OLD DOG, NEW TRICKS: THE SHIFT FROM GRAPHIC DESIGNER TO UX/UI DESIGNER IN HIGHER EDUCATION GRAPHIC DESIGN CURRICULUM

by

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ABSTRACT

Graphic design as a profession continues to morph with technology. Graphic designers must consistently learn the latest software and industry trends to stay relevant. Therefore, the quick change in technology constantly influences the responsibilities of a graphic designer. One of these changes is the niche design field of User Experience (UX) and User Interface (UI) design that has emerged as an attractive field of study for undergraduate students in graphic design. The objective of this study is to explore opinions on UX/UI design and curriculum in higher education graphic design programs through semi-structured interviews with practitioners and educators. Opinions on UX/UI methods, best practices, projects, and skills are explored. Findings could guide class offerings, content, and projects for students studying graphic design to better prepare students for these emerging UX/UI jobs.

Key words: graphic design, UX/UI, user experience (UX), user interface (UI) curriculum, product design, problem-solving, flexibility

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CHAPTER I

INTRODUCTION

The essence of all design work is function and meaning. Through visual and semantic language, a designer must create work that assists the viewer not only in experiencing a particular emotion but also in truly understanding the content (Lupton & Phillips, 2011). User Experience (UX) and User Interface (UI) job titles, comparable to the primary title of graphic designer, have developed in the last 20 years, and the delivery vehicle is changing from paper to screens of all sizes. The terms UX and UI designer, in addition to product designer, are replacing the titles of graphic designer and web designer or digital designer.

The profession of graphic design, at its core, is arranging visual elements to communicate. For a long time, graphic design has been associated with "the look" of a product or layout of a page. As technology advances and expectations about digital interactions grow, people have begun "focusing more on the user experience or "the feel" part of the product" (Babich, 2017a, para. 2). UX refers to any user's interaction with a product or service (Stevens, 2019). A designer, no matter what the modifier, is making the decisions and creating those experiences. UX designers' job responsibilities include product development, identifying key user groups, creating representative personas, designing information architecture, wireframing, prototyping, and conducting product

testing (Babich, 2017a). UI designers, on the other hand, create a specific part of the product for digital use such as the layout, graphic elements, typography, and color. As the lines between what a graphic designer does continue to blur, many designers find career opportunities in the field of UX/UI (Benton, 2016).

UX/UI Origins

UX/UI as a profession is new, but the concepts can be found in the ancient world. Stevens (2019) noted that the origins of UX/UI can be found in Chinese feng shui, a philosophy based on arranging surroundings in the most optimal, harmonious, or user-friendly way, dating back to 4000 BC. Using the philosophy of feng shui as a comparison, a designer might be in charge of arranging the elements of a mobile app or website to create an environment that is user-friendly and pleasing. The goal of most digital applications can be reduced to the notion that the product is easy to navigate, and the information is easy to find while having an enjoyable look and feel (Dash, 2014; Stevens, 2019). While the birth of UX/UI can be found thousands of years ago, it was not until the last century that these ideas had a formal name for the occupation.

A pioneer in the field of user experience, "Donald Norman, joined the Apple team in the early 1990s as their User Experience Architect, making him the first person to have UX in his job title" (Stevens, 2019, para. 24). Before his time at Apple, he wrote the book, *The Design of Everyday Things* (1988), in which he coined the term "user experience" because he thought the terms "human interface" and "usability" were too narrow. Norman (2008) felt user experience covered "all aspects of the person's experience with the system, including industrial design, graphics, the interface, the physical interaction, and the manual" (p. 3). Graphic design as a field of study

encompasses many of the touchpoints he described: graphics, interface, and the way humans experience a product. Graphic designers, through formal education, are taught that design is about problem-solving and communication through visuals (Bowers, 2011). Problem-solving and communication start with the foundation of visual elements, layout composition, typography, and color theory (Eskilson, 2007). Building upon these foundations, college design education and design jobs can be vastly different, but these foundational design teachings can prepare students for many niche design jobs such as product development, branding and identity, packaging, multimedia, and web/digital design (Heller, 2005). In the 1990s, web design became a career for graphic designers who were once tethered to print and product design, and a whole new field was born (Eskilson, 2007). The digital web available in an instant on smartphones has brought the next opportunity for visual communicators who traditionally study graphic design.

Exactly how to train undergraduates in UX/UI is a pertinent curriculum topic for educators (Getto & Beecher, 2016), and how much or how little emphasis on UX/UI design is a topic discussed among graphic design educators. As technology changes and design principles permeate into other industries, what is considered design has broadened over the past couple of decades (Beller, 2017). There is confusion around UX and UI designers and their duties. The line between where one discipline ends and the other starts is foggy, and to add to the confusion, “different teams take varying approaches to how the teams should interact and divide responsibilities” (Benton, 2016, para. 3). The term UX/UI has increased use in the graphic design, product design and technology fields, even though researchers have not found clear consensus yet of its definition and scope leading to ambiguity of the term (Lallemand et al., 2014).

In the software industry tradition, UX designers combine the disciplines of information architecture, visual design, industrial design, human factors, interaction design (IxD), human-computer interaction (HCI), and architecture (Dash, 2014). In addition to graphic design curricula, UX is also studied in computer science and human computer interaction (HCI) programs (Dash, 2014). Design methodologies, including human-centered design and design thinking, in addition to ethnographic research, iteration, and prototyping are traditionally taught in graphic design for problem-solving in the graphic design curriculum that are also foundational to successful UX design (Harrington & Martin, 2018; Lupton & Phillips, 2014).

Professional Responsibilities & Salaries

UX designers come from a multitude of backgrounds, such as marketing, software engineering, and graphic design (Morris, 2018). Babich (2017a) explains, "Designer's responsibilities can vary dramatically from company to company and sometimes even from project to project within one company" making duties for UX/UI designers vastly different depending on types of projects and where they work (para. 4). The skills listed for UX/UI jobs on Indeed.com (2020) and Glassdoor.com (2020) describe experience using HTML, CSS, Java, a basic knowledge of coding, Photoshop and Illustrator for mockup purposes, Adobe XD, and InVision and Azure for wireframing. Graphic design programs have traditionally taught some of these skills at the undergraduate level—some more in-depth than others—and programs vary from school to school (Beller, 2017).

In 2019, The American Institute of Graphic Artists (AIGA) gathered data from 9,429 designers working globally. The data revealed that most graphic designers earn between $50,000 and $75,000 a year (Brewer, 2019). According to Glassdoor.com

(2020), salaries for the UX/UI jobs average $80,928 per year for entry-level (0-1 year of experience), $104,580 per year for mid-level (7-9 years of experience), and $113,368 per year for senior positions (15+ years of experience; Designer UX/UI Salaries, 2021). According to Glassdoor.com, (2020), as of November 2021, the average salary for a User Experience Designer/Product Designer in the United States was $115,743 per year. The potential wage earnings make a UX/UI job attractive to incoming students and graduating students preparing to join the job market, especially with the rising cost of higher education (Baker, 2018; Loveland, 2020).

UX/UI jobs are growing because of increased use of technology in people's everyday lives. Some of the biggest companies responsible for designing products that customers use multiple times a day, such as Apple and Google, have been investing in user-centered design and research for decades (Budds, 2016). As a result, consumers are growing accustomed to an excellent experience every time they interact with digital applications (Dam, 2020). Because of these growing expectations, the demand for UX design practitioners will continue to rise (Baker, 2018). CNN Money predicted that UX design jobs would grow by 22% between 2010 and 2020, with over two million new jobs being created (CNN, 2020).

Rationale

Status of Higher Education and UX

Studies have shown that higher education programs are not keeping up with the needs of the UX industry. A study by Gray (2014) noted that in the area of UX, many students are under-prepared in areas such as UX advocacy, client communication, and

professionalism. Many graphic design programs follow this lack of preparation for preparing graduates in the areas of UX design (Buzzard, 2016).

To better prepare graduates for the needs of the UX/UI industry, Mike Buzzard, a design manager in the UX Department at Google, along with many colleagues, visited several schools including Savannah College of Art and Design (SCAD) in 2014 to better understand the landscape of design programs (Budds, 2016). Meeting with both faculty and students, they discussed ideas about what is required for young designers to succeed today and into the future. They noted that "changing education is challenging and his team proposed changes that require significant momentum to overcome the friction of politics, bureaucracy, and limited resourcing within higher education" (Buzzard, 2016, para. 6). They also suggested that industries should communicate expectations to higher education clearly, participate in education design programs at the college level, and develop and invest in internship programs. (Buzzard, 2016). Both SCAD and the team from Google felt there was a "gap in design education that needed to be filled" (Budds, 2016, para. 2). According to Buzzard (2016) and his team, design schools appear to be the place that this type of industry partnered curriculum and innovative pedagogical approach is fostered.

After Buzzard's visit, SCAD launched its UX Design Curriculum in September 2015. The Google partnership with SCAD came "naturally as Google was familiar with Savannah College of Art and Design's (SCAD) diverse design course offerings and SCAD was willing to experiment with its approach" (Budds, 2016, para. 8). The UX program at SCAD is one of the first four-year undergraduate degrees offered in UX

design (Budds, 2016). In a response to the growing need for trained UX professionals, the UX program is one of SCAD's fasted growing programs (Lebos, 2019).

Many schools across the United States have quickly transitioned to accommodate this new field of study (Miller, 2019). Some have swiftly pivoted to provide training in UX/UI, while others are not changing fast enough. Some programs offer unique undergraduate and graduate degree plans specific to this job title, while others have injected the new study area into existing courses (Vizard, 2016).

