of the study and also feel

that their participation is making a valuable contribution to the results of the study. The authors also stated that if individuals are invited directly to participate in the study, rather than receiving a generic invitation, the likelihood of their participation is stronger. Lunkenheimer (2002) also pointed out that the use of a modified Delphi in which participants are given a list of competencies, rather than being asked to develop the list, leads to a lower dropout rate. This study utilized a previously-developed questionnaire which provided participants with a list of competencies rather than prompting them to create one.

Hasson, Keeney, and McKenna (2000) acknowledged the current debate regarding how to classify participants as experts. The idea that one group can represent expert opinion has been largely criticized and would be considered a disadvantage to utilizing the Delphi Technique. However, the selection of participants who are committed to the issue and have a vested interest in the study's outcome will ensure that respondents are likely to become not only actively involved but also engaged in the process. Hasson et al. (2000) pointed out that use of the Delphi can be exposed to both researcher and subject bias; however, this may also be viewed as an advantage because the technique directs participants to an eventual consensus.

The issue of sample size is an important component to the Delphi process. Some studies have used as many as 60 participants, while others have used as few as 15. However, it is important to note that the larger the sample size, the more data to be generated. When selecting participants, the Delphi does not use random sampling as many other methods do. Experts are selected based on their knowledge and experience, referred to as purposive or purposeful sampling. The expectation of this type of sampling assumes that the researcher has enough knowledge about the subject that participants can

be handpicked (Hasson et al., 2000).

Based on the previous recommendations, participants were selected based on purposeful sampling. Creswell (2012) described purposeful sampling as a qualitative research method where individuals are intentionally selected. As mentioned earlier, participants included university-level graphic design educators from North and South Carolina as well as graphic design industry professionals from the aforementioned states. The researcher invited participants from each of the 23 university programs in North Carolina and the 12 university programs in South Carolina. Participants from the universities were expected to have full-time teaching appointments in the area of graphic design. Requests for participation were sent to all full-time faculty members in graphic design at each institution. It was anticipated that sufficient voluntary participation would be achieved to adequately conduct the study. The intent was to include participation from a total of 34 participants representing the field of graphic design education. However, the actual number of educators participating in the study was 15.

The selection of industry professionals varied slightly in its approach. In order to select the most qualified individuals, the researcher used snowball sampling; however, no participants recommended any additional potential participants. The researcher intended to contact board members from the North and South Carolina chapters of AIGA to request participation and recommendations of appropriate industry experts. The chapter to be contacted from North Carolina was AIGA Charlotte and the chapter from South Carolina was AIGA South Carolina. This organization was selected because it is the largest and oldest professional graphic design organization (AIGA, n.d.a). By using this approach, it was expected that adequate representation from various regions of each state would be accomplished. It was anticipated that participation from approximately 30

participants, 15 from each state, would be achieved. Participating university educators were also asked to make recommendations of appropriate industry professionals; however, again, no additional participants were identified using this sampling method.

Again, as with educator participation, the actual number of participants varied slightly depending on response rates from industry professionals. A total of 25 industry professionals agreed to participate in this study. As recommended by Stitts-Gohdes and Crews (2004), each participant, educator, and industry professional, was directly contacted via personalized email invitation. The invitation included an overview of the study, including the need for participants to commit to ongoing participation, as well as the purpose and research questions to be answered. This invitation also acknowledged that final results of the study would be shared with those who participated. Appendix B is a copy of the letter sent to experts requesting their permission to participate in the study. Appendix C is a copy of the informed consent form providing participants with the benefits and potential risks of the study.

In the event that the desired participation of 64 respondents did not occur, the minimum acceptable number of participants was 30. If less than 30 respondents were willing to participate in the study, data from those respondents would be collected; however, it would need to be supplemented by other means of data collection, such as focus group interviewing and/or site visits.

Research Method

The Delphi can be described as a qualitative research method to be used when research studies are opinion-based, the research environment is emotional, participants are not centrally located, and/or more reliable results would be achieved if participants did not meet face-to-face (Andrews & Allen, 2002). However, Bourgeouis, Pugmire,

Stevenson, Swanson, and Swanson (n.d.) stated that the Delphi uses a combination of qualitative and quantitative processes. As discussed by Hasson et al. (2000), the first-round questionnaire of the Delphi can collect qualitative comments which are then redistributed to participants as quantitative data in round two of the questionnaire. Stitt-Gohdes and Crews (2004) added that the Delphi is useful if the research problem would benefit "from subjective judgments on a collective basis" rather than "analytical techniques" (p. 1). The two main arguments for its use are anonymity of participants and central tendency. The process requires cyclical assessment in which "there is a tendency for opinions to move toward a central point of consensus" (Andrews & Allen, 2002, p. 3).

Andrews and Allen (2002) characterized the traditional process in terms of seven steps. The first step is to send a questionnaire to a group of selected participants. Step two is to receive responses from the selected participants. The third step involves the creation of a second questionnaire based on results from the first and includes space for comments on each item as well as a section to include new ideas related to the issue being addressed. Step four is to, again, receive responses from the participants. Step five is basically a repetition of step three, a summary of the input from the second questionnaire. The sixth step describes the continuation of the questioning until saturation occurs and no new ideas are generated and no further strengths and weaknesses are identified. The final step, step seven, is resolution, which is based on results from the final questionnaire. Andrews and Allen stated that if one or several solid ideas are generated, then the process concludes; however, if this does not occur, further assessment is needed.

Recommendations for further assessment include, but are not limited to, the development of a rating scale questionnaire in which participants rank ideas based on

importance. A second option is the creation of a questionnaire in which participants are asked to select and identify the top four or five ideas that are most important. The third option is a modified resolution technique in which participants rank each idea on a three-point scale. All items with a value greater or equal to two are dropped and the process continues until results are stabilized, which may take up to four cycles. It should be noted, however, that according to Wang (2006) there is no rule regarding how many rounds of questioning should be used. In addition to the traditional, several modifications to the Delphi have been utilized in various research studies.

Modifications to the Delphi Technique

Riggs (1983) addressed the many extensions and modifications of the Delphi. The System for Event Evaluation and Review (SEER) allows researchers to utilize a questionnaire containing forecasts previously developed by a group of experts through a series of interviews. Riggs pointed out that this modification shortens the length of the study by not requiring as many rounds of questioning. Wang's (2006) study utilized this type of modification in that the first-round questionnaire was developed based on interviews with three experts as well as a review of literature. Stahl and Stahl (1991) recommended developing the initial round one questionnaire based on a review of literature. Lunkenheimer (2002) also developed his round one questionnaire exclusively based on a review of literature. One other modification recognized by Riggs is referred to as cross-impact analysis. Riggs stated that this modification "takes into consideration the impact of the occurrence of one event on a subsequent event when several events are interrelated" (p. 90). The advantage of this modification is the elimination of contradicting opinions. Custer, Scarcella, and Stewart (1999) utilized a modified Delphi referred to as the Rotational Delphi Technique which employs a "procedure for rotating

subsets of larger competency sets through sub-panels in order to reduce the level of fatigue on panelists and to increase the volume of competencies that can be effectively and efficiently studied using the Delphi procedure" (para. 9). The Delphi Technique itself appeared to be, based on previous research, relatively flexible in its process. However, in order to be successful, "care must be taken to select panel members who are experts in the field, the number of participants, the survey instrument, and the number of rounds to be completed" (Lukenhiemer, p. 31).

Haughey (n.d.) also proposed an alternative to the traditional process. He proposed a modified Delphi Technique in terms of seven steps. The first step involves the selection of a facilitator, which in most cases would be the researcher. The second step is to identify a panel of experts willing to participate in the study. The third step is to define the problem the researcher is seeking to answer. The fourth step involves gaining a better understanding of the views of participants. Step four can be conducted through the use of a survey or questionnaire. Upon receipt of the round one questionnaire, the researcher would collate and summarize the data, eliminating outliers in order to obtain common viewpoints. Step five involves the creation of the second-round questionnaire, which is based on results of the first. The questionnaire would then be distributed to all participants, again in the form of a survey or questionnaire. Results would be collated and summarized, again eliminating outliers. Haughey suggested that the elimination of outliers encourages the overall goal of the Delphi process, which is to arrive at a consensus. The third-round questionnaire would be developed and distributed in step six of the process. At this point, Haughey stated "the final questionnaire aims to focus on supporting decision making. Hone in on the areas of agreement. What is it the experts all agreed on" (para. 13)? It may also be necessary to have more than three rounds in

order to reach a clearer consensus. Haughey's proposed Delphi steps, as well as those from Wang's (2006) study, served as a guide for this current study. Table 1 represents the process followed for this study.

Table 1

Process Outline for Conducting a Modified Delphi Study

1. Select the facilitator (researcher)
2. Select and contact respondents
3. Select sample size
4. Define the Delphi problem
5. Prepare round one questionnaire and distribute to respondents
a. Collate and summarize data
6. Develop and distribute round two questionnaire
a. Collate and summarize data
7. Develop and distribute round three questionnaire
8. Distribute round four questionnaire to ensure a clearer consensus
9. Collate and summarize data from rounds three and four
10. Prepare and distribute final report

Goodman (1987) described the four characteristics of the traditional Delphi Technique that distinguished it from other processes. The first characteristic was anonymity. The advantage to this was that experts would not be influenced by the opinions of others, which can happen in focus group interviewing. However, Goodman stated that Sackman (1975) argued that anonymity may lead to a lack of accountability and snap judgments of participants because they would know that what was stated would not be challenged by others. The second distinguishing characteristic was iteration with controlled feedback. This process was described previously and involves rounds of questionnaires in order to achieve a consensus from experts. The advantage here was that participants would have opportunities to provide comments as well as to modify previous comments. Modifications would be added in the comment section of each identified

competency. The third characteristic involves statistical group response, which was beneficial because expert opinions build upon participants' responses through repeated questionnaires. This was achieved through ranking ideas on a Likert scale. The use of expert participants was the final distinguishing characteristic of the Delphi Technique. Since the original aim of the Delphi was to forecast the future, experts did not recommend using randomly selected populations but rather specialists within the field that is being studied (Goodman).

As with any research method, the Delphi Technique had both strengths and weaknesses. According to Andrews and Allen (2002), strengths of the Delphi included anonymity of participants, cost-effectiveness, free of pressures and influences, conducive to the sharing of information, encouraged independent thinking, feedback was representative of a broad perspective, and environment is free of hostility. Powell (2003) also pointed out that the Delphi was a relatively fast, efficient means for arriving at a consensus among experts. Weaknesses of the Delphi are discussed in the *Limitations* section of this chapter.

Instruments

Traditionally, Delphi studies use a series of questionnaires as the primary data collection instruments. Therefore, this research study initially used a previously-developed questionnaire used in Wang's (2006) study. Wang's survey instrument was developed based on a review of literature as well as consultation with three experts. Stitt-Gohdes and Crews (2004) stated, "unlike survey research, the rounds used with the Delphi provide opportunity for initial feedback, collation of feedback, and distribution of collated feedback back to participants for further review" (para. 27). For reliability purposes, it was important to employ an instrument that had been previously validated

(Creswell, 2012). In this case, the questionnaire used was one developed by Wang (2006) for his study *Identification of the Significant Competencies in Graphic Design.* This current study was an expansion of Wang's study and focused in North and South Carolina. Appendix D provides documentation from Wang granting the researcher permission to expand his study and use his survey instrument. Though Wang's study took place in 2006 and technology trends have evolved since then, the original survey sufficiently addressed the areas to be explored. It was also important to note that one additional qualitative component was added to Wang's survey. The question prompted participants to list any tools needed in an effective university-level graphic design program, which was needed in order to answer Research Question 3. Appendix E provides documentation granting the researcher permission from Wang to modify the existing survey.

The Delphi process required a series of questionnaires that developed over time based on feedback from experts; therefore, Wang's (2006) survey served as a starting point. The questionnaire was reformatted into a web-based questionnaire via the software Survey Monkey. The first-round questionnaire is located in Appendix F. Creswell (2012) pointed out that the advantages to using web-based questionnaires include the quickness in which data can be gathered, the ability to use previously-developed questions rather than having to design them, and the ability to take advantage of the "extensive use of the Web by individuals today" (p. 383). The questionnaires in rounds one, two, and three used a Likert scale to rank 21st century skills, content knowledge, and tools required for a successful university-level graphic design program. The Likert scale contained categories ranging from one to seven, with seven being extremely desirable and one being extremely undesirable. The fourth-round

questionnaire prompted participants to identify the 20 most desired skills, content knowledge, and tools needed in effective university-level graphic design program. In rounds one and two, participants also had the opportunity to provide comments regarding each competency and list any additional competencies. Allen and Andrews (2002) pointed out that Delphi questionnaires give participants opportunities to provide positive and negative comments regarding each competency, as well as list any new competencies.

Procedures

The procedures for conducting this mixed-methods study, specifically using the convergent parallel design, were based on procedures from Haughey's (n.d.) recommendations as well as Wang's (2006) research study. Creswell (2012) pointed out that this research design allows for the researcher to collect both qualitative and quantitative data simultaneously and to merge the data to better understand the research problem. The strength of this method is that it "combines the advantages of each form of data, that quantitative data provide for generalizability, whereas, qualitative data offer information about the context or setting" (Creswell, p. 542). This current study utilized a modified Delphi Technique.

For this study, the round one questionnaire contained previously-identified graphic design competencies based on Wang's (2006) round one questionnaire, rather than instructing participants to develop their own list of competencies, as with a traditional Delphi study. The questionnaire prompted participants to rank competencies based on importance using a Likert scale ranging from one to seven. Participants were also given the opportunity to provide comments regarding each skill, content knowledge, and tool; and to provide opinions in the round one questionnaire. The round two questionnaire was based on responses from round one and instructed participants to,

again, rank competencies using a Likert scale ranging from one to seven. As with the round one questionnaire, participants were able to provide comments and opinions. Both rounds one and two questionnaires also allowed for participants to list any additional competencies that may not be included on the questionnaires. As with Wang's study, the third-round questionnaire was completely quantitative in nature and prompted participants to simply rank each previously-identified skill, content knowledge, and tool using the same Likert scale from one to seven, seven being extremely desirable. Round three survey questions were, again, based on results from round two. The fourth and final questionnaire instructed experts to rank the top 20 most desired 21st century skills, content knowledge, and tools required for a successful university-level graphic design program. The goal of round three was to determine the importance of each identified skill, content knowledge, and tool. The goal of round four was to identify the 20 most important competencies and was used to gain a clearer consensus. Wang's (2006) study utilized the round four questionnaire to identify the 20 most needed competencies for employment, while rounds one through three questionnaires addressed graphic design competencies. This current study utilized all four rounds to identify 21st century graphic design skills, content knowledge, and tools needed in an effective university-level graphic design program.

Procedures for analyzing the collected data from rounds one, two, three, and four were similar to those used by Wang in his 2006 study. Although Likert scale data traditionally is measured in terms of frequencies, since this study is an expansion of Wang's, it was important to utilize a similar statistical analysis. Descriptive statistics were used to analyze the quantitative data. The mean was identified in order to determine the average of all scores. The standard deviation was also calculated in order to

determine the spread of the scores. The median was calculated to determine a more reliable measure of central tendency and to take into account any outliers. The mode was calculated in order to determine frequency. Data results from round one were used to create survey questions to be included in round two, and so on. Data from round four were analyzed in terms of frequencies. The Statistical Package for the Social Sciences (SPSS) was used to generate the descriptive statistics. Coding was used to analyze the qualitative data. The researcher categorized and labeled the data according to themes. According to Creswell (2012), themes typically consist of no more than four words. As mentioned previously, coding was only necessary for rounds one and two of the questionnaire, as rounds three and four were completely quantitative. Therefore, the final results of the study were represented by quantitative findings.

In order to accurately ensure that all research questions were being accurately measured, the following data analysis matrix was developed. Adjacent to each research question is the scale of measurement and statistical technique utilized.

Table 2

Data Analysis Matrix for Research Questions

Research Question	Scale of Measurement	Statistical Technique
1. What are 21st century graphic design skills as perceived by university-level graphic design educators and industry professionals? (Third- and Fourth-Round Questionnaires)	1. Seven-point Likert scale 2. Ranking in order of importance	1. Mean, Median, Mode, Standard Deviation 2. Mean
2. What are 21st century graphic design content knowledge areas as perceived by university-level graphic design educators and professionals? (Third- and Fourth-Round Questionnaires)	1. Seven-point Likert scale 2. Ranking in order of importance	1. Mean, Median, Mode, Standard Deviation 2. Mean
3. What are 21st century graphic design tools as perceived by university-level graphic design educators and professionals? (Third- and Fourth-Round Questionnaires)	1. Seven-point Likert scale 2. Ranking in order of importance	1. Mean, Median, Mode, Standard Deviation 2. Mean
4. How do findings from this current study compare to those of Wang's (2006) study conducted in Kansas and Missouri?	1. Comparative Analysis	NA

Limitations

Potential limitations regarding the mixed-methods research design involved those limitations specific to quantitative and qualitative studies. According to Creswell (2012),

limitations of quantitative studies include protecting anonymity, obtaining permissions, and adequately communicating the purpose of the study. For this current study, anonymity was an advantage in using the Delphi method because participants did not meet face-to-face. Informed consents were collected from all participating respondents and also included a clear explanation regarding the purpose of the study. Limitations of qualitative studies included avoiding researcher bias, preserving participant identities, and sufficiently describing the purpose of the study. Researcher bias was not anticipated to be an issue in this study because each instrument was based on participant responses from the previous questionnaire. Also, descriptive statistics were used to analyze the data. With the convergent design specifically, the limitation dealt with inconsistent sample sizes (Creswell, 2012). However, with this particular study, sample sizes remained consistent for both the quantitative and qualitative portions of the study.