Because higher education has been slow to implement UX/UI courses or degrees, bootcamps and certificate programs have been developed to support the demand (Buzzard, 2016). Online courses and certificates are readily available and can be tempting to students for the short duration they offer for completion (Doody & Maccarone, 2016). Arguing that short unregulated programs are a taint on the UX industry, or any industry that requires myriad skills and years of training, Doody and Maccarone (2016) advocate for higher education to develop more UX/UI programs. Any UX design curriculum search will provide many online courses, certificates, videos, and portfolio-building tools. The lengths of such programs range from one week to a year. According to Buzzard (2016), these options allow individuals to self-select the training for skills and tools they feel are needed to be successful in UX design. A few high-profile examples of UX/UI online courses available are offered by General Assembly, Treehouse, and Code Academy (Babich, 2017b). In July 2020, Google announced an online certificate for UX design that will be treated like four-year degrees in their company (Hess, 2020).

There are several higher education schools that offer similar courses and certificates in a university setting such as CalArts and The New York Institute of Art +

Design. CalArts also offers a UX course on Coursera, an online learning company that provides courses from their campus with an obtained certificate upon completion (CalArts, 2020). The New York Institute of Art + Design (NYIAD) also offers an online course to gain an NYIAD Career Certificate in User Experience (UX) design. NYIAD advertises its online course for anyone looking to start or advance a career in website and application design (New York Institute of Art + Design, 2020). These types of programs are appealing because an accredited school is attached to the course.

Need for Current Research on UX/UI Curriculum

Graphic design programs have often had to face the challenge of chasing the newest software versus stressing core art and design foundations and problem-solving skills, which continue to underpin successful UX/UI designer success. As technology begins to outpace curriculum, changes must be quickly injected into higher education to keep pace and produce career-ready graduates (Beller, 2017). The concern for planning curricula is identifying the number of classes needed at the undergraduate level to prepare graduates for the niche design field of UX/UI (MacDonald & Sosebee, 2018). In addition to these UX/UI needs, a variety of other specializations need to be introduced such as packaging and publication design, at the undergraduate level to provide an enriching experience and exposure because there are such a wide variety of jobs available to graphic design students. Beller (2017) described the problem as "a rotating complexity of graphic design's identity" (p. 4). However, with the right mix of foundational courses and specialization tracks, academia can match the needs of industry to create graduates who are qualified to enter the workforce (Wilson, 2014). Industry has a unique position to partner with higher education and lead UX innovation in academia (Getto,).

Research Questions

This connection of industry to academia inspired this research. A qualitative study with a set of semi-structured were designed to investigate the experiences and opinions of graphic design educators and industry UX/UI practitioners. The questions guiding this research were:

RQ1: How do UX/UI practitioners perceive current UX/UI design and curriculum?

RQ2: How do educators who teach students in graphic design programs perceive current UX/UI design and curriculum?

RQ3: What are recommendations from educators and practitioners for implementing the discipline of UX/UI into current graphic design programs to better prepare students for these emerging jobs?

The experiences and opinions expressed through the interview process can help make sense of what is currently occurring in higher education and the UX/UI industry through interviews and qualitative data analysis.

Summary

The immersion of technology into everyday life has the field of UX/UI experiencing rapid grown. Training for UX/UI jobs is needed. Graphic designers are skilled at conveying information in a visual format that is needed for UX/UI design. Therefore higher education graphic design programs have an opportunity to incorporate this UX/UI training into their programs.

In this paper, a literature review explores the past research on UX/UI in higher education, illuminating prior knowledge of UX/UI in higher education. The methods

section explained the details of the research study. The analysis section explains the findings from the educator and practitioner interview, and the discussion section and recommendation section conclude the research paper. This study has the potential to interpret best practices for what should be occurring in the immediate future for graphic design programs and make recommendations for future action based on industry professionals' responses.

CHAPTER II

LITERATURE REVIEW

The field of UX/UI is reasonably recent as a discipline for formal study, and graphic design programs are concerned with its curricular impact. Because of its newness, higher education UX/UI curriculum's road map is still being constructed (Vizard, 2016). Academic institutions play an important role in producing job ready UX designers, but barriers exist in doing so, including access to adequate training in UX's best practices (Getto & Beecher, 2016). Thus, design schools have continually found themselves needing to readjust curriculum to meet industry needs. This literature review provides support for the idea that graphic design curriculum needs constant evaluation to meet student and industry needs. It provides research that supports the fact that individuals trained in design are finding careers in UX/UI. Arguments supporting the need for more UX training in higher education are also presented in the literature review. Additionally, the review includes examples of how educators are approaching projects and teaching UX/UI principles in existing curriculum structures and the types of methods and projects that are most beneficial. This research leads to the current study of UX/UI in graphic design curricula through the opinions and experiences of educators and practitioners to examine mythologies and projects that are best for these students.

Curriculum Evaluation in Graphic Design

Wilson (2014) recommended that design curriculum and courses be reviewed and revised to stay current with the needs of the industry. Wilson (2014) also suggested that design schools have a hard time finding the right place on college campuses, arguing that design schools might be more aligned to media and communication than fine art schools, or they might benefit from standing alone as their own schools. Wilson (2014) made the assertion that user experience (UX), user interaction (UI), and user centered design (UCD) should be introduced to undergraduate design education "in parallel with the base design curriculum to help students understand the need for their work to be tailored to the intended user or audience" (Wilson, 2014, p. 113). These findings support that integrating UX/UI principles into the graphic design curriculum was not a new concern.

Examining what it takes to be a successful graphic designer, Beller () found that curriculum should expand on design principles, introduce new technologies and media, integrate more professional skills, both written and verbal, embrace more team building and collaborate projects, professional skills, and guide students to be more self-directed learners to better prepare graduates for success in the field. The author pointed out that graphic design educators in higher education needed to address the challenges of planning curriculum by being responsive to industry needs (Beller, 2017). Indicating that design faculty need to be aware of the needs in professional practice, Beller (2017) suggested "design education is training students for careers that do not even exist yet or careers with expanding job titles" (p. 101). Noting the complexity of graphic design, Beller (2017) argued there is no true identity to graphic design for the reason that graphic design embodies so many specializations.

Growing Need for UX/UI Education

Exploring the growing need for UX professionals and lack of education available, Getto et al. (2013) argued that "UX programs to train professionals at that time were non-existent" (Getto et al., 2013, p. 65). Getto and Beecher (2016) cited the "increased demand for digital products, and user needs becoming more complex to support developing this training type" (p. 157). Because a wide range of businesses are creating products and touchpoints with consumers that require optimal user experience, Getto and Beecher (2016) supported additional urgency for UX. Gülsen et al. (2019) presented modeling as a teaching approach for "equipping design students with the theoretical and applied knowledge and skills relevant in UX projects" (p. 12). To support the lack of UX training at the university level, Gülsen et al. (2019) noted their research in design education "was driven by the need for fully fledged UX designers in industry, which is hardly achieved with traditional design curriculums that are not specifically developed for training UX designers and researchers" (p. 12).

Because of limited formal education of UX/UI and the growth in available UX/UI jobs, many practitioners come from a variety of career and training backgrounds, including design, software development and through self-teaching (Baker, 2018; Getto et al., 2016; Vizard, 2016). To investigate the variety of backgrounds UX practitioners are coming from, Lallemand et al. (2014) collected 758 surveys and found that 18.8% of practitioners' educational backgrounds were in art and design, 5.6% marketing and business, 19.7% from technology/software, 15.3% from computer interaction, 21.6% from psychology/social sciences, and 19.2% undetermined. Many practitioners currently employed in UX, or other human-computer interaction roles have come into these

positions without formal training in the discipline (Vizard, 2016). With the growing need for UX/UI trained designers, the UX/UI industry requires a more substantial focus on educating students explicitly for these types of careers (Lallemand et al., 2014). Graphic design programs are an area where this type of training UX/UI can begin.

Approaches to UX/UI Curriculum

The variety of backgrounds of UX/UI practitioners and the multidisciplinary nature of the field opens the door for many areas of study to participate in this field. Combining a collective experience with UX research and teaching, Getto et al. (2016) presented the methodology of lean UX, which narrows the distinct UX methods and deliverables to nine topics. They hoped the study of lean UX discussion would "spark discussion and possibilities for this methodology in many disciplines" (para. 45). Getto et al. (2016) stressed the importance of collective knowledge by forming collaborative teams of designers and developers. They characterized UX as, "as an inherently cross-functional discipline, UX can be folded into almost any discipline" (Getto et al., 2016, para. 45). They presented a set of guidelines for creating a lean UX course by providing an overview of the way educators and students have been able to work through different projects and the research partnerships and grants that have developed out of the work. Despite the creation of the lean UX, Getto et al. (2016) pointed to the need for multiple courses to train UX designers.

Competencies and Skills for UX/UI

Searching for best practices on how to implement UX/UI into their discipline, library information, Fleming-May et al. (2018) deployed a semester-long project in which a large library UX problem was addressed and solved by students at the graduate level.

They found there was limited infrastructure to prepare students for these roles in UX. They worked with practitioner partners from academic libraries and information agencies to develop a new model for preparing information professionals with assessment and UX expertise (Fleming-May et al., 2018). The study found that without a unifying organization reaching a consensus on core competencies for UX practitioners, it has been the UX practitioner community that has developed a consensus on frameworks, skillset, and deliverables. Fleming-May et al. (2018) defined the competencies of UX in the following areas: (1) interaction design and information architecture; (2) user research: heuristics, cognitive walkthroughs, prototyping, usability; (3) visual design and media skills; and (4) understanding clients and stakeholders: business and communication skills (Fleming-May et al., 2018, p. 32).