The Delphi Technique also had specific limitations. According to Powell (2003), researchers have pointed out that the Delphi is a very time-intensive method. The use of the modified Delphi expedited the process and overall time commitment of both the participants and the researcher. Other weaknesses of the technique included perceptions given by participants may not be representative of the population, the elimination of outliers could lead to a *middle-of-the-road* consensus, results cannot be viewed as a complete solution to the problem, requires oral and writing skills, requires sufficient time, and requires a commitment from participants to remain involved throughout the duration of the study (Andrews & Allen, 2002). Though perceptions given may not be representative of the entire population, results gathered from the study gave an indication as to those 21st century graphic design skills, content knowledge, and tools needed in an effective university-level graphic design program. The elimination of outliers, as stated

earlier, encouraged participants to reach a consensus, which was the overall goal of the Delphi. Though not a complete solution to the research problem, it was anticipated that results would aide in university-level graphic design curriculum development and assessment. Issues related to oral and writing skills were not anticipated to be problems in this study because all participants were working professionals; therefore, it was presumed that respondents had sufficient communication skills. The time commitment required of participants was a concern; however, the anticipated length of the study was communicated to participants and the modified Delphi contributed to shortening the commitment time of participants.

Other limitations related to the proposed data collection instruments. Limitations related to the use of web-based questionnaires included the potential for low response rates, technological problems, security issues, and potential problems with email, specifically Internet junk mail. One other limitation related to web-based questionnaires was that web-based surveys targeted a population where it was assumed computer use was prevalent; therefore, the sampling was not representative of the general population. However, due to the nature of the area being studied, most (if not all) participants were selected based on purposeful sampling. Therefore, the fact that web-based questionnaires do not use random sampling techniques was not a problem with this particular study.

Delimitations

According to Creswell (2003) delimitations are put in place by the researcher to "narrow the scope of the study" (p. 148). Delimitations related to this study were that participants consisted of graphic design educators and industry professionals, the study was conducted in North and South Carolina, and the study focused on university-level graphic design programs.

To summarize, this study used a modified Delphi Technique as the research method and incorporated both qualitative and quantitative processes. Forty-three participants were selected based on purposeful sampling. A series of four questionnaires were distributed electronically to all participants. Once all data were collected, a combination of descriptive statistics and coding was used to analyze the data. At the conclusion of the study, a consensus was reached among university-level graphic design educators and industry professionals regarding 21st century skills, content knowledge, and tools needed for a relevant, successful university-level graphic design program.

Chapter 4: Results and Analysis

Introduction

As previously reported, the purpose of this study was to identify 21st century skills, content knowledge, and tools needed in an effective university-level graphic design program. The study used a mixed-methods modified Delphi Technique as the research method and is an expansion of Wang's (2006) study which identified significant graphic design competencies using participants from Kansas and Missouri. This study utilized experts in the graphic design field as the research participants, consisting both of university-level educators and industry professionals from North and South Carolina. The Delphi process consists of rounds of questionnaires in order to reach a consensus among experts. This modified Delphi used four rounds of questionnaires. The research questions to be answered were:

Research Question 1: What are 21st century graphic design skills as perceived by university-level educators and industry professionals?

Research Question 2: What are 21st century graphic design content-knowledge areas as perceived by university-level graphic design educators and industry professionals?

Research Question 3: What are 21st century graphic design tools as perceived by university-level graphic design educators and industry professionals?

Research Question 4: How do findings from this current study compare to those of Wang's (2006) study conducted in Kansas and Missouri?

The following sections include a discussion of data collection methods, including participant selection. Results from rounds one, two, three, and four will be addressed and will be followed with a summary of the overall findings. The chapter will conclude with

a discussion regarding the results of this study as it compares to Wang's (2006) findings in his study.

Data Collection

Process. This study followed Haughey's (n.d.) recommendations for conducting a modified Delphi research study, as well as some of Wang's (2006) strategies. This modified Delphi consisted of seven steps. As discussed in Chapter 3, the first step is to identify the facilitator which, in this particular study, was the researcher. Step two involves the selection of participants, which is discussed in detail in the *Participants* section of this chapter. The third step is to identify the problem; in other words, what the facilitator is seeking to find out. In this case, the problem is expressed in the four research questions mentioned earlier in this chapter. The fourth step, as suggested by Haughey (n.d.), is to gain an understanding of the viewpoints of participants, which is oftentimes achieved through the use of surveys or questionnaires. The creation and distribution of the first-round questionnaire was developed during this step of the process, which will be further explained in the following section. Collating and summarizing the data from round one is also an element of step four.

Step five is to prepare and distribute the second-round questionnaire and again collate and summarize the data from that round. The sixth step is to prepare and distribute the third-round questionnaire as well as collate and summarize the data. Haughey (n.d.) explained that upon completion of the third round, a fourth round could be needed to gain a clearer consensus, which is the final step in the process. Wang's (2006) format for the fourth-round questionnaire was used here in the final step of the modified Delphi process and is further explained in the *Data Analysis* section of this chapter. The following section discusses the data collection instruments.

Instruments. The instrument used for the first-round survey of this research study was a questionnaire originally developed by Wang for his 2006 study. Since this study is an expansion of Wang's (2006) study, the previously-developed questionnaire was applicable. The original questionnaire was created by Wang based on a review of literature as well as in consultation with three experts in the field. One modification to the questionnaire was made. Research Question 3 sought to identify tools needed in an effective university-level graphic design program. In order to adequately answer that question, an additional question to the original questionnaire was added. Wang granted the researcher permission to do so (see Appendix E).

The first-round questionnaire (see Appendix F) utilized a Likert scale survey listing graphic design competencies ranging from one to seven, with one being extremely undesirable and seven being extremely desirable. Participants were asked to rank those statements. The nature of the Delphi allows participants to give positive or negative comments regarding each statement, and participants were given the opportunity to do so for each statement. The final two questions were qualitative in nature and asked participants to list any additional competencies and/or tools not previously mentioned which are needed in a university-level graphic design program, as well as any tools needed. Results were then analyzed and open-ended responses were coded, which is discussed later in this chapter. The second and third rounds were similar to round one in format; however, new statements were added based on responses from the previous rounds. Round two (see Appendix G) also utilized a Likert scale survey listing graphic design competencies ranging, again, from one to seven, and also allowed participants to include positive or negative comments regarding each statement. Round two also had an open-ended question prompting participants to list any additional competencies not

previously mentioned. One question in round two differed slightly in format than in round one. Round one generated a listing of tools needed in an effective university-level graphic design program. Those results were coded, which will be explained later, and a listing was developed requesting experts to choose all tools needed. It should be noted that a "none of the above" option was included, should participants feel no tools were needed. Round three (see Appendix H) was identical to round two in terms of format and question type. Round four (see Appendix I) utilized the same design that Wang (2006) used in his study. This questionnaire prompted participants to rank in order of importance the top 20 most needed skills and content knowledge in an effective university-level graphic design program. Experts were then asked to rank in order of importance tools needed in an effective university-level graphic design program. This format was used to gain a clearer consensus among experts. Table 3 is a representation of each round and what it consisted of.

Table 3

Survey Format Description

Questionnaire	Survey Format
Round One	1. Likert scale survey with comment option 2. Two open-ended questions for listing additional statements and tools
Round Two	1. Likert scale survey with comment option 2. Two open-ended questions for listing additional statements and tools
Round Three	1. Likert scale survey with comment option
Round Four	1. Ranking of top 20 statements 2. Ranking of tools

As noted in the previous explanation, the Delphi process requires a series of questionnaires in order to gain a consensus among experts. In order to reach that consensus, questionnaires should build off of the previous versions. Therefore, rounds two, three, and four were developed based on data received from the previous instruments. The goal here is to move participants toward an eventual consensus. As described earlier, the Delphi process uses a convergent parallel design, meaning that data collection and analysis occur simultaneously. Therefore, additional explanation regarding the development of the rounds two, three, and four questionnaires is discussed in the *Data Analysis* section of this chapter.

Participants. As mentioned previously, participants recruited for this study included university-level educators and industry professionals in the graphic design field. Participants also had to be working in the states of North and South Carolina. It is important to note that Wang (2006) used participants from Kansas and Missouri in his study. Therefore, as addressed in Research Question 4, it is significant to note the comparison among various regions within the United States.

The methods for requesting participation from educators and industry professionals varied slightly in approach. Through independent explorative data collection, the researcher identified all universities in North and South Carolina offering graphic design programs. The researcher then identified all full-time faculty teaching within those programs, and requests for participation were sent to those individuals via email.

The original plan for requesting participation from industry professionals was to contact the Charlotte, North Carolina chapter and the South Carolina chapter of the AIGA to request names and contact information of members. However, when contacted, the

researcher was told that all member information is confidential; therefore, the directory could not be used to request participation. The Executive Director of AIGA offered an alternative for gathering participants. The researcher created a webpage (see Appendix J) containing an overview of the study as well as the informed consent instrument. A sentence was added stating that anyone interested in participating should contact the researcher via email. The link to this webpage was distributed via AIGA's online newsletter to all North and South Carolina AIGA members. This method yielded eight participants. Additional industry professional participation requests were sent using LinkedIn, an online business-oriented social networking site (LinkedIn.com). When an educator or industry participant committed to this study, an email was then sent requesting contact information of other individuals who may be interested in participating. However, no additional participants were gathered using this snowball sampling method.

In total, approximately 200 email requests for participation were distributed. Of that 200, 18 university-level educators and 25 industry professionals committed to this study. The email request prompted participants to read and agree to the informed consent via email reply. Upon receipt of the participation confirmation, the researcher sent a reply email thanking the participant and indicating when he or she would receive the first-round questionnaire.

All questionnaires were designed using SurveyMonkey, a web-based survey creation software. For each round of questioning, a link was generated giving participants access to the questionnaire. An email explaining the purpose of the study and the format of the questionnaire, along with the link to the questionnaire, was sent to all participants. All rounds of questionnaires were distributed to participants on a Monday and participants were given until the end of the day Friday of that same week to

complete the questionnaire. Participants were given a week off in between questionnaires. The first questionnaire was distributed September 24, 2012, and the last questionnaire was distributed November 5, 2012.

Initially, the desired number of participants was 64—30 educators and 30 industry professionals. However, 30 was the minimum number needed to effectively conduct this study. Hsu and Sandford (2007) stated that according to Witkin and Altschuld (1995) participant size should be less than 50. As stated earlier, 43 participants committed to participating in this research; however, that number was not reached in any of the rounds of questioning. Instead, a minimum of 30 was reached in each round. A response rate of 30% for online surveys is considered average (Instructional Assessment Resources, n.d.), and response rates for all rounds of questionnaires in this study were well above that number. Table 4 shows the participant response rate for each round of questionnaires. Round one yielded the highest response rate, which is common in the Delphi process. Participation does tend to decline based on the number of rounds included in the process. Hsu and Sanford noted, "due to the multiple feedback processes inherent and integral to the concept and use of the Delphi process, the potential exists for low response rates" (p. 5).

Table 4

Participants' Response Rates from the Four Rounds of Questionnaires (N = 43)

Questionnaire	Number of Participants	Number of Responses	Percent of Response
Round One	43	38	88%
Round Two	43	33	77%
Round Three	43	31	72%
Round Four	43	31	72%

It is important to also note here that some demographic information was collected in each round. However, the decision was made not to disaggregate the two participant groups primarily because the focus of this study was to reach a consensus among experts; therefore, that information would not be beneficial. Also, some participants chose not to answer the question addressing occupation, while others felt that they were both an educator and industry professional.

The following section is a detailed analysis of the results of each round of questioning as well as a discussion regarding the development of rounds two, three, and four questionnaires.

Data Analysis

Round One Results. Descriptive statistics, including mean, median, mode, and standard deviation, were used to analyze the quantitative data generated from the round one questionnaire. This statistical technique was selected based on the data analysis method used in Wang's (2006) study. Results are shown in Table 5.

Table 5

Round One Questionnaire Descriptive Statistics Results (N = 38)

1. Understand the history of graphic design.
Mean = 6.1579 Median = 6.0000 Mode = 7.0000 SD = 1.1514

2. Apply sales promotion techniques for advertising and marketing.
Mean = 5.5789 Median = 6.0000 Mode = 6.0000 SD = 1.2656

3. Determine the costs associated with graphic design and other creative services.
Mean = 5.8649 Median = 6.0000 Mode = 6.0000 SD = 1.3158

4. Explain and evaluate customer service issues.
Mean = 6.0263 Median = 6.0000 Mode = 6.0000 SD = .8216

5. Apply the principles of graphic design.
Mean = 6.8684 Median = 7.0000 Mode = 7.0000 SD = .3426

6. Apply the concepts of typography.
Mean = 6.8158 Median = 7.0000 Mode = 7.0000 SD = .3929

7. Apply basic knowledge of Gestalt psychology to graphic design.
Mean = 5.9189 Median = 6.0000 Mode = 6.0000 SD = .9539

8. Apply the basics of graphic design multimedia.
Mean = 6.5263 Median = 7.0000 Mode = 7.0000 SD = .6035

9. Apply the basics of graphic design for print production.
Mean = 6.4474 Median = 7.0000 Mode = 7.0000 SD = .8913

10. Apply the basics of graphic design for webpage development.
Mean = 6.5676 Median = 7.0000 Mode = 7.0000 SD = .6028

11. Apply the basics of photography for graphic design purposes.
Mean = 6.1892 Median = 6.0000 Mode = 6.0000 SD = .7393

12. Perform graphic design creatively.
Mean = 6.7632 Median = 7.0000 Mode = 7.0000 SD = .4896

(continued)

Round One Questionnaire Descriptive Statistics Results (N = 38)

13. Prepare digital documents.
Mean = 6.5789 Median = 7.0000 Mode = 7.0000 SD = .6831

14. Apply the techniques of color management.
Mean = 6.4324 Median = 7.0000 Mode = 7.0000 SD = .6472

15. Apply the techniques of digital prepress.
Mean = 6.0789 Median = 6.0000 Mode = 7.0000 SD = 1.0751

16. Apply the techniques of photographic lighting.
Mean = 5.4737 Median = 5.5000 Mode = 5.0000 SD = 1.0064

17. Apply the techniques of photography.
Mean = 5.8056 Median = 6.000 Mode = 6.0000 SD = .7491

18. Apply the techniques of screen printing.
Mean = 4.9474 Median = 5.0000 Mode = 5.0000 SD = .9571

19. Apply the techniques of using drawing software.
Mean = 5.7895 Median =6.0000 Mode = 6.0000 SD = 1.0944

20. Apply the techniques of using multimedia creation software.
Mean = 5.7105 Median = 6.0000 Mode = 6.0000 SD = 1.2926

21. Apply the techniques of using page layout and publishing software.
Mean = 6.3684 Median = 7.0000 Mode = 7.0000 SD = 1.4031

22. Apply the techniques of using image editing software.
Mean = 6.5263 Median = 7.0000 Mode = 7.0000 SD = .9223

23. Apply the techniques of webpage development software.
Mean = 6.0000 Median = 6.0000 Mode = 7.0000 SD = 1.2019

24. Write clearly, concisely, and correctly.
Mean = 6.5526 Median = 7.0000 Mode = 7.0000 SD = .7952

The five statements receiving the highest mean scores were “apply the principles of graphic design,” “apply the concepts of typography,” “perform graphic design

creatively," "prepare digital documents," and "apply the basics of graphic design for webpage development." Some expert comments relating to the application of the principles of graphic design included "this is a key skill," "a constant endeavor," and "this is extremely broad." Comments regarding the application of concepts of typography included "this is the area where designers have the most control" and "I often find younger designers not pushing typography enough." Comments related to performing graphic design creatively were "Obvious requirement. Graduates lacking this competency will probably not find employment" and "the nature of graphic design should always explore problem solving in a creative manner." Comments regarding the fourth highest ranking competency in round one, prepare digital documents, included "is as necessary a skill as preparing mechanical art was 20 to 25 years ago. Design skills can only be taken so far without production skills to follow through." Lastly, one comment received related to webpage development stated:

> This is a growing need. The debate comes at what stage a design program needs to include programming skills. Many employers separate the duties of front-end creation from the development/coding/programming responsibilities. Those students who can do both are more desirable currently. But, I feel an emphasis should be placed on teaching the former, rather than the latter, is more appropriate as I see software developing in a direction that requires less coding knowledge.

The statement generating the lowest mean score, which was 4.9474, was "apply the techniques of screen printing." One comment from an expert participant regarding the lowest ranking statement was "screen printing skills aren't a necessity for design graduates, but a welcomed addition to their tool belt." All statements indicated a range of 5.0 to 7.0 for the median score and mode. All standard deviation scores remained at or

below 1.4, indicating a normal distribution, which means that all scores are close to the average. Since all statements received a mean score of 4 or better, all were included in the round two questionnaire.

When asked to list any additional statements not previously included in the questionnaire, professionals provided 20 additional competencies. Coding was used to analyze the qualitative data generated from this question. Creswell (2012) recommended first conducting a preliminary exploratory analysis in order to get a general sense of the data. The researcher read through all comments several times while noting keywords to assist in identifying similar themes. Next, the similar themes were categorized into broad statements in order to narrow the data. The themes were then generated into statements to be included in the round two questionnaire. For example, some statements included the ability to draw, paint, and/or sculpt. It was determined that rather than including all of the statements as separate competencies, it would be more appropriate to group those competencies into a more broad statement reading "Exhibit the skills of artistic expression (drawing, painting, sculpting)." Appendix K is a sample of the coding sheet used to analyze the qualitative data. Also, some additional competencies listed by experts were very similar to those already addressed in the questionnaire. For example, one new competency dealt with color theory. It was determined that the competency could be added to the already-mentioned competency dealing with color management. Thus, the revised competency read "Apply the principles and techniques of color theory and management." As recommended by Foss and Waters (2003), the researcher consulted with a qualitative data-coding expert to ensure that competencies were appropriately categorized based on similar themes. In total, eight new statements were added and two existing statements were modified. An asterisk represents newly added

statements and modified statements in Table 5. It should be noted that this same process was also used in the coding of round two qualitative data.

The round one questionnaire also prompted participants to list any tools needed in an effective university-level graphic design program. Sixteen participants added comments to the "Tools" question. Some participants listed more than one tool in each statement. Some comments included "Microsoft Office and Adobe Acrobat," "Adobe software products are an industry standard," and "Ruler, exacto, sketchbook." All comments received in round one were again coded and categorized according to themes and were included in the round two questionnaire. The format for the question in round two prompted participants to select all tools needed, as well as allowed for any additional tools to be added (see Question 37, Appendix G). The following is a detailed explanation of round two.

Round Two Results. As with round one data, descriptive statistics were again used to analyze the quantitative data from round two. Results are shown in Table 6.

Table 6

Round Two Questionnaire Descriptive Statistics Results (N = 33)

---

1. Understand the history of graphic design.
Mean = 6.2424 Median = 6.0000 Mode = 6.0000 SD = .7918

*2. Exhibit skills in the foundations of artistic expression (painting, drawing, sculpting).
Mean = 5.8788 Median = 6.0000 Mode = 6.0000 SD = .9924

3. Apply the principles of graphic design.
Mean = 6.8750 Median = 7.0000 Mode = 7.0000 SD = .3360

4. Apply the concepts of typography.
Mean = 6.7879 Median = 7.0000 Mode = 7.0000 SD = .4152

5. Apply basic knowledge of Gestalt psychology to graphic design.
Mean = 5.9091 Median = 6.0000 Mode = 6.0000 SD = .8791

6. Perform graphic design creatively.
Mean = 6.7500 Median = 7.0000 Mode = 7.0000 SD = .5080

7. Write clearly, concisely, and correctly.
Mean = 6.4242 Median = 6.0000 Mode = 7.0000 SD = .6139

*8. Exhibit interpersonal skills (problem solving, curiosity, motivation, innovation, conceptual thinking, communication).
Mean = 6.8485 Median = 7.0000 Mode = 7.0000 SD = .3641

*9. Exhibit effective presentation skills.
Mean = 6.4545 Median = 7.0000 Mode = 7.0000 SD = .6170

*10. Knowledge of current communications industry trends (convergence, visual communication, storytelling, videography).
Mean = 6.1818 Median = 6.0000 Mode = 6.0000 SD = .7687

11. Apply sales promotion techniques for advertising and marketing.
Mean = 5.5455 Median = 6.0000 Mode = 6.0000 SD = 1.0028

*12. Apply the basics of packaging design.
Mean = 5.5455 Median = 6.0000 Mode = 6.0000 SD = .7942

(continued)

Round Two Questionnaire Descriptive Statistics Results (N = 33)

13. Determine the costs associated with graphic design and other creative services.
Mean = 5.7576 Median = 6.0000 Mode = 6.0000 SD = 1.0317

14. Explain and evaluate customer service issues.
Mean = 5.455 Median = 6.0000 Mode = 6.0000 SD = 1.0923

15. Apply the basics of graphic design for multimedia.
Mean = 6.2727 Median = 6.0000 Mode = 6.0000 SD = .6742

*16. Apply the basics of graphic design for print production, including knowledge of finishing operations.
Mean = 6.4848 Median = 7.0000 Mode = 7.0000 SD = .7124

17. Apply the basics of graphic design for webpage development.
Mean = 6.4848 Median = 7.0000 Mode = 7.0000 SD = .5658

18. Apply the basics of photography for graphic design purposes.
Mean =6.3333 Median = 6.0000 Mode = 6.0000 SD = .6455

19. Prepare digital documents.
Mean = 6.6875 Median = 7.0000 Mode = 7.0000 SD = .5923

*20. Apply the principles and techniques of color theory and management.
Mean = 6.4545 Median = 7.0000 Mode = 7.0000 SD = .6170

21. Apply the techniques of digital prepress.
Mean = 6.3030 Median = 7.0000 Mode = 7.0000 SD = 1.1035

22. Apply the techniques of photographic lighting.
Mean = 5.6875 Median = 6.0000 Mode = 6.0000 SD = .8958

23. Apply the techniques of photography.
Mean = 5.8788 Median = 6.0000 Mode = 6.0000 SD = .8200

24. Apply the techniques of screen printing.
Mean = 4.9394 Median = 5.0000 Mode = 5.0000 SD = .8269

25. Apply the techniques of using drawing software.
Mean = 5.9697 Median = 6.0000 Mode = 7.0000 SD = 1.0454

(continued)

Round Two Questionnaire Descriptive Statistics Results (N = 33)

26. Apply the techniques of using multimedia creation software.			
Mean = 6.0000	Median = 6.0000	Mode = 6.0000	SD = 1.1640
27. Apply the techniques of using page layout and publishing software.			
Mean = 6.6061	Median = 7.0000	Mode = 7.0000	SD = .7044
28. Apply the techniques of using image editing software.			
Mean = 6.4848	Median = 7.0000	Mode = 7.0000	SD = .7550
29. Apply the techniques of webpage development software			
Mean = 5.9394	Median = 6.0000	Mode = 6.0000	SD = 1.1440
*30. Apply the techniques of video editing software.			
Mean = 5.5152	Median = 5.0000	Mode = 5.0000	SD = .9395
*31. Apply the techniques of 3D and motion design software.			
Mean = 5.3636	Median = 5.0000	Mode = 6.0000	SD = 1.0553
*32. Apply the techniques of traditional production and drawing tools.			
Mean = 5.6970	Median = 6.0000	Mode = 7.0000	SD = 1.1035

Note: *Newly added or modified statements.

The statements receiving the highest mean scores from round two included "apply the principles of graphic design," "exhibit interpersonal skills," "apply the concepts of typography," "perform graphic design creatively," and "prepare digital documents." As with round one, the lowest ranking statement was again "apply the techniques of screen printing." Four of the five highest ranking competencies from round one were again included in round two. The one exception was "exhibit interpersonal skills," which was a newly added statement based on comments from round one. Again, all median and mode ranges were between 5.0 and 7.0, and the range of standard deviations were between .33 and 1.1, which also indicates a normal distribution in that all scores remained close to the average.

Comments received from round two regarding the application of the principles of graphic design included “this is fundamental to any design program” and “I still feel that this question is extremely broad and vague.” This comment prompted a modification to the existing statement. In round three, the question was changed to “apply the principles of graphic design aesthetics, including composition.” One comment received on the “prepare digital documents” statement also prompted a slight modification to wording. The comment stated, “For what? To email? To publish online? To present? To print? All of the above?” For round three, the statement was modified to read “prepare various digital documents.” Comments related to the newly added statement “exhibit interpersonal skills” included “this helps contribute to the development of sound creative thought and strategy” and “this will develop and should be emphasized throughout the course and studio work.”

In keeping with the Delphi process, round two again prompted participants to list any additional statements not previously mentioned. Twelve of the 33 experts completing round two included new statements. These qualitative data were coded according to themes in the same manner as round one. Statements that were similar in theme were combined to create a new statement. Some statements were similar to those already included in the questionnaire, therefore prompting modifications. Newly added and modified statements are again marked with an asterisk in Table 6. Round two generated two new statements and three modified statements.

As stated previously in the *Round One Results* section, round two prompted participants to select all tools needed in an effective university-level graphic design program and to list any additional tools not previously stated in the question. Tools selected as needed by 50% or more of participants included Adobe Photoshop, Adobe

Illustrator, Adobe Indesign, Adobe Acrobat, Adobe Dreamweaver, Microsoft Office, scanners, printers, exacto knives, sketchbooks, rulers, and Macbook Pro laptop. Participants included seven new comments related to tools. Those comments were included as new tools in the final question of round three. The researcher concluded that rather than including the previously listed tools again in round three, only those newly identified tools would be added. Round four included all tools selected by 50% or more of participants. The newly added tools can be found in question 40 of the round three questionnaire (see Appendix H). A detailed explanation of round three is discussed in the following section.

Round Three Results. As with the previous rounds, descriptive statistics were used to analyze the data received from round three. Results are shown in Table 7.

Table 7

Round Three Questionnaire Descriptive Statistics Results (N = 31)

---

1. Understand the history of graphic design.
Mean = 6.1290 Median = 6.0000 Mode = 6.0000 SD = .8462

2. Exhibit skills in the foundations of artistic expression (painting, drawing, sculpting).
Mean = 5.5806 Median = 6.0000 Mode = 6.0000 SD = 1.0886

3. Apply the basic principles of graphic design aesthetics, including composition.
Mean = 6.8710 Median = 7.0000 Mode = 7.0000 SD = .3408

4. Apply the concepts of typography.
Mean = 6.8667 Median = 7.0000 Mode = 7.0000 SD = .3458

*5. Apply foundational elements of graphic design, such as creating traditional paper mockups and hand-rendering of type.
Mean = 5.6129 Median = 6.0000 Mode = 6.0000 SD = 1.1741

6. Apply basic knowledge of Gestalt psychology to graphic design.
Mean = 5.9032 Median = 6.0000 Mode = 6.0000 SD = .9783

7. Perform graphic design creatively.
Mean = 6.7742 Median = 7.0000 Mode = 7.0000 SD = .5603

8. Write clearly, concisely, and correctly.
Mean = 6.4516 Median = 7.0000 Mode = 7.0000 SD = .7229

9. Exhibit interpersonal skills (problem solving, curiosity, motivation, innovation, conceptual thinking, communication).
Mean = 6.7097 Median = 7.0000 Mode = 7.0000 SD = .4614

10. Exhibit effective presentation skills.
Mean = 6.2581 Median = 6.0000 Mode = 6.0000 SD = .7288

11. Knowledge of current communications industry trends (convergence, visual communication, storytelling, videography).
Mean = 6.1935 Median = 6.0000 Mode = 6.0000 SD = .6542

(continued)

Round Three Questionnaire Descriptive Statistics Results (N = 31)

*12. Knowledge of related disciplines (business and marketing, art, psychology, geometry, and physics).
Mean = 5.6129 Median = 6.0000 Mode = 6.0000 SD = .7154

13. Apply sales promotion techniques for advertising and marketing.
Mean = 5.3226 Median = 5.0000 Mode = 5.0000 SD = .9087

14. Apply the basics of packaging design.
Mean = 5.5806 Median = 6.0000 Mode = 6.0000 SD = .6204

15. Determine the costs associated with graphic design and other creative services.
Mean = 5.8065 Median = 6.0000 Mode = 6.0000 SD = .8725

16. Explain and evaluate customer service issues.
Mean = 5.6774 Median = 6.0000 Mode = 6.0000 SD = .9447

17. Apply the basics of graphic design for multimedia.
Mean = 6.0000 Median = 6.0000 Mode = 6.0000 SD = .8165

18. Apply the basics of graphic design for print production.
Mean = 6.3226 Median = 6.0000 Mode = 6.0000 SD = .5993

19. Apply the basics of graphic design for webpage development.
Mean = 6.3548 Median = 6.0000 Mode = 6.0000 SD = .5507

20. Apply the basics of photography for graphic design purposes.
Mean =5.9677 Median = 6.0000 Mode = 6.0000 SD = .7521

21. Prepare various digital documents.
Mean = 6.4516 Median = 6.0000 Mode = 6.0000 SD = .5680

22. Apply the principles and techniques of color theory and management.
Mean = 6.4194 Median = 6.0000 Mode = 7.0000 SD = .6204

*23. Apply the techniques of digital prepress, including finishing files for print or web, imposition, substrate selection, ink selection, finishing operations, and an understanding of print processes.
Mean = 6.0968 Median = 6.0000 Mode = 6.0000 SD = .7463

(continued)

Round Three Questionnaire Descriptive Statistics Results (N = 31)

24. Apply the techniques of photographic lighting.
Mean = 5.3548 Median = 5.0000 Mode = 6.0000 SD = .9146

25. Apply the techniques of photography.
Mean = 5.5484 Median = 6.0000 Mode = 5.0000 SD = .8501

26. Apply the techniques of screen printing.
Mean = 4.6774 Median = 5.0000 Mode = 4.0000 SD = .9087

27. Apply the techniques of using drawing software.
Mean = 5.7419 Median = 6.0000 Mode = 6.0000 SD = .8932

28. Apply the techniques of using multimedia creation software.
Mean = 5.7742 Median = 6.0000 Mode = 6.0000 SD = .8046

29. Apply the techniques of using page layout and publishing software.
Mean = 6.4839 Median = 7.0000 Mode = 7.0000 SD = .5699

30. Apply the techniques of using image editing software.
Mean = 6.4516 Median = 7.0000 Mode = 7.0000 SD = .6239

*31. Apply the techniques of webpage development software, as well as basic html, css, web analytics, and wireframing.
Mean = 5.8710 Median = 6.0000 Mode = 6.0000 SD = .8059

*32. Apply the techniques of video and audio editing software.
Mean = 5.2581 Median = 5.0000 Mode = 5.0000 SD = 1.1245

33. Apply the techniques of 3D and motion design software.
Mean = 4.9355 Median = 5.0000 Mode = 6.0000 SD = 1.0626

34. Apply the techniques of traditional production and drawing tools.
Mean = 5.6000 Median = 6.0000 Mode = 6.0000 SD = 1.1919

Note: *Newly added or modified statements.

The highest ranking competencies from round three include “apply the principles of graphic design aesthetics, including composition”; “apply the concepts of typography”; “perform graphic design creatively”; “exhibit interpersonal skills”; and “apply the techniques of using page layout and publishing software.” The latter is a new

top five statement, while the other four remain among the highest ranking throughout all three rounds. It should be noted that despite the modifications in wording for "apply the techniques of graphic design aesthetics, including composition" and "prepare various digital documents," the two remain in the top five. Median scores remained between 5.0 and 7.0 for this round, while the lowest scoring mode of 4.0 was identified. This applied to the lowest scoring competency, which was again "apply the techniques of screen printing." Other mode scores continued to be consistent ranging from 5.0 to 7.0, while standard deviations ranged from .34 to 1.2, once again indicating a normal distribution in that all scores were close to the average. The newly identified highest ranking competency "apply the techniques of using page layout and publishing software" received one comment which stated, "this is key to getting ink on paper."

Though participants had the option to provide positive or negative comments regarding each statement in round three, experts were not given the opportunity to add any new statements or tools. Round two was the final round in which qualitative data were gathered. The Delphi process is a method in which participants are encouraged to reach a consensus using rounds of questioning. The modified Delphi method used for this study concluded with three rounds, with one additional round to be used to gain a clearer consensus. All statements included in round three received a mean score of at least 4.6 or better; thus all statements included in round three were included in round four.

The following tools listed in round three were selected by 50% or more of participants as those needed in an effective 21st century university-level graphic design program. Newly identified tools included social media tools; Dropbox; the Cloud between designer, customer, and printer; external hard drive; Pantone swatchbook; and paper swatches. These tools were included in round four along with those identified by

50% or more of participants from round two.

For comparison purposes, the following bar graphs were used to illustrate and advance a clearer understanding of each competency and its mean scores for each round of questioning. Statements containing only one or two scores were those created from comments received from participants; therefore, that statement was not available for inclusion in round one. Those statements ranking in the top five for all three rounds of questioning were "apply the basic principles of graphic design aesthetics, including composition"; "apply the concepts of typography," and "perform graphic design creatively." These competencies all remained relatively equal in terms of average scores across all three rounds. It should also be pointed out that those competencies identified as the least significant statements remained low throughout all rounds and, in some cases, were gradually lower as the rounds progressed.