In an additional study examining the skills needed for successful UX, Roy et al. (2018) researched and presented a list of listed hard and soft skills that enable success in the UX field:

> Those include: an innate curiosity, empathy for users, problem solving and creative solution finding. There are hard skills, of course, that include understanding and knowledge of areas such as, research methods and practices, design function and visual, development frameworks, prototyping tools, human computer interaction, user psychology, organization of information; and some programming definitely helps. (Roy et al., 2018, p. 37)
>
> The combination of multiple skills and different areas of study highlights the multidisciplinary nature of UX/UI.

A similar study by Getto (2014) presented best practices of UX for both academia and industry. He proposed that the UX process involves research, prototyping, usability testing, and maintenance and added UX "elements such as information architecture, user research, and visual design" (Getto, 2014, para. 14).

All three studies have findings that agree that research, organization or architecture of the information, and visual design are core UX competencies. The consensus of these skills and methodologies presented in this research could help inform best practices and shape curricula in UX education.

Best Practices in UX Curricula

As new UX programs are being developed in higher education, different systems for the UX material delivery have been explored. Vorvorearnu et al. (2017) presented the design and initial evaluation of a new studio-based undergraduate program at Purdue University in UX as the first of its kind at a large, research-intensive U.S. university. The Purdue program offered several curricular innovations, such as an integrated studio pedagogy interwoven across two types of studios and courses spanning over five semesters of the undergraduate experience. Vorvorearnu et al. (2017) presented two types of studios: a learning studio and an experience studio. The learning studios are cohort-specific and provide an integrated approach to teaching fundamental UX skills, while the experience studios engage in client projects in an agency-like environment. Both studio methods are rooted in the traditions and practices of art and design education. The art and design practice of critique is the encouragement and the development of skills through learn-by-doing, followed by a reflection period and formative feedback from instructor and peers (Vorvoreanu et al., 2017). Because UX is inherently multi-disciplinary (Getto

et al., 2016), Purdue did not set up the program to have the students take classes in separate courses. Instead, the Purdue researchers recommended teaching UX as a multi-disciplinary approach, integrating team teaching from disciplines in graphic design, psychology, communication, and computer science (Vorvorearnu et al., 2017). This multidisciplinary approach, in addition to client-driven projects, also aligned with what was reported as best practices at the Savannah College of Art and Design (SCAD) when they developed their new program with Google (Budds, 2016).

Yu et al. (2020) found project-led, client-based, learning-by-doing UX assignments to be the most effective for students based on a panel discussion of educators and practitioners. This finding supported the effectiveness of existing practices in UX education (Yu et al., 2020). This collaboration between real-world clients and students helped the students build a strong work portfolio for career transition and advancement (Yu et al., 2020).

To evaluate the effectiveness of different project assignments MacDonald and Rozaklis (2017) compared data from students and alumni over a four-year period from three different UX project approaches at the Pratt School of Information. One approach was a UX project embedded in a course as an assignment. Another was participation in an extracurricular project outside of class. The third approach was a real-world, client-based project that lasted an entire semester (MacDonald & Rozaklis, 2017). The data collected by MacDonald and Rozaklis (2017) showed students had positive experiences with all project types, but the students reported they gained the most knowledge from the client-based project that lasted the entire semester. This is consistent with the results from Yu et al. (2020) who suggested that client-based projects support a productive learning

experience for students. These opportunities for students to work on client based projects will come from connecting with industry.

Partnering with Industry

Getto et al. (2016) highlighted the emergence of UX degree plans in higher education and the importance of industry partnership noting, "we are just beginning to see the emergence of full-fledged degree programs in user experience" (p. 68). To better understand the needs of the industry and to influence best practices in education, partnering with industry practitioners should be a major goal in higher education UX programs (Getto et al., 2016). In addition to industry partnerships, Getto et al. (2016) suggest interdisciplinary programs include classes from professional writing, studio design, computer science, and philosophy, meant to prepare students for careers that range across software development. One statement from the study highlights the emphasis of adopting change:

> We can never teach all of the tools our students or trainees need for their future or ongoing careers simply because these tools have not been invented yet. Instead, we must instill in our mentees the notion that technological innovation is not only inevitable but a positive, kinetic impulse that can propel them forward. Rather than teaching a set of tools or products, learners need to gain an understanding of how to adapt, learn, grow, and most of all, embrace change. (Getto et al., 2016, p. 68)

Technological innovation has been a driving force of change in field of graphic design, and UX/UI design has been one of those changes graphic design programs are embracing.

Visual Component of UX/UI

A study by Chein et al. (2016) examined the importance of the visual component through data to capture successful UX in product design. Chein et al. (2016) provided a framework of data-driven product design for capturing product visual aesthetics UX to effectively identify the practical design concepts from consumer preferences to consumer response. They examined the importance of visual components in the overall satisfaction in UX, noting that few studies had been done to identify the relationship between product characteristics of visual aesthetic, and determined more research needed to be done.

Also examining the connection of successful UX and visual components, Sosebee and MacDonald (2018) surveyed 24 universities offering UX programs at the graduate-level. They examined how prepared HCI/UX graduates were to address the visual design challenges in their future careers. They collected and analyzed program outcomes, titles, descriptions, and syllabi for visual design and communication courses, and presented an overview of current visual design courses being offered in human computer interaction. Sosebee and MacDonald (2018) found that only 14 of 24 universities with graduate level UX programs had courses related to visual design, and of those 14 schools, there were only 15 course descriptions related to design concepts such as typography, color, and software skills. Sosebee and MacDonald (2018) had hoped to address and develop a more comprehensive approach to visual design instruction in the UX field. They planned additional research to explore which areas of visual design are being underrepresented at the graduate level.

The acknowledgment of visual design as important to UX in the findings of these studies is where graphic design education becomes essential. To explore how better to

address the needs of UX/UI training in graphic design education, the theory of sensemaking was selected for the theoretical framework for the research presented in this paper.

Sensemaking

Sensemaking, a term introduced by Karl Weick (1988), refers to how we structure the unknown to be able to act on it. Sensemaking is also the process by which people give meaning to their collective experiences, defined as "the ongoing retrospective development of plausible images that rationalize what people are doing" (Weick et al., 2005, p. 409). Ancona (2012) used the analogy of a map for sensemaking: a map of plausible understanding for changing situations. The map is tested through data collection, action, and conversation; and then refined or abandoned depending on the credibility.

There are seven properties of sensemaking described by Weick (1995): identity, retrospection, enactment, social, ongoing, extracting cues and plausibly. A person's identity influences how they act in and react to experiences. Retrospection describes how people feel about experiences after time. As people speak about their experiences and feelings, they enact and are able to organize what they think. Sensemaking is social; the speakers share their opinions through stories about their experience with another person. As individuals share their experiences through narratives, identity plays a role in the reality that is ongoing. Individuals decide what information is applicable and important to providing cues to their feelings. Lastly, plausibility explores that each experience is unique and interpreted by the feelings of the individual and is not necessarily fact.

When people try to make sense of events, they begin with some perspective, viewpoint, or framework, however minimal (Klein et al., 2006). The participants identity as design educators and practicing designers in the field of UX/UI design informed the research through their perspective and lived experiences. They were asked to reflect on what is happening in their environments in the social setting of an interview The opinions and attitudes were shared by reflecting on and answering the interview questions.

The plausible answers provided by participants were their own opinions and described how they made sense of experiences that are ongoing and enacted on in their own environments. Other research has found it beneficial to gather the shared experience of those in industry and those in education to create a plan of action as schools advance programs (Yu et al., 2020).

The sensemaking approach is often used to provide insight into factors that surface as organizations address either uncertain or ambiguous situations (Weick, 1988; Weick et al., 2005). Because the consensus on UX/UI practices has been formed by those working in the field and there is no governing body dictating core competencies for UX practitioners, it has proven difficult to pinpoint an exact skill set and deliverables (Fleming-May et al., 2018). That lack of outlined skills adds to the uncertainty of what type of educational experiences to provide an undergraduate interested in this field of work.

Sensemaking has been found useful in another study focusing on issues in higher education. Research by Kezar and Eckel (2002) used sensemaking to interpret interviews and determine if goals were being met and transformational change was occurring in

higher education. The aim of their study was to "provide insights to academic leaders who sought to bring about change" (Kezer & Eckel, 2002, p. 317).

Beginning with what is and projecting what could be through this study might help educators employ improved means of approaching UX/UI in graphic design education. Pointing out an advantage of sensemaking, Ancona (2012) said "by mapping an unfamiliar situation, some of the fear of the unknown can be abated" (p. 3). The research questions for this study were developed with this perspective in mind to probe practitioners' experiences and provide some insight to guide project and curricula choices in the future.

The needs of students training in the discipline of graphic design have continued to change with advances in technology. UX/UI is a piece in the metamorphosis of curricula requisites for graphic design programs. The aim is that this study will provide a more structured framework on UX/UI curriculum needs, best practices, methodologies, and projects that will benefit students studying graphic design through the collected experiences and perceptions of educators and practitioners. Interpreting shared best practices for immediate future needs in the specialization of UX/UI design might aid the development of a curriculum that will benefit the educators and students and prepare them for their careers as visual communicators working in UX/UI.

Summary

Previous studies published in 2014 and 2016 support the idea for more study on UX/UI. The studies support the idea that successful UX/UI is built on a multidisciplinary approach. Visual components or graphic design were mentioned multiple times as a key factor for success UX/UI and noted as an important competency of UX designers

(Fleming-May et al., 2018; Sosebee & MacDonald, 2018). The system for studying UX/UI in the art school discipline of feedback and critique has been a model for implanting these areas of study in higher education (Vorvorearnu et al., 2017); therefore, graphic design programs have a vital part to play in preparing students for these professional roles and asserting their role in UX/UI methodology education. The next chapter includes the background of the researcher and introduces the method of this study.

CHAPTER III

METHOD

Purpose Statement

This study's primary objective is to develop an understanding of what is taking place in higher education and the graphic design industry by exploring the opinions of practitioners and educators on UX/UI design curriculum in higher education graphic design programs. A qualitative study was conducted to explore the experiences, opinions, and current practices of UX/UI practitioners and educators working in the field through 16 semi-structured interviews (see Appendices A for Consent Form, B & C for Interview Protocol).

Background of the Researcher

The qualitative analysis is "inherently subjective" (Stark & Trinidad, 2007, p. 1376) because the researcher is a conduit in the questions, interviews, and study design. The researcher's background is included to create transparency and make the reader aware of the researcher's relationship to the study. I have been a visiting professor of graphic design at the school of art for three years at Texas Tech University. The program averages a total of 125 students among all levels of undergraduate academic study. I have taught various courses, including design process, computer design methods, typography, publication, visual systems, advanced design process, and portfolio. Prior to my work in higher education, I owned and operated a design studio specializing in event collateral

and branding. My passion for graphic design curriculum has guided my interest in this study. My primary goal is to help build and develop curricula that will match the needs of the industry.

Question Development

The newness and growth of UX/UI design has created a need to formalize education and adapt curricula in graphic design programs to prepare students who want to specialize in this field of study. As this profession grows, there is also an increasing need to determine the best practices necessary to train designers interested in UX/UI. Industry professionals have expressed a need for higher education to focus on training in this area (Getto & Beecher, 2016). Because the study's primary goal was to gather the perceptions of the participants to understand the requisites needed in the UX/UI field and what higher education was currently implementing to support and could implement, a set of semi-structured interview questions were developed based on experience teaching UX/UI in higher education. Key questions were determined by the researcher's interaction with other designers working as UX/UI practitioners. Questions were designed to inquire about UX/UI courses, specific types of projects, digital design principles, research methods, and software used. Another question investigated the idea of graphic design and UX/UI being a separate field of study. Next, a proposal for the research was sent to the West Texas A&M University Internal Review Board (IRB) and approved for study (Appendix D).

Participants

Participants were selected through convenience and snowball sampling from two types of people knowledgeable of UX/UI design: educators and practitioners.

Professional contacts recommended other educators and practitioners they felt would be good participants for the research. The two groups were selected to provide both insights from academia and industry. The educators recruited to participate were professionals who currently hold a faculty position at four-year universities and teach graphic design or in a related field. The pool of practitioners who are currently working in a UX/UI position or a job with UX/UI responsibilities, with a bachelor's degree in graphic design or a related field. Those with a bachelor's degree were chosen because those practitioners have a similar educational experience to the level of education the research was focused, and the curricula needs of four-year higher education graphic design programs.

An email to gauge willingness to participate was sent to educators and UX/UI practitioners before the consent form was emailed (Appendix A). If the recipient replied, a follow-up email with the consent form and the explanation of the topic and the study's voluntary nature was sent. The participant sent a reply email with a signed acknowledgment of the consent form as an email attachment. They could choose not to participate, and they could stop participating at any time without negative consequences, however, all participants contacted accepted the interview request and had knowledge of UX/UI. Risks to the participants were minimal. Interviews were set up using the online video conferencing software Zoom, and an Outlook calendar request was sent to the participants. Zoom interviews were set up to account for health concerns related to the COVID-19 pandemic when this study was conducted. It also gave the researcher the ability to connect with educators and practitioners across the United States.

Two sets of interview questions were developed with varying inquiries. There was one set of questions for educators and another set of questions for practitioners

(Appendices B & C). The interviews were recorded using Zoom and transcribed using Otter.ai transcription software. The recorded interviews and transcripts were stored on the researcher's password-protected local hard drive.

The educators interviewed were employed at universities in Texas, Virginia, Colorado, and Florida. The UX/UI practitioners worked in Texas and Georgia and were also asked about their UX/UI practice and curriculum views (Appendices B & C). Out of the 16 individuals interviewed, five were female, and 11 were male. All of the participants had degrees in graphic design or a related field, and the educators teach at a four-year degree university setting. Thirteen of the 16 participants held a Bachelor of Fine Arts in Graphic Design or Design Communication, one had a Master of Fine Arts in Digital Imaging, one had a Master of Fine Arts in Graphic Design, and another had a Master of Fine Arts in Electronic Media. The industries of the practitioners included software design, agriculture, transportation, and 3D printing. The ages ranged from 24 to 59. The mean age of practitioners was 36.16, and the mean age of the educators was 47. A pseudonym was assigned to each participant.

Faculty Participants

Dave and Mary are designers and directors of schools with graphic design programs and have been in education for over 20 years. Alicia and Martin are both chairs of graphic design programs and have been graphic designers for over 25 years. Melissa is an assistant professor and has been a graphic designer for 15 years. Frank is an associate professor and has been a graphic designer for 27 years. Jarrett is an assistant professor, a graphic designer for 14 years, and has taught at three different large universities. Katrina

is an associate professor at a small private university and has been a graphic designer for 20 years.

Industry Participants

Josie has the job title of director of UX and has been a designer for 17 years and in the UX/UI field for more than 10 years. Rick is a UX/UI designer and has been a designer for 22 years, working as a high-end retail graphic designer before moving into UX/UI. Matt is a UX/UI designer and has been a graphic designer for 10 years. Anna is a UX/UI designer and has been a designer for 15 years, working as a UX/UI designer for the past 12 years. Sam owns a design firm specializing in digital product design and has been a designer for 18 years. Justin is a product designer and has been a graphic designer for 16 years. Giovanni is a product designer and has been a designer for two years. John is a product designer and has been a designer for 12 years and has also taught a digital design class as an adjunct instructor. See appendix E for a data table of interviews.

Interview Methods

In order to gather unique, meaningful, and rich responses, individual in-depth interviews were chosen and conducted with each participant. This method allowed a dialogue between researcher and participant and granted each participant the freedom to make sense and fully explain their opinions and experiences. The interviews were guided by the predetermined semi-structured questions but also allowed for follow-up questions or clarifications in answer. The interviews recorded on Zoom took place from January 29, 2021, to March 11, 2021, and lasted approximately 45–60 minutes each.

Data Analysis

Once the interviews were concluded, transcriptions were made using Otter.ai. The transcriptions from Otter.ai were saved as Microsoft Word documents, and the transcripts were reviewed for accuracy. The Microsoft Word documents were then uploaded to Atlas.ai software. The Atlas software provides tools that allow users to locate, code, and annotate findings in primary data material and organize that qualitative data for evaluation (Altas.ti, 2021). The data were read multiple times by the researcher and marked for meaningful statements.

Once the interviews were transcribed and uploaded into Atlas.ti, the interview data were inductively coded or open coded for similar themes. This method was chosen because the researcher expected a broad range of answers to the interview questions and could allow the narrative to develop from the raw data. It has been argued that this type of coding approach is useful for situations where a single coder is knowledgeable on the subject matter being researched and is a single principal investigator (Campbell et al., 2013). Repeated words and phrases were coded from interview responses without a beginning codebook. A total of 542 segments of answers from the interview questions were divided into 22 category groups. The groups were made of answers with similar words and phrases or answers to the interview questions directly. Words and phrases such as problem-solving, design foundations, portfolio projects, ideal qualities of a graduate, and qualities to look for when hiring were highlighted and assigned a code. Following that first round of initial, open-inductive coding, thematic coding was used on the statements, and textural and structural descriptions, grouping into larger themes. The final step in organizing these larger statements and descriptions were categorizing them into

key themes and subthemes, and a written composite was drafted. The broader themes were organized into five sections: characterizations of UX/UI, challenges in the graphic design field, methods of UX/UI, curriculum implementation, and student preparation. Each of those themed sections has 4-6 subsections. Detailed descriptions and direct quotes were used in the composite to create a textual summary of the practitioners' and educators' lived experiences and opinions and how they make sense of their field.

Verification

All the participants fit the criteria for the interviews and were qualified to give their opinions on UX/UI design and discuss their personal experiences. The educators actively teach graphic design students in four-year undergraduate programs and address needs in the graphic design curriculum. The practitioners were all employed and held positions as UX/UI designers and carried out UX/UI design as part of their job responsibilities. Following the verification strategies outlined by Morse et al. (2002), the participants were all asked the same set of questions for their designation (educator or practitioner) in the same order for congruence. The questions were appropriate given the background knowledge of the researcher.

Educators and practitioners shared opinions and experiences that created repeated phrases and patterns to form themes in the data analysis. The findings from the data analysis of the interviews supported information and findings from the literature review.