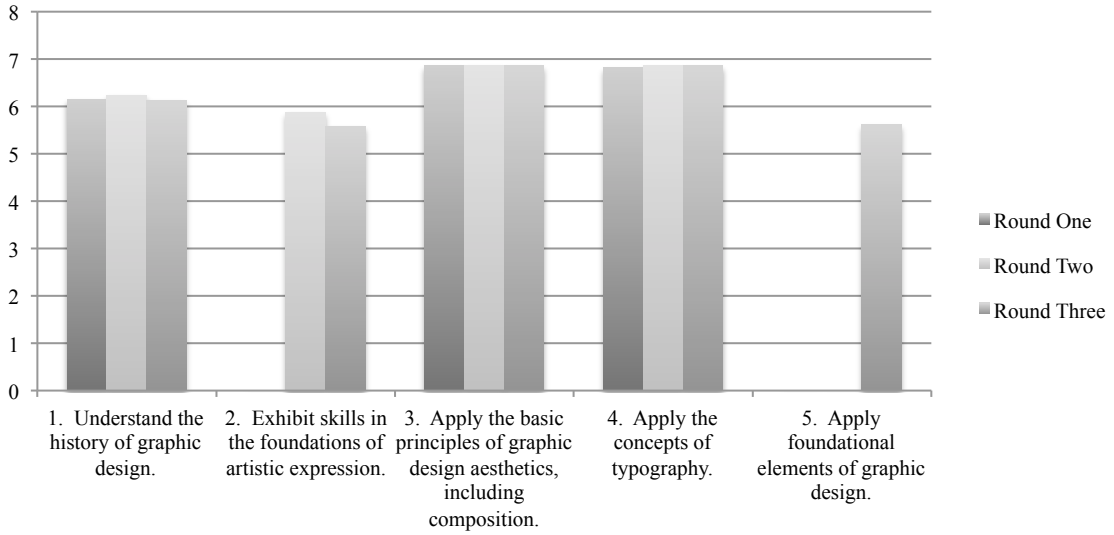

Figure 1. Mean Comparisons of Statements One through Five from Rounds One, Two, and Three.

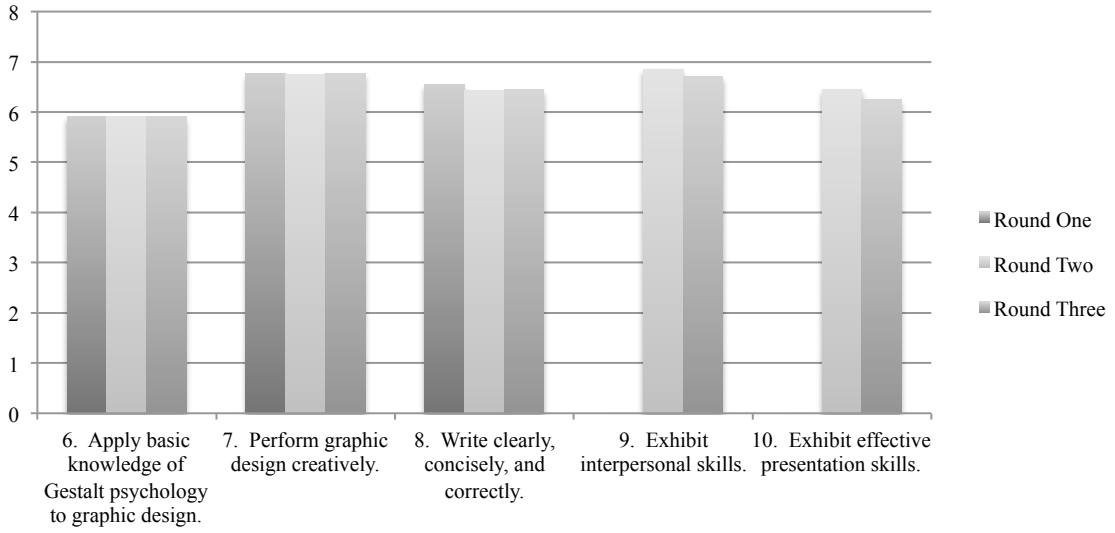

Figure 2. Mean Comparisons of Statements Six through Ten from Rounds One, Two, and Three.

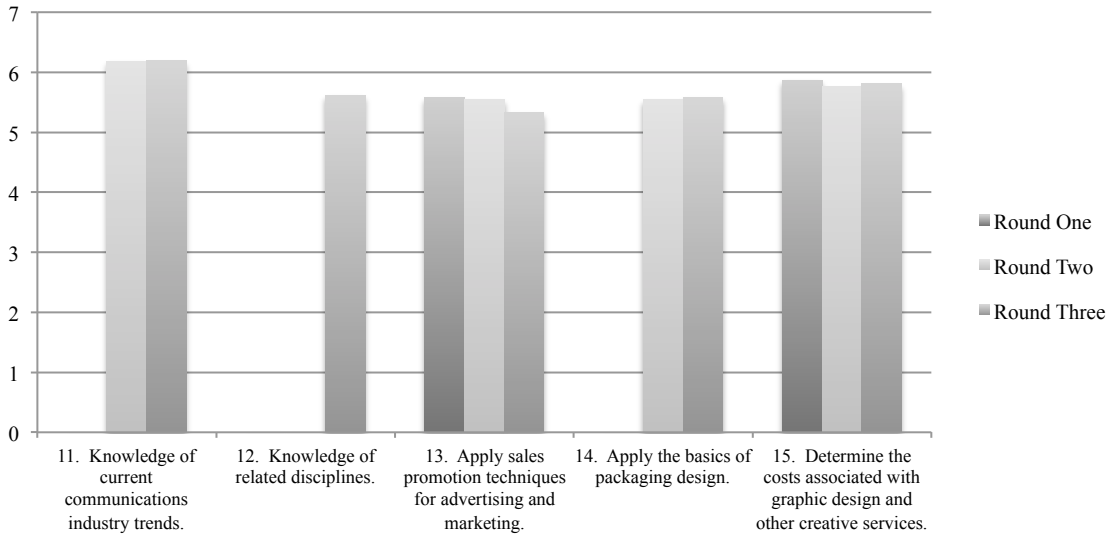

Figure 3. Mean Comparisons of Statements 11 through 15 from Rounds One, Two, and Three.

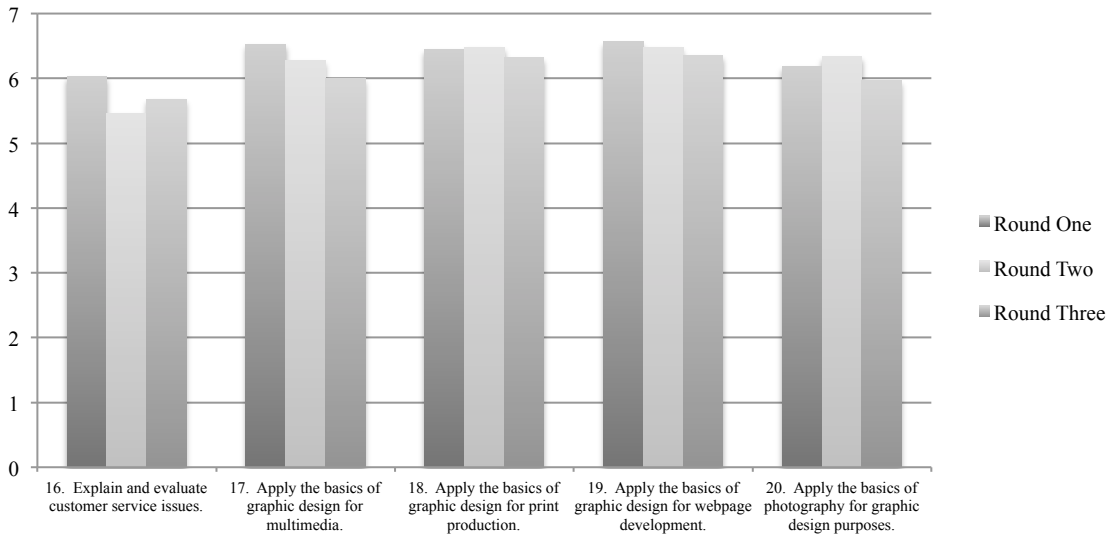

Figure 4. Mean Comparisons of Statements 16 through 20 from Rounds One, Two, and Three.

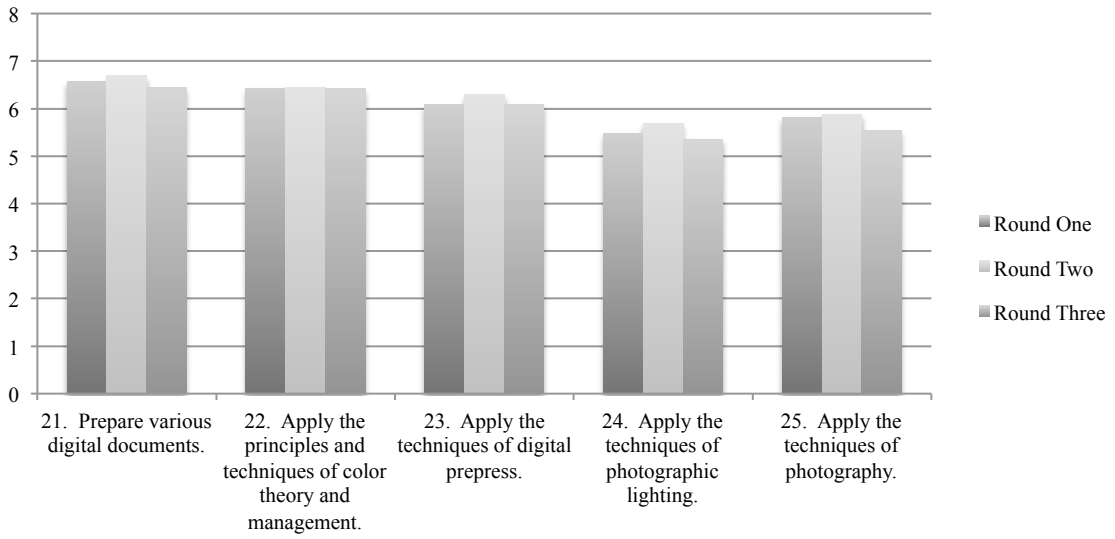

Figure 5. Mean Comparisons of Statements 21 through 25 from Rounds One, Two, and Three.

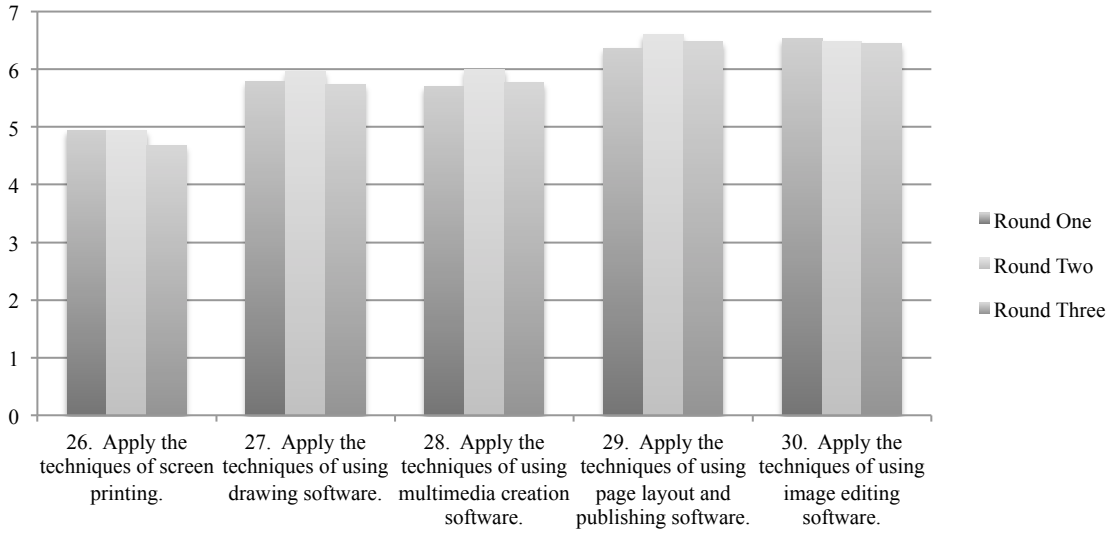

Figure 6. Mean Comparisons of Statements 26 through 30 from Rounds One, Two, and Three.

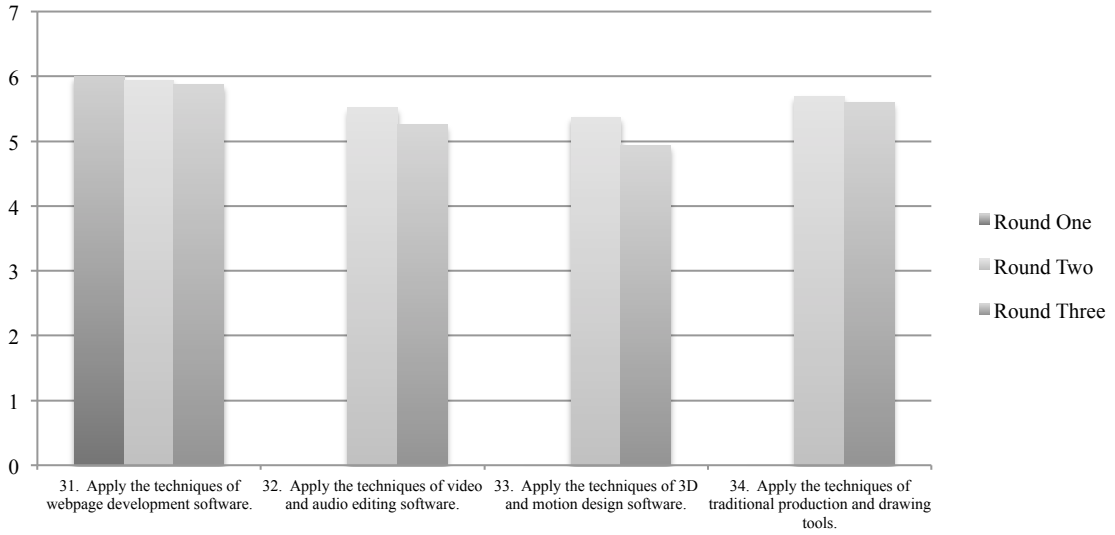

Figure 7. Mean Comparisons of Statements 31 through 34 from Rounds One, Two, and Three.

Round Four Results. Round four sought to gain a clearer understanding regarding statements considered to be most needed in an effective 21st century university-level graphic design program. Participants were asked to rank the top 20

statements most needed in order of importance. Participants were also asked, in a separate question, to rank tools most needed in a university-level graphic design program, again in order of importance. Results are shown in Tables 8 and 9. A complete listing of all 34 identified competencies is located in Appendix L.

Table 8

Round Four Questionnaire Mean Results for Skills and Content Knowledge (N = 31)

Statement	Mean
1. Apply the basic principles of graphic design aesthetics, including composition.	3.58
2. Perform graphic design creatively.	5.84
3. Apply the concepts of typography.	6.13
4. Exhibit interpersonal skills (problem solving, curiosity, motivation, innovation, conceptual thinking, communication).	7.26
5. Write clearly, concisely, and correctly.	10.00
6. Exhibit effective presentation skills.	12.13
7. Understand the history of graphic design.	13.74
8. Knowledge of current communications industry trends (convergence, visual communication, storytelling, videography).	14.26
9. Apply the basics of graphic design for print production.	14.39
10. Exhibit skills in the foundations of artistic expression (painting, drawing, sculpting).	14.58
11. Apply the principles and techniques of color theory and management.	14.68
12. Apply foundational elements of graphic design, such as creating traditional paper mockups and hand-rendering of type.	15.03
13. Apply basic knowledge of Gestalt psychology to graphic design.	15.71
14. Apply the basics of graphic design for webpage development.	15.84
15. Apply the basics of graphic design for multimedia.	15.97
16. Apply the techniques of using page layout and publishing software.	16.19
17. Apply the basics of photography for graphic design purposes.	16.42
18. Apply the techniques of using image editing software.	16.68
19. Prepare various digital documents.	16.87
20. Apply the techniques of digital prepress, including finishing files for print or web, imposition, substrate selection, ink selection, finishing operations, and an understanding of print processes.	18.10

Table 9

Round Four Questionnaire Mean Results for Tools (N = 31)

Statement	Mean
1. Adobe Creative Suite (Photoshop, Illustrator, InDesign, Acrobat, Bridge)	1.19
2. Microsoft Office (Word, Excel, Powerpoint)	5.39
3. Sketchbooks	5.87
4. Adobe Dreamweaver	6.16
5. Printers	6.45
6. Scanners	7.42
7. Macbook Pro Laptop	7.45
8. Social media tools	8.10
9. "the Cloud" between designer, client, and printer	8.45
10. Rulers	8.97
11. Pantone swatchbook	8.97
12. Dropbox	9.03
13. External hard drive	10.42
14. Paper swatches	11.13

Rather than showing frequencies, which was the original intent, the researcher determined that results could best be interpreted based on mean scores. This determination was based on the fact that some participants chose to rank all competencies listed rather than choosing only 20; therefore, the data shown in Table 8 are slightly

skewed. This is a survey instrument limitation which will be more thoroughly addressed in Chapter 5. However, the data collected in the final round are rather consistent with findings from previous rounds. It also should be noted that data received from the second question addressing tools are accurate because participants were instructed to rank the entire list.