Summary

The method described in this chapter provides a framework to explore opinions, experiences, and current practices of UX/UI design and curriculum in higher education graphic design programs through in-depth, semi-structured interviews with practitioners

and educators to identify key themes and possible gaps in the curriculum. The data gathered and organized through sensemaking as a theoretical foundation will form themes identified by the researcher and provide a larger view of the changes happening within the graphic design curriculum. This chapter included the purpose of the study, the research questions, the sources of the related literature, the researcher's background, research design, data collection, and data analysis. The next chapter will provide a thematic data analysis of the interviews with selected statements as evidence to support themes identified by the researcher.

CHAPTER IV

DATA ANALYSIS

This research used semi-structured interviews to explore the experiences and opinions of graphic design educators in higher education and UX/UI practitioners. Using thematic data analysis, key themes with supporting statements from the educators' and practitioners' responses in areas such as software and design foundations in UX/UI practices, are presented in order to identify best practices and make recommendations for future action. The findings could help guide class offerings, content, and projects to better prepare graphic design students for emerging UX/UI jobs.

From the 16 interviews, the major themes were categorized into five main sections: characterizations of UX/UI, challenges in the graphic design field, methods of UX/UI, implementing curriculum, and preparing graduates. The first section, characterizations of UX/UI, provides evidence that a bit of ambiguity surrounds UX/UI and how it is defined for graphic designers, including the industries that use UX/UI. The second section, which covers the challenges for the field of graphic design, provides insights of the constant flux of new technologies and tools for graphic designers to learn both as practitioners and educators. Additional subthemes addressed talked about by educators in the challenges section include naming courses and finding qualified UX/UI instructors. The section on curriculum presents patterns in curriculum styles and methods, such as design foundations and the value of learning to code. Best approaches to

curriculum and types of projects needed for students are discussed. Industry standard software and additional areas for training are identified. The last section of the data analysis describes the types of portfolio work and the characteristics those in the industry look for when hiring, as well as the attributes educators felt were ideal for graduates.

Characterizations of UX/UI

Definitions of UX/UI

The terminology surrounding UX/UI can become complex and the nuances surrounding the job responsibilities that accompany these terms overlap and blend. Even the type of industries that hire UX/UI designers is a wide range. UX and UI are, by definition, two different disciplines (Benton, 2016). The bringing together of the terms UX/UI is debated by those who practice and have these job titles. There are also different interpretations in defining the scope of UX/UI as educators teach the principles and methodologies.

Academics and practitioners in the field agree that UX refers to research and a human-centered approach to problem solving through their experience, and UI refers to the actual look and choices the designer makes about the product. To explain these definitions, one educator said:

> I think that it can be a digital or a physical product. When we talk about it as designers in that context, mostly, it's talking about the experience of using a digital product. The term UI refers more to the actual design of the interface. (Melissa)

Graphic designers have a unique viewpoint because they can have a wide range of different specialized jobs with widely varying responsibilities depending on where they

work. Many times, designers do both UX and UI as part of their job requirements. One belief that emerged is designers and educators understand why the combination of the two terms occurs from a designer's standpoint.

Almost all the participants expressed awareness that UX and UI are different by definition, but they understand why they are combined when discussing digital design and why graphic designers especially put those two concepts together. There was also a sentiment in the interviews of the terms UX/UI being misused, sounding cool, or just being an industry buzz phrase. Explaining how the vocabulary has changed, one educator said, "the language has been modified throughout the years. At some point, it was called adaptive and responsive design, which I still use that language with the students" (Frank). Another educator describing how the terms are fused said, "There is a middle ground between the two where they both come together" (Alicia). A practitioner described the issue of the two terms by saying, "sometimes those don't belong together; there are a lot of times where they do. I think in the context of, say, graphic design, those things do marry up pretty well" (Sam). Another practitioner stated her opinion of the terms together by saying "When you have kind of shoved those two together, we're talking about digital, obviously. And I think that this is where it gets oversimplified" (Josie).

These statements illustrate participants' acknowledgment that UX/UI could be viewed as different specialties with unique purposes but, from a graphic designer's viewpoint, are often merged. Depending on the team a designer works with, the challenge of UX/UI design is that designers' responsibilities might be one or the other or both. Because the basis of this research is through the perspective of graphic design, UX/UI will be referenced together.

Industries using UX/UI

Because many industries use UX/UI terminology in job listings, ambiguity surrounds terms, and they are not limited to graphic design jobs. UX/UI can be applied to more than just digital design and not just app and software development. UX/UI can be applied anytime a human touches a product or needs to be led through an experience. Many designers discuss all design having some form of UX (Jones, 2018). Justin, a practitioner explained:

> I think everybody needs UX. I feel like if you're doing design right, you're using UX in that design. So, it doesn't matter if it's a digital project or a website or a department, no matter what the project is. I mean, I feel like there's not a huge leap from knowing what the user needs to make in that design, whatever medium that is. So, I think you actually transcend all mediums.

Additional perceptions that were identified in the analysis of the data were that UX/UI can be applied to multiple industries and products that are not just digital; however, digital is what is driving the market for these types of jobs. First, being able to use UX/UI in a variety of businesses meant everyone could apply UX/UI methodologies to their products. However, UI specifically refers to an interface, so that would only be a facet of a digital product.

The second idea was that the words "product design" references work created in the digital space, referring to it as a product, whether that was a website or an app. Rather than calling it digital design, UX/UI is moving toward being called product design. John, a practitioner, made sense of the terminology change by relating:

> So, the way I look at it is like, I don't even call it UX anymore. I just call it, product. Because user experience should be built into that business strategy. So, I would say every industry has UX. Not all of them have UI because there's not always a digital component. But I mean, anything on a screen would have a UI element.

This again can complicate what specific jobs and industries are using UX/UI when they have multiple names and responsibilities. This challenge supports the need for practitioners and educators to keep informed on industry knowledge, terminology, and skills.

Challenges

Self-initiated Learning

Self-initiated learning and being flexible emerged as a subtheme of challenges as the educators and designers spoke about staying current on trends and technology when asked about how they were implanting UX/UI into their curriculum structure. All the interview participants were actively pursuing self-initiated continuing education. Continued learning was necessary to stay relevant and keep pace with industry trends.

The interview responses revealed educators felt the pressure to stay current with industry standards to be effective teachers. Educators expressed the need to meet students where they communicate digitally even if it is not as natural to them. Meeting the students' needs can be a challenge because of the constant flux in industry demands. To meet the needs of the students, educators expressed the need to be proactive, so it does not become overwhelming. Taking courses during the summer breaks was deemed necessary. To embrace the constant change, one educator made sense of the situation by

suggesting designers find, “ways to enjoy the stuff that you want to do and just [give] in to being a lifelong learner because there’s going to be new tools” (Dave).

Online learning resources were a consistent response, with Lynda.com, Skillshare.com, and YouTube repeatedly mentioned as reliable sources for self-initiated continuing education. Educators also noted that conferences, professional organizations such as American Institute of Graphic Artists (AIGA), reading, and research were important. The practitioners were also actively participating in updating their knowledge. The practitioners expressed that it was the nature of the UX/UI field that dictated the need for continued learning:

> Being a UX/UI designer shows that you’re always keeping fresh, I think like knowing those tools coming down, for example knowing what that Figma is like. Working hard to be kind of a leader in the space and keeping abreast of trends and knowing what’s coming. It’s like, super important; I think you just can’t get stale, because like, there’s going to be someone younger and hungrier, coming up behind you. (Anna)

Almost all practitioners and educators mentioned life-long learning and self-initiated learning at some point in the interview process. Even the youngest practitioner already realized the need to constantly update your knowledge:

> A good amount of it is really just still self-teaching. And then I think that’s kind of the thing that is fun about it. To me, it is like, you always have to stay learning. And I know, I’m only a year and a half into this, but I can see how, if you do not stay on top of trends, you are going to fall behind so quickly. (Giovanni)

The ability to push oneself to continue to learn and adopt new tools needs to be a recognized part of the UX/UI and graphic design profession. It can be taught as an established reality for those in the design profession.

Flexibility

The idea of being flexible also emerged as another theme in curriculum development. Educators noted that if they kept the names of the courses very generic, they had more freedom to select different types of projects and approaches to projects without having constraints from the university. This allowed the different programs to be responsive to the needs of students and industry, and four educators mentioned addressing this issue with generic broad names. The educators noted that they strategically keep their course names very generic, to allow the redevelopment of the curriculum constantly without having to go through all the all the barriers and governance that universities put in place. For example, they had courses named interaction one, interaction two or visual systems. An educator explained how she addressed the problem with this response:

> I think just being really, really flexible, malleable, and creating courses that are very general so that they can embrace the new changes that occur. I think just being really flexible, very fluid, with courses, keeping them very fluid at the junior and senior year so that we are responsive not only to the student needs but to the industry needs. (Alicia)

The educators seemed open about the need to have generic course titles so they could avoid returning to administration with description title changes every few

years, making it easier to keep their programs updated. In addition to keeping course names general, another educator noted they keep project types open-ended.

These statements support the theme of challenges as schools are adapting to industry demands by keeping course titles generic and project types flexible to allow the educators to modify quickly to the changing industry climate.

Hiring for Education

Participants in academia said they face a challenge recruiting qualified individuals to teach UX/UI in order to prepare graduates for jobs in the UX/UI. However, educators say this situation is improving. One of the barriers to recruitment identified was financial because industry salaries are higher than salaries offered for education jobs. Salaries were an issue at large and small institutions. Another issue was an overall lack of candidates who have advanced degrees in graphic design because so many designers go into industry, and certain regions in the U.S. lack MFA programs for graphic design. One of the educators explained the issue in this way:

> If you would have asked me five years ago, yeah, total problem. I think our problem with the institutions [is] they don't want to pay. So, you're hiring in an industry where people make a boatload of money, and they want to pay like the lowest pay there is out there. Well, it's hard to attract. Yeah, money is our biggest challenge. (Mary)

In addition to salary struggles, educators supported the need for instructors with industry experience. Educators believed the administrations do not support candidates with industry experience rather than advanced degrees. An educator gave this explanation:

> Yes, because it's like pulling teeth for administration to understand that our professional field makes you qualified. To get positions is a struggle. It is a struggle to do justifications. It's always a struggle. They don't seem to understand our field at all, and I think it's because we are in art. (Alicia)

This educator was trying to make sense of why it was difficult for her to hire instructors and felt the field of study, art, is different than others.

In addition to challenges with school administrations, many different bodies overseeing accreditation for universities such as Southern Association of Colleges and Schools (SACS) or the National Association of Schools of Art and Design (NASAD) also add to the challenge in hiring individuals with industry experience when they do not meet the SACS or NASAD requirement for graduate hours in that specific major. One educator felt that education in itself is doing a disservice to the qualifications needed to teach because some instructors lack industry experience.

The applicant pool for educators was noted as improving over the past five years. One practitioner explained, "I think we're in a transition period now, where a lot of practitioners and educators are kind of phasing out, and newer ones are coming in with these skills. And I think it will hopefully improve over time" (Jarrett). Salaries and bureaucracy appear to be a barrier that inhibit the highest qualified individuals needed in education for UX/UI and to grow graphic design programs. The barrier of graphic designers lacking advanced degrees also added to the problem of qualified candidates needed to fill positions.

Methods of UX/UI Design

Fundamentals of Design

UX/UI design has factors that make it different from print design, however, UX/UI design and graphic design share factors and methods. In conjunction with design principals and ideation as a foundation, the components unique to UX/UI identified by participates were empathy, prototyping through software, user testing, and coding knowledge. There is not an official governing body for UX/UI design, so the standard best practices have been formed from practitioners out of industry need. Identifying recurring themes in UX/UI design could inform best practices to be taught in graphic design curriculum.

Design fundamentals were referred to in multiple responses for their importance and strengths in UX/UI design. Understanding the importance of design fundamentals can set the foundation for designers to find employment in many areas, but the fundamentals are quintessential for success in UX/UI. Educators mentioned the transferability of foundational design knowledge:

> There is always going to be the newest software to chase, that's never going to end. So graphic design programs stick to just focusing on teaching the fundamentals, like layout and then the code part of it, then you can learn any software you want apply those principles. So, what they should have is at least an understanding of four major disciplines within graphic design, which is typography, and then structure, and then the functionality of the, whatever they're designing, which will be multimedia, meaning web or, or time-based media. Those are very important pillars. (Frank)

Of the practitioners, half mentioned design principles specifically. One practitioner described the issue:

> If you don't have your design fundamentals down, then you're going to struggle. So, design fundamentals of typography, color spacing, visual hierarchy–your design principles, for sure. And then, as I said, code literacy, not, full on coding, but just code literacy…just a good eye for design. You need to know design principles and usability principles. (Giovanni)

Several designers called attention to the important visual hierarchy and scale in UX/UI design that could support the assertion by Chein et al. (2016) that successful UX/UI includes training on the visual components.

Many of the practitioners supported the need for foundational classes in graphic design curriculum because they are most applicable to their UX/UI jobs. They noted that design foundations, the basic principles of design, were a great springboard into a UX/UI career and felt that these skills were instrumental in their success as UX/UI designers. One designer also noted that in addition to design principles, artistic principles such as color and shape were important for UX/UI Design. Design and art foundations such as typography, hierarchy, scale, repetition, and color are transferable to many mediums, and practitioners and educators identified mastering those foundational skills as important for competence and success as a UX/UI designer.

Empathy

Thinking like the customer or putting yourself in place of the customer or users was mentioned several times by practitioners as a foundational principle and method of UX/UI design that is a differentiating factor from print design. In UX/UI, the designer

has to think about the user in a different way and how they might behave, not how they think the design should look or behave and make choices based on insights from the user. The interaction and engagement of digital mediums is drastically different from the static medium of print design. Rather than just looking at static image, a designer must image how a user moves through the product. UX/UI designers have to think about all the different ways a customer could experience the product and the feelings they might have when things go wrong, or when tasks are difficult. UX/UI designers have to consider diverse types of users as well. A practitioner elaborated on this issue of not being the user in UX/UI design by saying:

> The biggest things for UX designers is to learn all about empathy. And that is really kind of you putting yourself in the user's shoes. And you're going through this whole process of understanding what this user does, whether it's through testing, or any sort of persona, to make sure that you understand what your user wants to do and doesn't want to do. And that's the popular misconception…you are not your user. You need to get out there and test your software, your product, whatever it is against real-world scenarios, and again, with real people so that they can give you good feedback. (Rick)

To really understand the customer and their actions, using empathy was noted as an important method to working through a UX/UI project. Participants said learning about empathy was critical in addition to journey mapping, user testing, and customer feedback to find the best answers and understand the customer. UX/UI designers said they must critically think about how the user would feel, and professors must train students to understand this important part of the UX/UI process.

Ideation

In design thinking, ideation is the process that comes after identifying the problem and empathizing with the user. In addition to foundational design knowledge and understanding the role empathy plays, ideation is a key component of best practices described by participants. To support the need for solid design thinking before getting into software or relying on technology to solve the problem, educators highlighted the importance of developing the skill of imagining multiple ideas and ways of solving a problem and again thinking about the user first. One academic graphic design program had instituted a class that was focused on fostering creativity as part of their core required classes. This class highlighted different design thought processes. Another educator from a different program reflected on idea of ideation as a skill that needed to be cultivated be describing the using one's brain over software:

> There is not a software that will help you with the initial ideas. I think that your brain is the most important thing and your sketchbook and your pencil. Like, that's really the most important thing. You have to be able to think, you have to be able to plan, you have to be able to understand the process. And it's very important to get the ideas on paper, or even if you're like, low flying with wireframing, Adobe CC or Sketch or whatever, you have to be able to think and plan and process and design with your brain. There's no software that's going to help you with that. (Jarrett)

Teaching the skill of ideation can be fortified through different approaches, such as the solid sketch book practice mentioned. Learning a variety of different design

methodologies and theories can help students build creative practices for producing a variety of ideas and solutions without relying on technology.

Prototyping

Methods for prototyping have evolved quickly in the last five years with several options now available to designers and developers. Prototyping software has changed the way designers have been able to work on solutions more quickly and share designs with others on their teams. Understanding these tools is important for practitioners to speed up productivity and for educators to be able to teach industry standard software to students. Figma, a browser-based design tool, and Whimsical, for building wireframes, were mentioned as software that has sped up and changed the way designers are working on UX/UI projects. A practitioner explained the significance of this change:

> When I first got to my job, nobody was prototyping. You would have to do an Adobe After Effects. And that was out of reach. It was time-intensive, out of our skillset, and we just couldn't do it. And so, we were usually looking up links and URLs and sharing those with developers. We were like, okay, we want the button to look like this, and it's two-thirds of the way down the page. And that was exhausting. And we would give over long documents with all these examples. So just spending three or four hours to prototype what these things look like is so efficient and so handy. And it has been very important in, like, my progression in my job. (Matt)

The availability of these types of prototyping software has changed the way designers can present ideas in the last 10 years, thus making designing more efficient. Prototyping has been valuable to speed up the way designers work to get ideas to the screen and get

feedback from their teams and clients. Having a basic understanding of how they work, and the power of these tools is valuable for both practitioners and educators.

User Testing

Both practitioners and educators pointed out that the strength of designers using UX/UI is that UX/UI provided data to confirm their design choices. Having the ability to prototype quickly has created the ability to test more frequently as well. Practitioners liked having feedback data to support the choices they make as designers and felt it substantiated the outcome:

> Now you have the data to back up your design decisions. I'm relying on my design skills to get this solution started, but I'm validating it through customer feedback. I'm telling you customers love it. And if you don't want to go with it, that is on you. It's not like I didn't do my job as a as a UX designer. (Melissa)

Educators pointed out that the testing phase needs to be taught and can be difficult for design students who are focused on the aesthetics. One educator made sense of the situation by explaining:

> I just think making sure that they learn how to test right. I think everyone wants to jump to the end of their conclusion. But you got to do low fidelity testing. You got to make sure your users are getting the goal that you want. So that's asking, really teaching the importance of testing before they go, oh, let's make it beautiful. It doesn't matter if it's gorgeous if it doesn't work. (Mary)

Students need to be taught to take the time to test so they have a proof of concept when presenting portfolio work and have the experience of user testing to validate design decisions. User testing can pick up on user sentiments, positive and

negative, help streamline the user's path through the product by analyzing their click-through path and see in real life how a person navigates the design. It was noted by participants that the job of the designer is to make sure they have confirmed the product's usability. A practitioner described that need explaining:

> It's our job to make sure that that person stays and converts as a lead or a client, a new customer, or they buy a product. You better figure it out really, really fast. And then you better test it, you better ask people [to] go visit this and will you place an order? (Sam)

Testing was repeated as an important step in UX/UI design. Practitioners and educators noted it was important to value the user's path and the steps needed to complete the task in the beginning and not just working on the visuals. Testing is valuable to designers because it can validate their design decisions, and they are not defending a choice based simply on a preference.