Those statements receiving the lowest mean scores, or those closer to one, are those considered most important. Interestingly, the three competencies identified in the top five from the previous rounds were once again in the top five of round four. However, one statement not previously included in the top five in any of the previous rounds was identified in this final round. That competency was "write clearly, concisely, and correctly," which consistently ranked among the highest in all three rounds with a mean score of at least 6.4; however, it was not a top-five competency until this final round. Also, those competencies ranking the lowest in all three previous rounds were again among the lowest in this fourth round. Those statements included "apply the techniques of screen printing," "apply the techniques of video and audio editing software," and "apply the techniques of 3D and motion design software." Though the latter two did not appear until round two, as they were included based on comments from participants, they both were in the lowest-ranking competencies in both rounds two and three.

Experts also overwhelmingly identified the Adobe Creative Suite as being the most needed tool for an effective university-level graphic design program, with 26 out of 31 participants selecting it as number one. The Adobe Creative Suite was followed by Microsoft Office, sketchbooks, Adobe Dreamweaver, and printers as the remaining top five most needed tools. Those tools ranking in the bottom regarding order of importance were Dropbox, external hard drive, and paper swatches.

The following section is an overall analysis of the results of the study, with an emphasis placed on the research questions.

Summary of Results

Research Question 1. What are 21st century graphic design skills as perceived by university-level educators and industry professionals? As reported in Chapter 1, 21st century skills-related competencies are those skills that consist of core subjects: 21st century learning and thinking skills, including critical thinking and problem solving; communication skills; creativity and innovation skills; collaboration skills, etc. (NEA, n.d.). The consistently highest ranking statements generated from this research are not considered to be 21st century skills-related competencies, but rather content-knowledge competencies. However, the statement "exhibit interpersonal skills" was among the top most needed skills. This statement was the second most needed statement identified from round two and fourth most needed statement identified from round four. According to the definition, interpersonal skills are considered to be 21st century skills. The fifth highest ranking statement from round four was "write clearly, concisely, and correctly." This competency is also considered a 21st century skill, as it is deals with effective communication, which encompasses both verbal and written skills. "Effective presentation skills" was another highly desired competency that is considered to be a 21st century skill, as it also deals with communication. This statement was ranked as the sixth most needed skill in a 21st century university-level graphic design program in round four. Thus, to answer Research Question 1, the 21st century skills most needed in an effective university-level graphic design program are exhibit interpersonal skills; write clearly, concisely, and correctly; and effective presentation skills.

Research Question 2. What are 21st century graphic design content-knowledge

areas as perceived by university-level graphic design educators and industry professionals? According to Davis (n.d.), content-knowledge areas consist of an understanding at the core of the discipline, including metacognition, empathy, holding a perspective, application, interpretation, and explanation. The top three highest scoring statements from each of the four rounds of questioning are all considered to be content knowledge areas because each deals with some form of application. Again, the top three identified statements were "apply the basic principles of graphic design aesthetics, including composition"; "perform graphic design creatively"; and "apply the concepts of typography." Other statements receiving high rankings, which also fall into the content knowledge category, included "prepare various digital documents," "apply the basics of graphic design for webpage development," and "apply the techniques of using page layout and publishing software." Each of these was identified in the early rounds of questioning as being highly desired competencies. With regard to the final round, the remaining content knowledge areas comprising the top 10 most needed were as follows: understand the history of graphic design, knowledge of current communications industry trends (convergence, visual communication, storytelling, videography), apply the basics of graphic design for print production, and exhibit skills in the foundations of artistic expression (painting, drawing, sculpting). Content knowledge areas were dominant with regard to the most needed competencies in an effective university-level graphic design program.

Research Question 3. What are 21st century graphic design tools as perceived by university-level graphic design educators and industry professionals?

Tools are defined as "something (an instrument or apparatus) used in performing an operation or those necessary in the practice of a vocation or profession" or "an element of

a computer program (as a graphics application) that activates and controls a particular function" (Merriam-Webster, n.d.). For this research study, it was important to identify those items needed to facilitate the learning and development of 21st century skills and content knowledge areas; thus, it was determined that this item needed to be examined separately from the other areas. The researcher requested identification of tools as another component to the questionnaire rather than including it with skills and content knowledge statements. It should be noted that participants had the option to choose "none of the above" or leave the question blank if the expert felt that no tools were needed in an effective 21st century university-level graphic design program. As previously discussed in the *Round Four Results* section, participants identified the Adobe Creative Suite as the most needed tool, with Microsoft Office and sketchbooks following. The two highest ranking tools are software applications, as is the fourth ranking most needed tool, Adobe Dreamweaver. Other top ranking tools were hardware devices—printers, scanners, and the Macbook Pro laptop computer.

Research Question 4. How do findings from this current study compare to those of Wang's (2006) study conducted in Kansas and Missouri? Since this current study is an expansion of Wang's study, the fourth and final research questionnaire sought to compare findings from Wang's study to those identified in this study. The primary purpose of Wang's study was to obtain a consensus and validation from a panel of experts in identifying the significant competencies for graphic design. As previously mentioned, that study utilized experts from Kansas and Missouri and was conducted in 2006. Due to the consistently changing technology and trends in graphic design and the geographic location of Wang's study, the researcher sought to determine if those significant competencies identified by experts in Wang's study were similar to the

findings of this current study.

The participants in Wang's (2006) study identified a total of 66 significant competencies for graphic design; whereas, this study identified 34 competencies and 14 tools needed in an effective university-level graphic design program. Wang's study examined important competencies for graphic design curriculum development and instructional design. The top five most desirable competencies were "perform graphic design creatively," "apply the principles of graphic design," "apply the concepts of problem solving," "apply design concepts," and "apply the techniques of page layout and publishing software." Three of the five significant competencies were also identified as significant in this current study. Those competencies were "perform graphic design creatively," "apply the principles of graphic design," and "apply the techniques of page layout and publishing software."

Wang's (2006) study also sought to determine the most needed competencies for employment in the graphic design industry. The top five scoring competencies were "apply the principles of graphic design," "apply the basics of graphic design for print production," "apply the techniques of page layout and publishing software," "be able to learn and comprehend," and "apply the basics of graphic design for webpage development." Again, three of the five top-ranked competencies were also identified as significant in this current study. Those competencies include "apply the principles of graphic design," "apply the techniques of page layout and publishing software," and "apply the basics of graphic design for webpage development."

Wang (2006) reported that the most significant competencies identified in the 2006 study were both design-oriented skills and soft skills-related competencies, such as working well with others. Design-oriented skills are those related to application or, in the

case of this current study, content knowledge areas. Soft skills refer to disposition or, in this case, 21st century skills. This study identified both content knowledge areas and 21st century skills among the most desired competencies needed in an effective 21st century university-level graphic design program. The results from round four of this study and the results of Wang's study identified three out of 10 common competencies. Therefore, it can be concluded that the results of Wang's study are similar to the results of this current study. Table 10 is a comparison of findings from round four of the current study to findings from Wang's former study. It should be noted that this study did not delineate between the two groups of participants; however, Wang's study examined competencies related to curriculum in which educators were surveyed and also identified competencies most needed for employment in which both educators and industry professionals were surveyed. Since this study addresses curriculum issues, it was important to include both survey results. Table 10 lists the 10 most needed competencies from this study and also identifies the top five most needed competencies from those participants surveyed in Wang's study.

Table 10

Comparison of Wang's Findings to this Current Study

Current Study	Wang's Study
21st Century Graphic Design Skills, Content Knowledge, and Tools Needed In An Effective University-level Graphic Design Program	Competencies Most Needed for Graphic Design and Curriculum Development
1. Apply the basic principles of graphic design aesthetics, including composition.	1. Perform graphic design creatively.
2. Perform graphic design creatively.	2. Apply the principles of graphic design.
3. Apply the concepts of typography.	3. Apply the concepts of problem solving.
4. Exhibit interpersonal skills (problem solving, curiosity, motivation, innovation, conceptual thinking, communication).	4. Apply design concepts.
5. Write clearly, concisely, and correctly.	5. Apply the techniques of page layout and publishing software.
6. Exhibit effective presentation skills.	Competencies Most Needed for Employment
7. Understand the history of graphic design.	1. Apply the principles of graphic design.
8. Knowledge of current communications industry trends (convergence, visual communication, storytelling, videography).	2. Apply the basics of graphic design for print production.
9. Apply the basics of graphic design for print production.	3. Apply the techniques of page layout and publishing software.
10. Exhibit skills in the foundations of artistic expression (painting, drawing, sculpting).	4. Be able to learn and comprehend.
	5. Apply the basics of graphic design for webpage development.

The following chapter includes a summary of the study as well as an interpretation of the findings. Limitations and suggestions for future research are also discussed.

Chapter 5: Discussion and Conclusions

Summary

This final chapter includes an overview of the research study as well as a thorough discussion of its implications. Limitations are also addressed, followed by suggestions for future research in the field of graphic design.

As previously mentioned, the purpose of this study was to identify perceived 21st century graphic design skills, content knowledge, and tools needed in a successful university-level graphic design program. Several factors influenced the need for this current research. The large number of graphic design programs, combined with the various disciplines under which these programs are housed, have created inconsistencies in the graphic design curriculum. While it may not be desirable to establish *cookie-cutter* graphic design programs which include the same curriculum, it is important that all students are acquiring those competencies needed to be successful in today's graphic design field. Also, as technology trends continue to evolve, it is necessary to identify which, if any, of these emerging technologies are needed in a successful university-level graphic design program. Though similar studies have been conducted and standards have been established, the need existed for a study to determine if those standards were still relevant in the 21st century. In addition, the need was present to conduct this current study in a different geographic region to examine if location had any impact on current 21st century graphic design skills, content knowledge, and tools needed in an effective university-level graphic design program. This study sought to answer the following research questions:

Research Question 1: What are 21st century graphic design skills as perceived by university-level educators and industry professionals?

Research Question 2: What are 21st century graphic design content-knowledge areas as perceived by university-level graphic design educators and industry professionals?

Research Question 3: What are 21st century graphic design tools as perceived by university-level graphic design educators and industry professionals?

Research Question 4: How do findings from this current study compare to those of Wang's (2006) study conducted in Kansas and Missouri?

In order to sufficiently answer these questions, a modified Delphi Technique was used as the research methodology. This method was selected primarily due to the emphasis it placed on reaching a consensus among experts. As previously discussed, the traditional Delphi method was originally developed in the 1950s by the Rand Corporation, but has since evolved and has gained in popularity and use. The modified Delphi used in this current study followed guidelines proposed by Haughey (n.d.) and consisted of seven steps. This study also wished to expand upon findings from Wang's (2006) study, which also used a modified Delphi. Some notable advantages of this research method include anonymity of participants; cost-effectiveness; free of pressure and influence; conducive to the sharing of information; independent thinking; representative of a broad perspective; hostile free environment; and a fast, efficient means for arriving at a consensus among experts (Andrews & Allen, 2002; Powell, 2003).

This study utilized four rounds of questioning. Rounds one and two included both quantitative and qualitative components. The round one questionnaire was the same questionnaire used in Wang's (2006) study, with one additional question added. Participants were asked to rank competencies on a Likert scale ranging from extremely undesirable to extremely desirable. Each statement included a comment section, giving

participants the opportunity to include positive and negative comments regarding each statement. Participants were also asked to include any competencies and tools not previously mentioned. Comments were coded and categorized according to themes, then formulated into new statements to be included on subsequent questionnaires. The rounds of questioning encourage participants to reach an eventual consensus among the group. The modified Delphi generally consists of three rounds; however, it is recommended that a fourth round be included to gain a clearer consensus. Rounds three and four contained no qualitative components. Round four varied in format from the previous three as it requested that experts rank all identified significant competencies and tools in order of importance. The most highly desired competencies remained among the most significant throughout all rounds of questioning. These competencies included "apply the basic principles of graphic design aesthetics, including composition"; "apply the concepts of typography," and "perform graphic design creatively." Other highly significant competencies ranking in the top five in various rounds included "exhibit interpersonal skills," "apply the basics of graphic design for webpage development," and "apply the techniques of using page layout and publishing software." The majority of these competencies are considered to be content knowledge, with the exception of "exhibit interpersonal skills" which is considered a 21st century skill. However, round four produced some additional statements that were not initially in the top five in previous rounds. These included "write clearly, concisely, and correctly"; "effective presentation skills"; "understand the history of graphic design"; "knowledge of current communications industry trends"; "apply the basics of graphic design for print production"; and "exhibit skills in the foundations of artistic expression."

All questionnaires were administered via the internet survey software

SurveyMonkey. Participants were sent an email with a link to the questionnaire as well as instructions for completing the questionnaire. Experts were given 1 week to complete each round, with a week off in between rounds. A total of 43 experts from North and South Carolina, consisting of graphic design educators and industry professionals, agreed to participate in this study. Participation level remained relatively high throughout all rounds, with a minimum response rate of 72%. All participants were contacted via email request, with the exception of eight experts. The researcher created a webpage outlining the study as well including information regarding any benefits and risks to participants. The webpage link was sent to all AIGA members in North and South Carolina. If an expert was interested in participating in the research, he or she was then prompted to contact the researcher via email. Again, this method yielded eight participants.

Interestingly, the results found in Wang's (2006) study were similar to those found in this current study. Research Question 4 dealt with the comparison of Wang's findings with this research. Three of the top five competencies identified by Wang were also identified by experts in this study. With regards to Research Question 1, three of the top 10 most desirable competencies were 21st century skills-related. Those included "exhibit interpersonal skills"; "write clearly, concisely, and correctly"; and "effective presentation skills." These statements relate to how individuals interact with each other and how individuals communicate, both verbally and written. Research Question 2 sought to identify content-knowledge areas. This question yielded the highest number of significant competencies. Three statements remained consistently among the top five throughout all rounds of questioning. Each is related to application and performance, all content knowledge-related skills. Those statements included "apply the basic principles of graphic design aesthetics, including composition"; "apply the concepts of

typography"; and "perform graphic design creatively." The remaining top five statements were also related to content knowledge. Finally, Research Question 3 identified tools needed in an effective university-level graphic design program. Experts overwhelmingly identified the Adobe Creative Suite as most desirable. Microsoft Office and sketchbooks were also among the top three tools. When analyzing the results of this study, one must examine how this research adds to the existing body of research, as well as the implications resulting from this research and how it can be applied to university-level graphic design programs.

Interpretation

Though similar findings regarding significant competencies were reported both in this current study and in Wang's (2006) study, discrepancies among graphic design educators and industry professionals have continuously been an issue in this field. As mentioned previously in Chapter 2, collaboration among the two groups has long been in existence; however, the relationship has been somewhat complicated (Latham, 2012). The underachievement of students in the workforce has been identified as the primary source of this conflict (Lapin, 1982). Wang's research also exemplifies this. Based on his findings, Wang reported that industry professionals placed more emphasis on a mastery of competencies that are considered to be more task-oriented, while educators placed a higher emphasis on knowledge-based competencies. In order for university-level graphic design programs to adequately prepare students, educators and industry professionals must come to some agreement. This study distinguishes itself from others in that one of the fundamental goals of this research was to encourage experts to achieve some agreement regarding what is needed in an effective graphic design program. This is also why the Delphi Method was an appropriate research method. Results show that

educators and industry professionals do agree on those competencies considered to be most needed in an effective 21st century university-level graphic design program.

Though this study had a slightly higher number of industry professionals commit to participating in the study, the actual number of experts who participated in each round remained relatively equal among the two groups. Therefore, the findings of this study can add valuable information to the body of research currently available on the subject, which is rather limited. This study also uncovered some interesting findings regarding technology and how it is impacting the current state of university-level graphic design programs.

As previously mentioned, one of the main contexts for which this study was to be conducted was to examine how evolving technology is impacting 21st century skills, content knowledge, and tools needed in an effective university-level graphic design program. Technological impacts also fueled the need to expand upon Wang's (2006) study. However, as Wang's study uncovered, as well as this current study, technology has not played a significant role in altering competencies needed in an effective university-level graphic design program. One notable example of this is the fact that the third most needed tool, as identified by experts, was a sketchbook. It is interesting that this study, conducted 6 years after Wang's study, did not reveal any new, highly desired competencies based on technology. Though numerous tools related to technology were selected as highly necessary, the competencies identified in this study were not necessarily competencies dependent on technology. Since content-knowledge areas, specifically application and performance-type competencies, were selected as most needed in this research, one can assume that adaptability to the technology is more desirable than the student having a working knowledge of each and every piece of

technology available. This is not to say, however, that findings from this research did not uncover new technological trends that are being applied to the graphic design field.