Coding

There are a numerous software and applications that allow digital designs to be built with and without code. The answers were split on determining if coding was a necessary skill. On the educator side, several referenced coding as an important skill and that students should be familiar and exposed to it. The educators noted several different ways to learn coding and different paths in addition to several different code languages. One educator summed it by saying "there's a lot of different paths there" (Jarrett).

The specific phrase "code literacy" came up three times in different interviews. One practitioner stated, "I think it's important to be code literate" (Matt). Being able to code was mentioned as helpful by several practitioner participants because you can start

building and playing with the design variables. One practitioner described it as a debate between being generalized versus specialized; you could be more specialized in UX if you loved coding. They rationalized coding experience as valuable because you could go behind the interface and edit on the back end. Anna said:

> As far as getting into front-end development and passing code off to developers, not a requirement where I am at my job. Before it was, you were almost considered a UX designer and front-end developer. Because the mock-ups the visuals, we worked in was almost a secondary code base that you could manipulate and kind of see things in production.

Most of the practitioners interviewed did support knowledge of being proficient in writing and understanding basic HTML and CSS coding. However, they also had members of their team who were specifically responsible for writing code as developers. One UX/UI manager reviewed developers' work as part of her job responsibilities but even had an additional developer to review the coding specifically. Another practitioner characterized the situation:

> We both understand code. HTML, CSS, you really don't need to know too much PHP. We understand JavaScript. We can write those. I think if they want to be UI/UX designers and in working software, I think that they are going to have to learn that at some point. We are seeing how whenever the coders are just responsible for the coding, and the designers are just responsible for the designs, both of those things are come out better. Instead of having someone trying to do both, you have somebody invested in one thing completely. (Giovanni)

To support the need for developers to adhere to design standards, one practitioner said he would code to keep control of the design. Justin illustrated this need to manage the visual design by explaining, “In the past, until recently, most of my designs, I would do the front-end development for them, mainly just to keep control, just to make sure what I design ended up exactly like I wanted to” (Justin). With limited time or larger projects, however, design and coding work requires separate teams.

Two practitioners said their daily responsibilities do not include coding but also supported the understanding of it. Understanding the code enabled the designers to go into the code and identify when something was wrong and fix it. Understanding how to code was also helpful to them in communication with the developers. One practitioner explained the duality of the situation:

> I do know it. I am not as strong as a coworker who went that route. I made a decision about five years ago, where I realized, I don’t want to go all-in web development. And in order to truly excel at it, you kind of have to pick your poison and go all in. But I think it’s important to be code literate. There are million-dollar apps right now that use no-code tools. And they utilize the pillars of UX strategy and execute a whole business without having to code. The most important parts of that are understanding the user, communicating the user, and some basic branding. (John)

This practitioner’s statement exemplified that argument of knowing and not know coding and how there is not a right answer for its use in UX/UI.

The answers on coding were split a little from the practitioners, three yes, two no, and three who thought it was a valuable skill. Educators were not specifically asked if

code was a request for UX/UI design, but it was mentioned five times directly in the interviews. Therefore, the responses indicate that coding is an asset to anyone who wants to go into UX/UI or to at least have a basic knowledge and understanding of coding.

Software

The colliding of the software and development world with the design world has presented many new software options for designers working in UX/UI especially for prototyping as previously mentioned. Both practitioners and educators were asked what software they thought would be important to learn and teach. The educators noted they have been in the industry long enough to see software cycle, so they were hesitant to name a specific new software outside the Adobe Creative Cloud. They noted that different projects require different tools, but that the Adobe Suite was essential. The educators' statements supported the practitioners in stating the Adobe family of products will be the foundation and you can add to the tools after those products are understood. As long as it is the right tool for the job, the software choice was flexible. The importance of having Adobe CS, Illustrator, and Photoshop, as foundations was supported by this statement:

> They just need to be versed in Adobe CS, and then you can really figure out anything else at that point. I think as long as you can just get to that step quickly and be able to communicate what you're trying to do to another group of people is really important…I'm kind of just software agnostic, because I think I've just learned so many over the years. Like, yeah, give me another software to learn, whatever. (Anna)

Outside Adobe CS, the software the participants were using for prototyping were Figma and Adobe XD. Figma excited many of the practitioners because it was browser based and can allow multiple people to work on one project at the same time.

The variety of software programs used by a UX/UI designer is referred to as a stack, and the stack was explained by UX/UI practitioners:

> Illustrator is my bread and butter. Illustrator was my home for a long time, so I still use it on a good design. And then Adobe XD, Visual Studio for code, which is just like a coding thing, and then really, a lot of the heavy lifting lately has been Figma and then also Whimsical for wireframing. I did learn Sketch first, but then my coworkers use Adobe XD and then the other product designer uses Figma. Figma is like, definitely the out-front thing. (Giovanni)

Figma was mentioned as the most exciting new tool by multiple practitioners, but this practitioner's statements supported the cycle of software changes practitioners face:

> Figma is definitely the most exciting one. So, it's almost like you got to learn one really well. And then, as far as UX/UI design applications, they're all basically there. It's not, you know, you can learn the new one in a weekend or something, at least like the basics of it. And it just seems like it's going to be in constant flux. So, it's kind of pointless to invest all of it into just the tool. (Anna)

In addition to Figma and Adobe XD, many other software tools were described as helpful to UX/UI designers. Whimsical and Sketch were mentioned as important wireframing tools as well as InVision for coding and proof of concept demonstrations. After Effects, Muse, Marvel, Google and Google Analytics, Nero, and Amplitude were also mentioned. Adobe XD was favored because of its relationship to the other Adobe programs that have

been standard in the graphic design field for so long. Support for Adobe was endorsed by this practitioner because of its connected tools:

> I'm going to say XD, and partly because I think the Adobe Suite is so valuable to a designer. There are things that are different in XD from Illustrator. But I still think it's probably the easiest to go, and you're familiar with Photoshop, you're really familiar with InDesign and Illustrator. So, I think it's easy to go pick up XD. I think the way everything syncs together, I mean, cloud documents and fonts, and all of that just kind of keeping in that ecosystem is easy. (Justin)

Several of the practitioners said they will go back to Adobe XD because they are so familiar with the Adobe software products.

The sentiment that there will always be something new coming and the continued cycle of new software was a recurring statement by several practitioners and educators. Many participants pointed out that designers will always have to learn something new at every new job based on what that job asks of you, but validated the Adobe CC Suite, Illustrator, Photoshop, and XD, are still standard and the Adobe products are still the most useful and relevant.

Implementing Curriculum

Best Courses

Evaluating higher education curriculum routinely is necessary, and many of the educator participants noted that they evaluate curriculum often because the industry continues to change rapidly. In the interviewing process, participants were asked which courses in their higher education graphic design experience helped the UX/UI designers the most in their jobs. The practitioners were also asked in the interviews about which

areas they wish they had received more training in when in their undergraduate programs. Many practitioners mentioned that UX/UI did not exist when they were in their undergraduate programs. Of the ones that did, they said they were introduced to UX/UI through web or digital design classes. Educators discussed what they thought were their most valuable courses for UX/UI. Web or digital design and interaction was a consistent answer. One educator noted that she was changing the language in her classes and the way she introduces UX/UI methods into her other courses. She made sense of the need and felt transition was straightforward:

> I felt I was under pressure to learn UX/UI. But it was actually, surprisingly, very easy. And it made sense. It was really nothing different than what we already do. And I think if you're a little on the anal side and you like organization, it isn't that hard to grasp. And I found that the students learned it really, really easily as well. (Alicia)

Educators and practitioners both agreed that motion, web classes, interaction design, and classes based on digital design were the most important.

Many practitioners mentioned that the web design classes they had in school were the most relevant. Practitioners emphasized classes in UX principles and research, motion, visual systems, design fundamentals, and portfolio classes were the most beneficial for UX/UI design. Several practitioners noted that they were in school before UX/UI principles were being incorporated into graphic design classes. "Actually, UX/UI was all self-taught, but I did some of that self-teaching at work as well" (Matt). Only the youngest participant had classes other than web design that address UX/UI principles. "UX research, interaction design, visual communication, web design, and advanced web

design, I would say they were the most directly UI/UX, where we're specifically talking about UX and things" (Giovanni). A portfolio class where you were autonomous in taking a design project through an entire design process was deemed one of the classes that aided a practitioner in building confidence.

Based on the interviews with practitioners and professors of UX/UI, increasing the courses that are digital design or interaction based will be beneficial for students. The continued flexibility in methods to approach projects and allowing students the independence to work through those projects through classes like a portfolio class will help prepare students for UX/UI design.

Student Projects

The graphic design curriculum follows the fine art school method of critique for most classes. This model allows for projects to be developed in learning-by-doing theory, including a period for feedback from peers and instructors. Many of the projects become the work that makes up the student's portfolio. Educators usually have the freedom to choose the types of projects they assign. This allows educators to provide the right project opportunities for student projects based in UX/UI. These projects will help build student portfolios and allow students to compete for jobs in the UX/UI field. Multiple projects were mentioned as being important as well as the ability to explore different media. Many of the educators described giving the students a problem as a point of departure for a project that is very broad and having the students explore solutions. Allowing the student to have choices with projects that have an in-depth research component accentuate the students' problem-solving ability. One educator simply stated,

"the idea of design is to solve problems" (Dave). Another described problem-solving, design thinking, and research as foundational skills.

Two educators mentioned the importance of using design projects to solve or introduce students to larger international problems with a worldview but also focusing on what can be done at a local level. The educators felt it was important for students to be made aware that you can use design to solve larger problems in the local community or the world. One described her process as "occasionally giving students [assignments] assigning things so that it's not their choice. [Assigning] things that they are uncomfortable with, or unfamiliar with, things they don't really understand so that they learn through their research" (Alicia).