It should be noted that two tools identified as significantly desirable in an effective university-level graphic design program are considered tools of the 21st century. Social media tools, such as Twitter and Facebook, and the Cloud between designer, client, and printer were included among the top 10 most needed tools. This exemplifies that, though core competencies remain among the most highly desired, the graphic design field is adjusting to and embracing current 21st century technological trends. It was also interesting though that no experts included hand-held tablets, such as iPads, as being highly desirable. It can be concluded, based on feedback from experts, that technology does not impact the foundational knowledge expected of university-level graphic design students, but that tools are important in facilitating the learning, comprehension, and achievement of university-level graphic design students. So, the question now becomes, what do all of these findings mean for current 21st century university-level graphic design programs?

The researcher in this study is also currently a graphic design educator in a small, liberal arts university. Thus, the sole overarching goal of this study was to determine how to best prepare graphic design students for the industry. Since graphic design programs are not required to undergo accreditation, it is up to graphic design educators along with industry professionals to ensure that these highly significant competencies are being included in the current graphic design curriculum. As previously stated in Chapter 1, the problem is that many students are graduating with similar graphic design degrees but with dissimilar skills and content knowledge. Some students are under the impression that they are professional graphic designers, when in fact they have not

received an adequate number and/or scope of courses focusing in graphic design. Since required accreditation by NASAD of all graphic design programs is not feasible as a solution to this problem, one must look for alternatives.

Program Evaluation. The research discussed in Chapter 2 did not identify a particular solution to curriculum issues identified in the graphic design field. Therefore, it is most appropriate to propose a plan for incorporating the findings of this research. Based on an examination of other disciplines, such as education, the most logical application for assessing and/or developing a graphic design curriculum encompassing each of the competencies identified in this research is to conduct a program evaluation in each institution offering graphic design degrees. This, obviously, would need to be conducted by those teaching in the graphic design program of each institution. The following is a proposed plan for graphic design educators regarding how best to put in place or establish these findings within a university-level graphic design program.

Grayson (2011) described the purpose of a program evaluation as being "methodically systematic, addressing questions that provide quality information about the quality of a program in order to assist decision making aimed at program improvement, development or accountability and to contribute to a recognized level of value" (p. 4). It is assumed that incorporating the competencies identified from this study would contribute to increasing the value of a graphic design program. This plan would also assist educators in determining whether or not these competencies were being adequately included within each course offered in the program. Though various types of program evaluations are recognized, a summative evaluation would be most appropriate for those programs seeking to evaluate existing curriculum. However, if a new graphic design program is developing, a formative program evaluation would be most appropriate in

order to determine what courses should be included. Since the issues addressed in this research are concerned primarily with current university-level graphic design programs, a summative program evaluation will serve as the proposed application.

According to Grayson (2011), conducting an effective program evaluation consists of seven essential steps: learn the institutional context of the program being studied; clarify the program's theory; identify all stakeholders; clarify the purpose of the evaluation; identify evaluative questions and criteria; locate, collect, and analyze the data; and report findings. Step one, learning the institutional context of the program, involves understanding why the program is needed and what kinds of needs are being addressed with the program. In higher education specifically, this also includes understanding the mission and vision of the university (Grayson, 2011). This would be a very important piece of the graphic design program evaluation, especially in the case of the researcher's institution, because understanding the mission of the liberal arts university would help tremendously in aligning the program with both the liberal arts standards set forth by the university as well as those 21st century skills, content knowledge, and tools identified by this study. It would also be equally important to identify the mission of the graphic design program being evaluated. As mentioned in Chapter 2, it was suggested that most graphic design programs have a similar mission, which is to "produce a fully-prepared, entry-level design professional" (Heller, 2005, p. 14).

In clarifying the program's theory in step two of the program-evaluation process, the program evaluator must learn the program's purpose, who the program serves, what the intentions of the program are, what the program wishes to accomplish, and what kinds of resources are needed to manage the program. The findings regarding tools needed in an effective university-level graphic design program would assist tremendously with this

stage of the evaluation process. Many resources, including software and hardware, as well as more traditional tools, have all been addressed with regards to their importance. Grayson (2011) also recommended conducting interviews with staff of the program being evaluated and to also locate written documents, such as program proposal materials and evaluation reports. In this context, it also would be beneficial to look at course descriptions, program-learning outcomes, and student-learning outcomes. If competencies identified from this study were not addressed in these three previous areas, significant modifications would be in order. Step three involves the identification of all stakeholders. It is assumed that the primary stakeholders are the students; however, educators and industry professionals would also have a vested interest in the outcome of the evaluation.

Clarifying the purpose of the evaluation is step four of the program-evaluation process. The purpose of this proposed program evaluation is relatively clear, to assess the quality and value of the program. Step five addresses identifying evaluation questions and criteria. Questions should be broad and linked to specific components of the program itself, such as learning outcomes. This is the most crucial step in the program evaluation (Grayson, 2011). Most likely, one important question to be addressed for current graphic design programs is "does the current graphic design concentration align properly with the 21st century skills, content knowledge, and tools identified in this research study?"

Locating, collecting, and analyzing the data, step six in the process, is intended to answer the evaluation questions. Common data collection methods include interviews, focus groups, surveys, and/or observations. In some cases, appropriate data may already exist, and no new data collection is needed (Grayson, 2011). For this proposed

evaluation, it is presumed that both new data as well as previously collected data would be used. The final step is to report the findings. It is important for program evaluators to ensure that the reported findings do in fact answer the evaluation questions. In addition to these suggested steps, it may also be necessary for programs to assemble community advisory boards of local or regional graphic design professionals in an ongoing effort for graphic design curricula to remain responsive to and/or reflective of the skill sets most important in that particular area's professional design community. Though this step was not mentioned in Grayson's recommendations, it is most applicable within the context of this study where an emphasis is placed on collaboration among graphic design educators and industry professionals.

In this recommended application of the research findings, it would be appropriate for the findings of the program evaluation to lead to the incorporation of the competencies identified in this study. However, in some cases, results of the program evaluation may lead to validation of existing graphic design curricula. As previously mentioned, the program evaluation would likely be conducted by faculty within the graphic design program. It should be stated that this plan is for those programs that are not currently accredited by the NASAD. This is because the NASAD conducts its own evaluations of programs in order to continuously assess the relevance and effectiveness of programs. Therefore, this proposed application essentially levels the playing field by allowing programs that cannot receive accreditation, due to a lack of course offerings and/or required hours in the discipline, to assess their own curriculum. Table 11 is an outline of the program evaluation process.

Table 11

Outline for Conducting a Program Evaluation

1. Learn the institutional context of the program being studied
2. Clarify the program's theory
3. Identify all stakeholders
4. Clarify the purpose of the evaluation
5. Identify evaluative questions and criteria
6. Locate, collect, and analyze the data
7. Report findings

This study essentially sought to identify and/or reevaluate 21st century graphic design skills, content knowledge, and tools. The core issue here is that though universal graphic design standards may not be desirable by some for whatever reason, whether it be lack of diversity or limited options for students, certain expectations are required of all students graduating with graphic design degrees. If these core competencies are not going to be enforced, it is then the responsibility of graphic design educators to ensure that these competencies are being taught. This allows all students a fair opportunity to be competitive in the graphic design job market, which is increasingly gaining in popularity. Now that these specific competencies and tools have been uncovered in this study, graphic design programs can evaluate their own curricula to determine if they are effective in terms of what educators and industry professionals indicate are most important.

Though this study reveals valuable information, it does not come without its limitations. The following section will discuss those limitations and how each was addressed, and will conclude with recommendations for further research.

Limitations

The first limitations to be discussed are those related to the methodology,

beginning with limitations of quantitative and qualitative research, as well as the convergent parallel design used to meet the specifications of the Delphi process. As reported in Chapter 3, limitations of quantitative studies include protecting anonymity, obtaining permissions, and adequately communicating the purpose of the study. In order to protect the anonymity of participants, all correspondence with participants was done via personalized email. In the case where all experts had to be contacted at once, each participant was blind copied in the email ensuring that no participant email addresses were shared. Also, an advantage to the Delphi process is anonymity because experts never meet face-to-face. The purpose of the study, as well as benefits and potential risks, were outlined in the invitation letter and informed consent. Once invitations and consents had been sent, participants were asked to reply acknowledging that he or she had read the consent and agreed to serve as a participant.

Since this study used a mixed-methods approach, qualitative limitations also have to be addressed. These include avoiding researcher bias, preserving participant identities, and sufficiently describing the purpose of the study. Researcher bias was not an issue in this study because each instrument was based on participant responses from the previous. The coding of the qualitative data were verified by a qualitative expert, thus ensuring results were not skewed by the researcher. The limitation of the convergent parallel design, which again means analyzing and collecting data simultaneously, is inconsistent sample sizes (Creswell, 2012). Though sample sizes varied from round to round, a response rate of at least 30 was reached in all rounds.

The Delphi Technique also has specific limitations. According to Powell (2003), researchers have pointed out that the Delphi is a very time-intensive method. However, the modified Delphi used in this study expedited the process and overall time

commitment of both the participants and the researcher. Some additional weaknesses of the technique include perceptions given by participants may not be representative of the population, the elimination of outliers may lead to a *middle-of-the-road* consensus, results cannot be viewed as a complete solution to the problem, the requirement of oral and written skills, the requirement of sufficient time, and the requirement of a commitment from participants to remain involved throughout the duration of the study (Andrews & Allen, 2002). Though perceptions may not be representative of the entire population, results of this study were consistent with those from a similar study conducted in Kansas and Missouri. No outliers were eliminated in this study. Fortunately, the coding process allowed the researcher to create similar themes, thus including all responses from participants. Though not a complete solution to the research problem, the results of this study will aide in university-level graphic design curriculum development and assessment. Issues related to oral and writing skills were not a problem, primarily because the majority of the questionnaires required no writing skills and no oral communication was needed to conduct this study. The time commitment required of participants was a legitimate concern considering that the process spanned over a month's time; however, most participants remained committed to the study throughout the process, as response rates reflect, which speaks highly of their dedication to the graphic design field.

Other limitations relate to the proposed data collection instruments. Limitations related to the use of web-based questionnaires include the potential for low response rates, technological problems, security issues, and potential problems with email, specifically Internet junk mail. The use of SurveyMonkey as the data collection software did pose a problem in the fourth-round questionnaire. The fourth round, as stated earlier, requested

participants to rate competencies in order of importance using a ranking format. There were a total of 34 statements related to skills and content knowledge, and 14 related to tools. The issue encountered came from the actual format in which SurveyMonkey receives responses. For example, when attempting to rank a statement as number one, rather than placing a number one beside the statement, SurveyMonkey reordered the list and placed that statement at the top. Participants were emailing the researcher explaining that the questionnaire was not responding properly. Fortunately, this issue was resolved with the assistance of a professional institutional researcher and an email was sent to all participants explaining the design of the questionnaire. It is not believed that this issue caused a lower response rate because response rates from round four were the same as the response rates from round three, in which no issues were encountered.

The survey format of the fourth-round questionnaire also posed some issues with regards to the data collected. Round four, again, requested participants to rank the top 20 competencies most needed in a successful university-level graphic design program. However, rather than choosing only 20 statements, some participants ranked all 34, which slightly skewed the data. Despite this limitation, that data generated from the final round proved to be rather consistent with the previous rounds. It should also be noted that the modified Delphi method used in this current study did not require a fourth round; however, a fourth round was recommended in order to gain a clearer consensus among experts.

Other limitations put in place by the researcher, which are referred to as delimitations, included participant selection. This study limited expert participation to university-level graphic design educators and graphic design industry professionals. This decision was based on the fact that this panel of experts has the most relevant, working

knowledge of the issue at hand and will also be affected by the outcome of this study. Also, since this study was an expansion of Wang's (2006) study, it seemed appropriate to use a panel of experts with similar qualifications to those used in his study. This study also focused on only the states of North and South Carolina. This was done purposely because the researcher wanted to conduct this study in a region outside of the states where Wang's study focused, Kansas and Missouri. Lastly, this research targeted only university-level graphic design programs. However, the skills, content knowledge, and tools identified in this study could easily be applied to community college-level programs. This and other suggestions for future research on the issue of graphic design competencies will be discussed in the following section.

Recommendations for Future Research

As reported earlier, this research utilized a modified Delphi process with 43 experts committing to participate. However, the highest response rate was reached in round one, with 38 experts completing the questionnaire. It would be interesting to conduct this study with more participants. Though acquiring experts for this research was challenging, it was encouraging that many were very committed to the discipline and were willing to help. Thus, conducting this study with more participants would significantly add to the research. Also, it would be important to expand and/or replicate this study for assessment purposes. Though the highest ranking competencies identified in this study were not necessarily technology-dependent, there was evidence that the graphic design field is evolving and is embracing 21st century tools. Therefore, it would be necessary to reevaluate these findings as technology continues to develop. One other recommendation relating to the methodology is to conduct this study using a different research method. Though the Delphi proved to be an appropriate method and was

essential to obtaining the valuable results that were gathered, it would be interesting to conduct a completely qualitative study using focus group interviewing and one-to-one in-depth interviewing. Though this type of study would be more time-consuming, it would, again, add valuable findings to existing research and would also aide in validating the results of this study and others like it.

As mentioned previously, this study was conducted using experts from North and South Carolina. Wang's (2006) study was conducted in Kansas and Missouri. Both studies had similar findings. When looking at the data from both, the next most logical step would be to conduct this study regionally within the United States and then, based on the findings, expand it to include the nation as a whole. In order to adequately conduct a regional or national study, more experts would have to commit to the research. This goes back to the recommendation discussed earlier regarding gathering more participants for the study. Though it would prove to be more challenging, it could be done, and the results would be invaluable in assessing and evaluating the curriculum of university-level graphic design programs.

In addition to expanding the study regionally and/or nationally, it would also be important to conduct this study in the community college setting. Though not addressed in this research, numerous programs in graphic design are offered at the associate degree level. Therefore, using the same research design, one could replicate this study state-by-state, regionally, and then nationally utilizing a similar expert panel including community college graphic design educators and industry professionals. Another related recommendation would be to expand the study to include all postsecondary levels. Conducting a study of this nature utilizing university-level graphic design programs and community college programs would yield information important for curriculum

development, especially if an emphasis was placed on collaboration among all higher education institutions.

As mentioned previously, this study did not delineate between the two groups of participants—educators and industry professionals. However, it would be interesting to conduct this same study while also analyzing discrepancies between the two groups regarding student expectations. Wang's (2006) study examined this issue; however, his study was conducted in 2006. Thus, a more recent study exploring this topic would be beneficial.

Finally, the last recommendation for further research is also the most important. The final suggestion is to implement the proposed application of these findings, which is to conduct a program evaluation utilizing the competencies and tools identified in this research as the standards for evaluation. This recommendation would essentially bring the findings of this study full-circle. As stated previously, the overarching goal of this research is to improve student learning within university-level graphic design programs and to ensure that students are being adequately prepared for the workforce. The most logical means for achieving this is to find a method for assessing and developing the content of the graphic design curriculum. A program evaluation is an excellent means for meeting this goal. Utilizing the guidelines discussed in this chapter regarding steps for conducting a program evaluation, one could thoroughly and effectively evaluate current graphic design programs to confirm or deny whether courses offered are sufficiently covering the skills and content knowledge needed in an effective university-level graphic design program. One could also evaluate whether or not programs are providing the necessary tools needed to facilitate the learning and comprehension of 21st century graphic design skills and content knowledge. Without implementation, the results of this

study will not help the most important stakeholders, the graphic design students.

Conclusion

As discussed previously, the results of this study will add to the existing body of research available regarding graphic design education. Wang (2006) stated in the closing remarks of his research that "there is a critical need to build on this research and ensure appropriate curriculum is available for education specialists" (p. 81). This contention is essentially what was achieved in this current study. Though it was originally thought that technology would have a more significant role in the identification of 21st century skills and content knowledge, the confirmation that the core concepts of graphic design remain the most important is essential to curriculum development and assessment of 21st century university-level graphic design programs. This idea can best be summed up by considering a statement received from one of the participants of this study.

> The most critical competency a student can bring forth is their innovative thinking and confidence to think creatively. Tools will change, techniques will vary, but the confident, creative mind has consistently been of service to humanity and will continue to be. The ideation process that seeks to understand, explore, develop new insights, and then create and iterate is the heart of innovation and creativity. Tools and techniques are just tools and techniques in the hands of smart creative thinkers.

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Appendix A

Graphic Design Programs and Concentrations in North and South Carolina and Description of Data Collection Method

South Carolina	
Anderson University	BA in Art with Graphic Design concentration
Charleston Southern University	BA in Graphic Arts and Design
Claflin University	BA in Digital Design
Clemson University	BS in Graphic Communications
Coastal Carolina University	BA in Graphic Design
Coker College	BA in Graphic Design
Lander University	BS in Visual Arts with Graphic Design concentration
Newberry College	BA in Art with Graphic Design concentration
Northern Greenville University	BA in Studio Art with Graphic Arts concentration
University of South Carolina Upstate	BA in Studio Art with Graphic Design concentration
Winthrop University	BFA in Art with Graphic Design concentration
Francis Marion University	BA in Fine Arts with Visual Communication concentration
North Carolina	
Barton College	BFA in Art and Design with Visual Design concentration
Campbell University	BA in Graphic Design
Chowan University	BS in Graphic Communications with Graphic Design concentration
	BS in Graphic Design
Elon University	BFA or BA in Art with Digital Art concentration
Gardner-Webb University	BA in Communication Studies with Graphic Design concentration
High Point University	BA in Graphic Design and Digital Imaging
Johnson C. Smith University	BA in Visual Art with Graphic Art concentration
Lenoir-Rhyne University	BA in Graphic Design
Mars Hill University	BA in Art with Graphic Design concentration
Meredith College	BA in Graphic Design
Methodist University	BFA in Graphic Design
Mount Olive College	BA in Visual Communication
	BS in Visual communication
Peace College	BA in Communications with Graphic Design concentration
Saint Augustine's College	BA in Visual Arts with Graphic Design concentration
Appalachian State University	BFA in Graphic Design
	BS in Graphic Arts and Imaging Technologies
Elizabeth City State University	BA in Graphic Design
	BS in Graphic Design
North Carolina A&T University	BA in Visual Arts with Graphic Design concentration
North Carolina Central University	BA in Art with Visual Communication concentration
North Carolina State University	BA in Graphic Design
University of North Carolina at Greensboro	BFA in New Media and Design
Western Carolina University	BFA in Graphic Design
Winston-Salem State University	BA in Visual Arts with Computer Graphics concentration
Wingate University	BA or BFA in Art with Graphic Arts concentration

Since there is no current listing of all graphic design programs and concentrations in the United States, the researcher determined the number through independent data collection. The U.S. Universities by State website (http://www.utexas.edu/world/univ/state/), accessed through the University of Texas at Austin, provides a database of all colleges

and universities in the United States. The researcher used this database as a means to access each individual school's website. From that point, the researcher determined whether or not each North and South Carolina college or university offered a graphic design program or concentration. This was accomplished by accessing each school's current program offerings. Due to the difficulty in accessing some of the school's program information and the fact that graphic design programs are named differently and housed in different disciplines, it is possible that some schools were overlooked. Therefore, this number is approximate.

Appendix B

Invitation Letter

August 17, 2012

Dear Mr./Ms.

I am a doctoral candidate in the School of Education at Gardner-Webb University. I am currently conducting a research study in the field of graphic design. The purpose of my study is to identify 21st century skills, content knowledge, and tools needed in an effective university-level graphic design program. In order to effectively conduct this study, I am seeking participation from a panel of graphic design educators and industry professionals. Thus, I am writing to ask you to serve as a participant.

If you agree to participate in this study, you will be asked to complete a series of four rounds of questionnaires, each with the purpose of gaining a consensus among experts. The first three rounds of questionnaires will seek to identify 21st century skills, content knowledge, and tools. In the first and second-round questionnaires you will have the opportunity to provide positive and negative comments regarding each statement, as well as add additional statements not included in the questionnaire. The fourth round questionnaire is intended to establish the importance of each skill, content knowledge, and/or tool. The results of this study are intended to aide in the development and/or assessment and evaluation of university-level graphic design curriculum, and will help to ensure that students are being adequately prepared to enter the graphic design industry. Each questionnaire should take no more than 10 to 15 minutes to complete. It is expected that the duration of the study will be approximately one to two months.

If you are willing to be a participant in this study, please read the following consent form and reply via email to _____ stating your participation. Thank you for your time and for considering this request. Should you have any questions, please feel free to contact me at _____ or by email. You may also contact my Dissertation Committee Chair, Dr. Jane King at_____.

Sincerely,

Amanda W. Bridges
Doctoral Candidate
School of Education
Gardner-Webb University

Appendix C

Informed Consent

Informed Consent

Identification of Perceived 21st Century Graphic Design Skills, Content Knowledge, and Tools Needed In An Effective University-level Graphic Design Program

Gardner-Webb University

I am currently conducting a research study in the field of graphic design. The purpose of this study is to identify perceived 21st century graphic design skills, content knowledge, and tools needed in a successful university-level graphic design program.
The study will utilize the Delphi Technique as the research method, which requires your participation in four rounds of questionnaires. Each questionnaire should require no more than 10 to 15 minutes of your time. It is anticipated that the duration of the study will be approximately one to two months. The following is an explanation of the benefits and risks to you as a participant in this study.

Benefits:

1. All results of the study will be shared with all participants.
2. Results of the study may aide in graphic design curriculum development and/or assessment.
3. The study will include recommendations regarding graphic design curriculum.

Risks:

1. There are no anticipated risks or discomforts to you as a participant of this study.
2. Questionnaires will be coded, however, no responses will be shared with others and all responses will be kept completely confidential.

Your participation is entirely voluntary, and you may choose to discontinue your participation at any time throughout the duration of the study with no penalty and/or loss of benefits. In addition, you will have the freedom to choose not to answer any questions contained in the questionnaires.

Thank you for considering this request for participation. To confirm or deny your participation please reply via email to _____ stating your preference. If you should have any questions, please feel free to contact myself, Dr. Jane King, or the IRB Institutional Administrator, Dr. Franki Burch at:

Amanda W. Bridges
Doctoral Candidate

Jane C. King
Assistant Professor, School of Education

Dr. Franki Burch
IRB Institutional Administrator

Appendix D

Permission to Expand Wang's Study

Dear Dr. Wang,

I successfully defended my proposal this past week. However, my committee recommended that I expand your study rather than replicate it. Thus, I am writing to request your permission to expand upon your previous research study on graphic design competencies?

Again, I thank you for your willingness assist me with this process, and I look forward to hearing from you soon!

Thanks again!

Sincerely,
Amanda Bridges

Amanda Bridges
Graphic Design Instructor
Gardner-Webb University

Hi Amanda:
Please feel free to do so. Congratulations and good luck on data collection.

Shine Wang

Appendix E

Permission to Modify Survey Instrument

Dear Dr. Wang,

I hope you are doing well. As you may remember, I am replicating your dissertation study on graphic design competencies. I am currently nearing the end of the proposal process and would like to ask your permission to add one modification to the survey you developed. I would like to add a comment section requesting participants to please list any tools that should be considered. Other than that, the survey will remain unchanged.

Thank you for your time and for allowing me to replicate your study. I look forward to hearing from you soon.

Sincerely,
Amanda Bridges

Amanda W. Bridges
Graphic Design Instructor
Department of Communication Studies
Gardner-Webb University

Dear Amanda:

I was out of my office for a while, and I am sorry that I did not reply your message sooner.

Sure, please free free to do so. Just a reminder. If you want to add a comment section requesting participants to please list any tools that should be considered, you need to consider how to analyze and interpret the data.

Good Luck.

Shine Wang

Appendix F

Round One Questionnaire

This first round questionnaire is intended to identify 21st century skills, content knowledge, and tools needed in an effective university-level graphic design program. Your participation is greatly appreciated. Please complete and return by 00/00/000.

Please rate each of the following statements on a scale ranging from extremely undesirable to extremely desirable by selecting the appropriate option.

1. Is your institution public or private?

- Public
- Private
- Not Applicable

2. What is the approximate size of your institution?

- Under 1,000 students
- Between 1,000 and 5,000 students
- Between 5,000 and 10,000 students
- Over 10,000 students
- Not Applicable

3. What is the approximate number of students in your program?

- Under 50 students
- Between 50 and 100 students
- Between 100 and 500 students
- Over 500 students
- Not Applicable

4. What the approximate size of your business?

- Under 20 employees
- Between 20 and 50 employees
- Between 50 and 100 employees
- Over 100 employees
- Not Applicable

5. Understand the history of graphic design.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

6. Apply sales promotion techniques for advertisement and marketing.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

7. Determine the costs associated with graphic design and other creative services.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

8. Explain and evaluate customer service issues.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

9. Apply the principles of graphic design.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

10. Apply the concepts of typography.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

11. Apply basic knowledge of Gestalt psychology to graphic design.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

12. Apply the basics of graphic design for multimedia.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

13. Apply the basics of graphic design for print production.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

14. Apply the basics of graphic design for webpage development

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

15. Apply the basics of photography for graphic design purposes.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

16. Perform graphic design creatively.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

17. Prepare digital documents.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

18. Apply the techniques of color management.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

19. Apply the techniques of digital prepress.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

20. Apply the techniques of photographic lighting.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

21. Apply the techniques of photography.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

22. Apply the techniques of screen printing.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

23. Apply the techniques of using drawing software.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

24. Apply the techniques of using multimedia creation software.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

25. Apply the techniques of using page layout and publishing software.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

26. Apply the techniques of using image editing software.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

27. Apply the techniques of webpage development software.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

28. Write clearly, concisely, and correctly.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

29. Please list any other competencies that should be considered.

30. Please list any tools that should be considered.

Thank you for your time and participation. Should you have any questions, please contact me by phone or email at (704) 406-2137 or awbridges@gardner-webb.edu

Appendix G

Round Two Questionnaire

Round Two Questionnaire

This second round questionnaire is intended to identify 21st century skills, content knowledge, and tools needed in an effective university-level graphic design program. Your participation is greatly appreciated.

Please choose the appropriate option for questions one through four. Rate statements five through 36 on a scale ranging from extremely undesirable to extremely desirable by selecting the appropriate option. Feel free to provide positive or negative comments regarding each statement. Choose all that apply for question 37. Please add any additional statements not previously mentioned in question 38.

Please complete and return by Friday, October 12, 2012.

1. Is your institution public or private?

- ○ Public
- ○ Private
- ○ Not Applicable

2. What is the approximate size of your institution?

- ○ Under 1,000 students
- ○ Between 1,000 and 5,000 students
- ○ Between 5,000 and 10,000 students
- ○ Over 10,000 students
- ○ Not Applicable

3. What is the approximate number of students in your program?

- ○ Under 50 students
- ○ Between 50 and 100 students
- ○ Between 100 and 500 students
- ○ Over 500 students
- ○ Not Applicable

4. What is the approximate size of your business?

- ○ Under 20 employees
- ○ Between 20 and 50 employees
- ○ Between 50 and 100 employees
- ○ Over 100 employees
- ○ Not Applicable

5. Understand the history of graphic design.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

6. Exhibit skills in the foundations of artistic expression (example: painting, drawing, sculpting).

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

7. Apply the principles of graphic design.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

8. Apply the concepts of typography.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

9. Apply basic knowledge of Gestalt psychology to graphic design.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

10. Perform graphic design creatively.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

11. Write clearly, concisely, and correctly.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

12. Exhibit interpersonal skills (examples: problem solving, curiosity, motivation, innovation, conceptual thinking, communication).

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

13. Exhibit effective presentation skills.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

14. Knowledge of current communications industry trends (example: convergence, visual communication, storytelling, videography).

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

15. Apply sales promotion techniques for advertisement and marketing.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

16. Apply the basics of packaging design.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

17. Determine the costs associated with graphic design and other creative services.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

18. Explain and evaluate customer service issues.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

19. Apply the basics of graphic design for multimedia.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

20. Apply the basics of graphic design for print production, including knowledge of finishing operations.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

21. Apply the basics of graphic design for webpage development.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

22. Apply the basics of photography for graphic design purposes.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

23. Prepare digital documents.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

24. Apply the principles and techniques of color theory and management.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

25. Apply the techniques of digital prepress.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

26. Apply the techniques of photographic lighting.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

27. Apply the techniques of photography.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

28. Apply the techniques of screen printing.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

29. Apply the techniques of using drawing software.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

30. Apply the techniques of using multimedia creation software.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

31. Apply the techniques of using page layout and publishing software.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

32. Apply the techniques of using image editing software.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

33. Apply the techniques of webpage development software.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

34. Apply the techniques of video editing software.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

35. Apply the techniques of 3D and motion design software.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

36. Apply the techniques of traditional production and drawing tools.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

37. Please select any tools (hardware, software, or other production tools) needed in an effective university-level graphic design program. Check all that apply.

- ☐ Adobe Photoshop
- ☐ Adobe Illustrator
- ☐ Adobe Indesign
- ☐ Adobe Acrobat
- ☐ Adobe Dreamweaver
- ☐ Adobe Flash
- ☐ Adobe Fireworks
- ☐ Adobe Premiere
- ☐ Adobe After Effects
- ☐ Manga Studio
- ☐ Corel Painter
- ☐ Final Cut
- ☐ Microsoft Office (Word, Excel, Powerpoint)
- ☐ Keynote
- ☐ Lynda.com
- ☐ Scanners
- ☐ Printers
- ☐ Engravers
- ☐ Exacto Knives
- ☐ Sketchbooks
- ☐ Rulers
- ☐ Visual Communication Devices
- ☐ Macbook Pro Laptop
- ☐ None of the Above

Other (please specify)

38. Please list any other competencies that should be considered.

Thank you for your time and participation. Should you have any questions, please contact me by phone or email at (704) 406-2137 or awbridges@gardner-webb.edu

Appendix H

Round Three Questionnaire

Round Three Questionnaire

This third round questionnaire is intended to identify 21st century skills, content knowledge, and tools needed in an effective university-level graphic design program. Statements receiving a 4.1 or better on the previous round two questionnaire are included, as well as some new statements generated from round two. Your participation is greatly appreciated.

Please choose the appropriate option for questions one through five. Rate statements six through 39 on a scale ranging from extremely undesirable (1) to extremely desirable (7) by selecting the appropriate option. Feel free to provide positive or negative comments regarding each statement. For question 40, please choose all that apply.

Please complete and return by Friday, October 26, 2012.

1. Are you an educator or industry professional?

- ○ Educator
- ○ Industry Professional

2. Is your institution public or private?

- ○ Public
- ○ Private
- ○ Not Applicable

3. What is the approximate size of your institution?

- ○ Under 1,000 students
- ○ Between 1,000 and 5,000 students
- ○ Between 5,000 and 10,000 students
- ○ Over 10,000 students
- ○ Not Applicable

4. What is the approximate number of students in your program?

- ○ Under 50 students
- ○ Between 50 and 100 students
- ○ Between 100 and 500 students
- ○ Over 500 students
- ○ Not Applicable

5. What is the approximate size of your business?

- Under 20 employees
- Between 20 and 50 employees
- Between 50 and 100 employees
- Over 100 employees
- Not Applicable

6. Understand the history of graphic design.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

7. Exhibit skills in the foundations of artistic expression (example: painting, drawing, sculpting).

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

8. Apply the basic principles of graphic design aesthetics, including composition.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

9. Apply the concepts of typography.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

10. Apply foundational elements of graphic design, such as creating traditional paper mockups and hand-rendering of type.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

11. Apply basic knowledge of Gestalt psychology to graphic design.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

12. Perform graphic design creatively.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

13. Write clearly, concisely, and correctly.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

14. Exhibit interpersonal skills (examples: problem solving, curiosity, motivation, innovation, conceptual thinking, communication, adaptability).

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

15. Exhibit effective presentation skills.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

16. Knowledge of current communications industry trends (example: convergence, visual communication, storytelling, videography).

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

17. Knowledge of related disciplines (examples: business and marketing, art, psychology, geometry, and physics).

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

18. Apply sales promotion techniques for advertising and marketing.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

19. Apply the basics of packaging design.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

20. Determine the costs associated with graphic design and other creative services.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

21. Explain and evaluate customer service issues.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

22. Apply the basics of graphic design for multimedia.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

23. Apply the basics of graphic design for print production.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

24. Apply the basics of graphic design for webpage development.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

25. Apply the basics of photography for graphic design purposes.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

26. Prepare various digital documents.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

27. Apply the principles and techniques of color theory and management.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

28. Apply the techniques of digital prepress, including finishing files for print or web, imposition, substrate selection, ink selection, finishing operations, and an understanding of print processes.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

29. Apply the techniques of photographic lighting.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

30. Apply the techniques of photography.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

31. Apply the techniques of screen printing.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

32. Apply the techniques of using drawing software.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

33. Apply the techniques of using multimedia creation software.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

34. Apply the techniques of using page layout and publishing software.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

35. Apply the techniques of using image editing software.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

36. Apply the techniques of webpage development software, as well as basic html, css, web analytics, and wireframing.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

37. Apply the techniques of video and audio editing software.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

38. Apply the techniques of 3D and motion design software.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

39. Apply the techniques of traditional production and drawing tools.

Extremely Undesirable	Undesirable	Somewhat Undesirable	No Opinion	Somewhat Desirable	Desirable	Extremely Desirable
○	○	○	○	○	○	○

Comments

40. The following are new tools identified from the previous round two questionnaire. Please select any tools (hardware, software, or other production tools) needed in an effective university-level graphic design program. Check all that apply.

- ☐ Social Media tools
- ☐ CAD
- ☐ Dropbox
- ☐ "the Cloud" between designer, customer, and printer
- ☐ Loupe
- ☐ External hard drive
- ☐ Pantone swatchbook
- ☐ Paper swatches
- ☐ iMovie
- ☐ Moviemaker
- ☐ Audacity
- ☐ Web template software
- ☐ Online print publishing tools
- ☐ None of the Above

Comments

Thank you for your time and participation. Should you have any questions, please contact me by phone or email at (704) 406-2137 or awbridges@gardner-webb.edu.

Appendix I

Round Four Questionnaire

Round Four Questionnaire

This fourth and final round questionnaire is intended to identify the top 20 most needed 21st century skills, content knowledge, and tools for an effective university-level graphic design program, as well as to gain a more clear consensus among experts. Your participation is greatly appreciated as always.

Please choose the appropriate option for questions one through five. For question six, choose the 20 most needed 21st century skills and content knowledge for an effective university-level graphic design program, with 1 being the most important. For question seven, please rank in order of importance, with 1 being the most important, tools needed in an effective university-level graphic design program.

Please complete and return by Friday, November 9, 2012.

1. Are you an educator or industry professional?

- ○ Educator
- ○ Industry Professional

2. Is your institution public or private?

- ○ Public
- ○ Private
- ○ Not Applicable

3. What is the approximate size of your institution?

- ○ Under 1,000 students
- ○ Between 1,000 and 5,000 students
- ○ Between 5,000 and 10,000 students
- ○ Over 10,000 students
- ○ Not Applicable

4. What is the approximate number of students in your program?

- ○ Under 50 students
- ○ Between 50 and 100 students
- ○ Between 100 and 500 students
- ○ Over 500 students
- ○ Not Applicable

5. What is the approximate size of your business?

- Under 20 employees
- Between 20 and 50 employees
- Between 50 and 100 employees
- Over 100 employees
- Not Applicable

6. Please choose the 20 most needed 21st century skills and content knowledge for an effective university-level graphic design program, with 1 being the most important.

	Understand the history of graphic design.
	Exhibit skills in the foundations of artistic expression (example: painting, drawing sculpting).
	Apply the basic principles of graphic design aesthetics, including composition.
	Apply the concepts of typography.
	Apply foundational elements of graphic design, such as creating traditional paper mockups and hand-rendering of type.
	Apply basic knowledge of Gestalt psychology to graphic design.
	Perform graphic design creatively.
	Write clearly, concisely, and correctly.
	Exhibit interpersonal skills (examples: problem solving, curiosity, motivation, innovation, conceptual thinking, communication, adaptability).
	Exhibit effective presentation skills.
	Knowledge of current communications industry trends (example: convergence, visual communication, storytelling, videography).
	Knowledge of related disciplines (examples: business, marketing, art, psychology, geometry, physics).
	Apply sales promotion techniques for advertising and marketing.
	Apply the basics of packaging design.
	Determine the costs associated with graphic design and other creative services.
	Explain and evaluate customer service issues.
	Apply the basics of graphic design for multimedia.
	Apply the basics of graphic design for print production.
	Apply the basics of graphic design for webpage development.
	Apply the basics of photography for graphic design purposes.

	Prepare various digital documents.
	Apply the principles and techniques of color theory and management.
	Apply the techniques of digital prepress, including finishing files for print or web, imposition, substrate selection, ink selection, finishing operations, and an understanding of print processes.
	Apply the techniques for photographic lighting.
	Apply the techniques of photography.
	Apply the techniques of screen printing.
	Apply the techniques of using drawing software.
	Apply the techniques of using multimedia creation software.
	Apply the techniques of using page layout and publishing software.
	Apply the techniques of using image editing software.
	Apply the techniques of webpage development software, as well as basic html, css, web analytics, and wireframing.
	Apply the techniques of video and audio editing software.
	Apply the techniques of 3D and motion design software.
	Apply the techniques of traditional production and drawing tools.

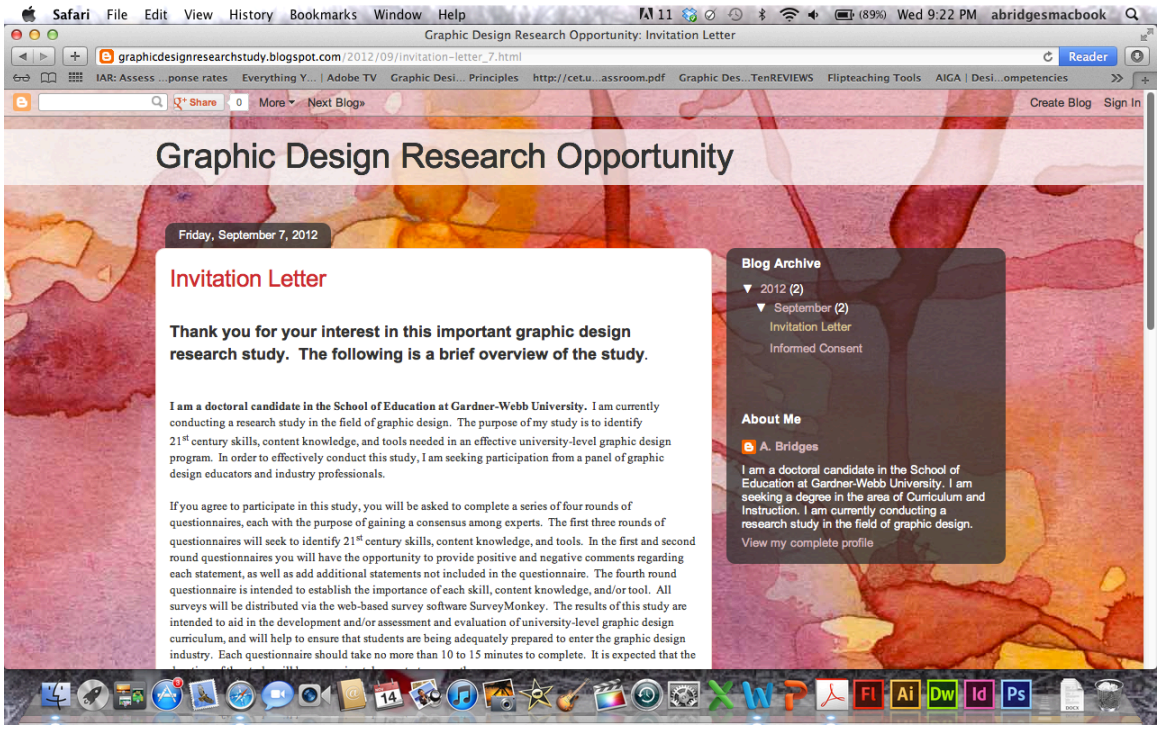
7. The following were selected by 50 percent or more of participants as tools needed in an effective 21st century university-level graphic design program. Please rank these tools, in order of importance with 1 being the most important.

	Adobe Creative Suite (Photoshop, Illustrator, Indesign, Acrobat, Bridge)
	Adobe Dreamweaver
	Microsoft Office (Word, Excel, Powerpoint)
	Scanners
	Printers
	Sketchbooks
	Rulers
	Macbook Pro Laptop
	Social Media tools
	Dropbox
	"the Cloud" between designer, customer, and printer
	External hard drive
	Pantone swatchbook
	Paper swatches

Thank you for your time and participation throughout all the stages of this research. Should you have any questions, please contact me by phone or email at (704) 406-2137 or awbridges@gardner-webb.edu.

Appendix J

Invitation and Informed Consent Website


Safari File Edit View History Bookmarks Window Help
Graphic Design Research Opportunity: Invitation Letter
graphicdesignresearchstudy.blogspot.com/2012/09/invitation-letter_7.html
Reader
Graphic Design Research Opportunity
Friday, September 7, 2012
Invitation Letter
Thank you for your interest in this important graphic design research study. The following is a brief overview of the study.
I am a doctoral candidate in the School of Education at Gardner-Webb University. I am currently conducting a research study in the field of graphic design. The purpose of my study is to identify 21st century skills, content knowledge, and tools needed in an effective university-level graphic design program. In order to effectively conduct this study, I am seeking participation from a panel of graphic design educators and industry professionals.
If you agree to participate in this study, you will be asked to complete a series of four rounds of questionnaires, each with the purpose of gaining a consensus among experts. The first three rounds of questionnaires will seek to identify 21st century skills, content knowledge, and tools. In the first and second round questionnaires you will have the opportunity to provide positive and negative comments regarding each statement, as well as add additional statements not included in the questionnaire. The fourth round questionnaire is intended to establish the importance of each skill, content knowledge, and/or tool. All surveys will be distributed via the web-based survey software SurveyMonkey. The results of this study are intended to aid in the development and/or assessment and evaluation of university-level graphic design curriculum, and will help to ensure that students are being adequately prepared to enter the graphic design industry. Each questionnaire should take no more than 10 to 15 minutes to complete. It is expected that the
Blog Archive
2012 (2)
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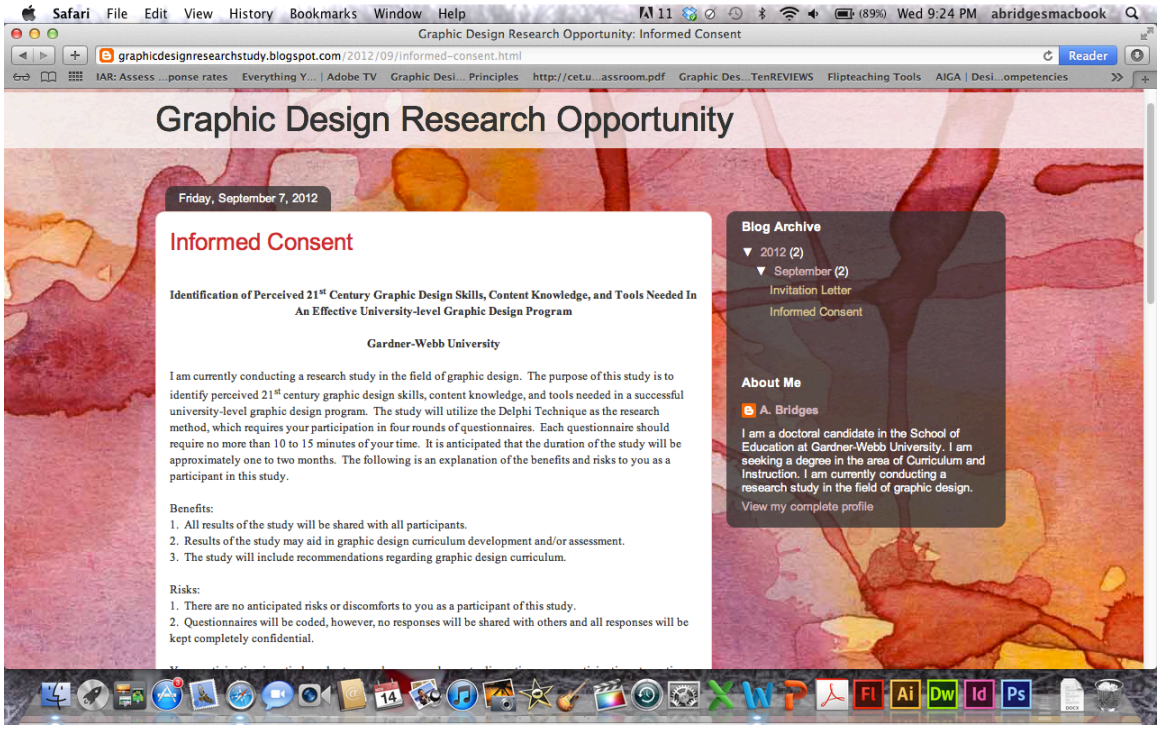
Invitation Letter
Informed Consent
About Me
A. Bridges
I am a doctoral candidate in the School of Education at Gardner-Webb University. I am seeking a degree in the area of Curriculum and Instruction. I am currently conducting a research study in the field of graphic design.
View my complete profile


Safari File Edit View History Bookmarks Window Help
Graphic Design Research Opportunity: Informed Consent
graphicdesignresearchstudy.blogspot.com/2012/09/informed-consent.html
Reader
Graphic Design Research Opportunity
Friday, September 7, 2012
Informed Consent
Identification of Perceived 21st Century Graphic Design Skills, Content Knowledge, and Tools Needed In An Effective University-level Graphic Design Program
Gardner-Webb University
I am currently conducting a research study in the field of graphic design. The purpose of this study is to identify perceived 21st century graphic design skills, content knowledge, and tools needed in a successful university-level graphic design program. The study will utilize the Delphi Technique as the research method, which requires your participation in four rounds of questionnaires. Each questionnaire should require no more than 10 to 15 minutes of your time. It is anticipated that the duration of the study will be approximately one to two months. The following is an explanation of the benefits and risks to you as a participant in this study.
Benefits:
1. All results of the study will be shared with all participants.
2. Results of the study may aid in graphic design curriculum development and/or assessment.
3. The study will include recommendations regarding graphic design curriculum.
Risks:
1. There are no anticipated risks or discomforts to you as a participant of this study.
2. Questionnaires will be coded, however, no responses will be shared with others and all responses will be kept completely confidential.
Blog Archive
2012 (2)
September (2)
Invitation Letter
Informed Consent
About Me
A. Bridges
I am a doctoral candidate in the School of Education at Gardner-Webb University. I am seeking a degree in the area of Curriculum and Instruction. I am currently conducting a research study in the field of graphic design.
View my complete profile

Appendix K

Sample Coding Sheet

Comment	Theme
Basic drawing abilities and the willingness to think via sketching. Understanding that computers are great at graphic design execution; they are not great at concept development.	Exhibit skills in the foundations of artistic expression (example: painting, drawing, sculpting).
Drawing/sketching—students should not be allowed to touch a computer in the first two years of learning design…	
Sketching to aid in the communication of ideas.	
Basic knowledge of art and being able to draw (drawing is fundamental).	
A focus should continue and possibly grow in the areas of foundations, drawing, painting, photography, printmaking, and sculpture.	
Sketching and drawing.	
Presenting ideas and concepts.	Exhibit effective presentation skills.
Presentation skills—This will be improved through class project critiques but very important to be able to clearly communicate the designer's ideas.	
The most critical competency a student can bring forth is their innovative thinking and confidence to think creatively.	Exhibit interpersonal skills (examples: problem solving, curiosity, motivation, innovation, conceptual thinking, communication).
Conceptualize.	
Curiosity, Conceptual thinking!	
I want all to be innovators…	
Being able to contribute to a group discussion or to share ideas among a group is a plus.	
…Students will quickly learn that problem solving is the backbone of great design.	

Appendix L

Complete Listing of Round Four Results

Statement	Mean
1. Apply the basic principles of graphic design aesthetics, including composition.	3.58
2. Perform graphic design creatively.	5.84
3. Apply the concepts of typography.	6.13
4. Exhibit interpersonal skills (problem solving, curiosity, motivation, innovation, conceptual thinking, communication).	7.26
5. Write clearly, concisely, and correctly.	10.00
6. Exhibit effective presentation skills.	12.13
7. Understand the history of graphic design.	13.74
8. Knowledge of current communications industry trends (convergence, visual communication, storytelling, videography).	14.26
9. Apply the basics of graphic design for print production.	14.39
10. Exhibit skills in the foundations of artistic expression (painting, drawing, sculpting).	14.58
11. Apply the principles and techniques of color theory and management.	14.68
12. Apply foundational elements of graphic design, such as creating traditional paper mockups and hand-rendering of type.	15.03
13. Apply basic knowledge of Gestalt psychology to graphic design.	15.71
14. Apply the basics of graphic design for webpage development.	15.84
15. Apply the basics of graphic design for multimedia.	15.97
16. Apply the techniques of using page layout and publishing software.	16.19

(continued)

Statement	Mean
17. Apply the basics of photography for graphic design purposes.	16.42
18. Apply the techniques of using image editing software.	16.68
19. Prepare various digital documents.	16.87
20. Apply the techniques of digital prepress, including finishing files for print or web, imposition, substrate selection, ink selection, finishing operations, and an understanding of print processes.	18.10
21. Knowledge of related disciplines (business and marketing, art, psychology, geometry, and physics).	18.45
22. Determine the costs associated with graphic design and other creative services.	19.42
23. Apply sales promotion techniques for advertising and marketing.	20.16
24. Apply the techniques of using drawing software.	21.23
25. Apply the basics of packaging design.	21.55
26. Explain and evaluate customer service issues.	21.90
27. Apply the techniques of webpage development software, as well as basic html, css, web analytics, and wireframing.	23.16
28. Apply the techniques of using multimedia creation software.	24.39
29. Apply the techniques of photography.	24.48
30. Apply the techniques of photographic lighting.	25.06
31. Apply the techniques of traditional production and drawing tools.	25.13

(continued)

Statement	Mean
32. Apply the techniques of screen printing.	28.55
33. Apply the techniques of video and audio editing software.	28.77
34. Apply the techniques of 3D and motion design software.	29.35