Assigning students projects that they had no prior knowledge of forced them to do research to learn about it on their own.

Two other educator statements supported working on a local level by partnering with real clients to give students that experience, which supports the findings by Yu et al. (2020) that real client partnerships are valuable experiences for students. "If they can get in front of a client, I think that would definitely be helpful . . . work on a small project that could possibly help a local company . . . be able to produce an app or something for their consumer" (Katrina). Being open for more collaborative projects with other universities or other outside entities was discussed as beneficial for students learning UX/UI. One educator explained a program that provides UX/UI opportunities for students to interface with the community on a project. He explained "it's hands-on, and they're actually product testing prototypes with people" (Jarrett). The faculty leads teams

of students and partners with clients in the community, mostly organizations and nonprofits.

Valuable projects for students from the practitioner's perspective focused on partnering with clients in the real world to get experience. Practitioners felt working on a sales or e-commerce website would be beneficial to students. Any projects that allow students to build their portfolio with real-world experience was cited as beneficial.

Two other practitioners mentioned case studies and evaluating existing projects as being important for student learning. In addition to case studies, collaboration through teamwork was emphasized and again testing was noted. Several practitioners mentioned the agile practices in software development. "Agile practices" involve discovering requirements and developing solutions through the collaborative effort of self-organizing and cross-functional teams and their customers/end-users (Beck et al., 2013). "Agile sprints" are problems investigated within a short time frame followed by testing. Because an agile sprint is not normally part of graphic design curricula, the practitioner felt the students would benefit from exposure to that methodology. She described the benefits of the agile sprint method as improved culture and faster ideation.

> It is creating that safe nurturing space with a group of people where you are not afraid to be vulnerable and talk about your ideas. And if you follow the ceremonies [process] properly, it can give you a great template to solve problems with other teams very quickly. (Anna)

The idea of introducing the sprint also supports the need for more user testing. The importance of concepting a digital product, a mobile application, or website, independently, testing the project and getting real people to try out the digital product or

app for students was reiterated by practitioners before the students get caught up in the finishing design phase. One practitioner detailed of the importance user testing by describing how important the process of asking questions and establishing a hierarchy of information before you put the finishing visual details. She suggested:

> I think a lot of people don't understand that like that final little, chrome or whatever we call it. It's like 10% of what you're doing. If you're actually UX or if you are just UI and all this is handed to you, then you can cake decorate all day. If it's software, make something that people are getting in there and using. (Josie)

She felt it was important to emphasis that step of user-testing to make sure the product information was organized and understandable to the user before deciding the final visual elements.

In addition to user testing, other recurring educators' answers focused on local and real-world problems as important projects for students. Educators also thought partnering on projects with real clients that solved a real problem. This mirrored the studies found in the literature review for client-based projects to help students studying UX. Practitioners mentioned websites or apps that the students conceive and create showing functionality and having in-depth research and process. Both educators and practitioners mentioned research-driven projects and work that allowed the students to show off their full process. Practitioners additionally identified teamwork, collaboration, design sprints, usability testing, and case studies as important.

Ideal Curriculum

Educators were asked their ideas about the ideal curriculum. Flexibility and the willingness to embrace change appeared again. The need for more UX/UI and digital

design foundations was also an additional strong subtheme supported by statements by several participants. One educator was very direct in saying UX/UI needs to be more emphasized:

> I would reiterate this, that UX/UI needs to be baked into the curriculum a lot more . . . I've been seeing is that UX/UI components are baked into a lot of systems-based projects, but you definitely need at least, I would say two classes. You need to be designing from header to footer and really kind of getting into the nitty-gritty of the process . . . . Now we're in a space where we really need to focus on those things earlier and make it they are just accepted. We are just going to have to honestly, totally shift the mentality of design programs. And this pains me to say from a print focus to digital in general. And right now, I don't feel like we're there. (Jarrett)

Two or more classes specifically on digital design was a repetitive answer from educators. To support the need for more digital design classes one educator said, "Even NASDA had told us that they're taking basically taking enough art history for a minor. So there seems to be some space in there for the technology and graphic design specific classes we need" (Martin). These statements support that more digital design classes need to be incorporated to graphic design programs. The opinions about the course titles staying flexible to accommodate industry change was repeated. One attitude was it was time to overhaul graphic design programs and have UX/UI classes more integrated into the programs on a deeper level. This research data supports findings by Getto et al. (2016) and indicates more training on UX/UI with additional digital based courses,

client-facing projects that partnering with industry would be beneficial to graphic design students.

Additional Areas for Training

Practitioners identified areas in which they wished they had received more training while in school. Lack of business training was mentioned several times by different participants. This could identify a gap in the curriculum and an area of study that could be valuable to students. Practitioners expressed the need to know business objectives. They felt more understanding of the business side could enable them to run their own agencies and businesses. The practitioner made sense of this by saying "to really understand the reality of the business landscape and how to identify business objectives, [designers need] to tie them into your design and [know] how and when to fight for the user" (Giovanni).

In addition to business objectives,-the integration of digital design was affirmed as needed in graphic design curriculum by practitioners. Justin felt that just design in general needed it be stressed, by explaining, "once again, that's signs of the time, but that difference between now and then. I'm sure it has to be a lot more emphasized". He explained that established UX/UI patterns and form creation needed to be taught. One practitioner suggested a class called Processes of the Digital World followed by a UX/UI class, followed by upper-level electives that are more specialized. Another practitioner's opinion supported the finding of Getto and Beecher (2016) that the programs needed to train UX/UI professionals are not readily available. The practitioner explained:

> What we're looking for now is not offered. Like, there are certain ways to work buttons, you can't just put submit on it, or, if it's a message, don't give them a 404 error, or some basic error, I see that all the time. Talk to them, like a they're a human. You have to make your digital products feel as human as they can. People need graphic designers, but you're going to be a lot more marketable if you understand these other things. And if you can use those right, it can go in a million different directions. I think it would be more beneficial for businesses like ours to have that taught. (Sam)

All the educators acknowledged UX/UI principles need to be addressed in the graphic design curriculum sooner and more in-depth while addressing digital design problems. The practitioners' opinions were a strong need for more business principles and emphasis on digital design and best practices. All the participants indicated a need to apply more digital into the curriculum and apply a human-centered design approach to solving design solutions for people.

UX/UI as a Degree

Opinions on whether UX/UI should be a separate area of concentration within graphic design, or a separate major degree plan was explored. The size of the programs and the resources of the universities, such as faculty size, were mentioned as the biggest factors in creating UX/UI programs. One educator expressed this opinion:

> I certainly think that you get the right kind of university. You could offer a separate degree in UX. And you could say, I mean, I would just call it UX. And then you can certainly talk about UI. But it's that UX could be expanded in lots of different ways. I mean, because you could have industrial design people part of

> that you could have graphic design people part of that. You can have engineering people part of that. (Dave)

Two other educator statements supported the idea that a UX/UI degree is possible depending on the size of the university and if infrastructures at that university provided a degree was a positive and equitable experience for the students.

Educators agreed that UX/UI could be either a major or a minor depending on the size of the program and the available resources such as faculty and number of students. Three educators supported that idea of having UX/UI as a minor or separate area of concentration in graphic design programs and also open to other disciplines, but acknowledged it would require modifications to the current curriculum:

> I think maybe if it's a component in the world of digital design track, even a minor, where they're doing web design, it's maybe in conjunction with social media marketing, website design, user interface experience. I think just from seeing what my students do when they graduate that they need a broader experience. I think sometimes we get so focused on one area of expertise. (Katrina)

This educator was reflecting on the possibility of UX/UI training providing students a broader educational experience, allowing more opportunities when the students graduate.

Due to the limited availability of UX/UI higher education degrees and the availability of certificates and boot camp programs, attitudes on the importance of a four-year bachelor's degree were explored with practitioners. There were contradictory statements. One practitioner felt that it was important for a designer seeking an entry level job:

> I think a degree is fairly important. For entry-level we would probably lean pretty hard on your education just because we know there is just so much to design that you can't learn on the job. I think having that foundation is really important from an accredited school. And then just, we use your, whatever your portfolio presence is. (Anna)

Practitioners emphasized having a degree was not paramount in securing a job if you know the principles of UX/UI and can show the work in a quality portfolio, although a degree might give an applicant an advantage or show they have the tenacity to complete degree requirements. Sam explained, "I don't care about a degree. I'm like, what's your portfolio look like? It helps because you can get that structured education". Because degrees in UX/UI are not prevalent at this point in time, the UX certifications were mentioned as an alternative to a degree. Giovanni mentioned the role Google is currently playing:

> There is another thing you look at besides education. Google is coming out with a UX certification. And right now, I see there's no recognized kind of certifications, it is very random. It's like all these random boot camps. And if you if you can get a formal education in it, that's awesome. So, I think I think that Google certification is going to be recognized.

Other practitioner relayed that now that Google has these certification courses available, they could be as effective as college degree. His opinion was:

> So, there's no reason to spend $40,000. It's easier to blow it up and start over. Which is why I think like Google certifications, and all these kinds of curated, online, things are going to be easier to get the ball rolling. (John)

Another practitioner supports the idea that a job in the UX/UI industry will not be dependent on a four-year degree and that requirement is changing. That practitioner felt the world is shifting away from the four-year degree. He expressed that a bachelor's degree was not being as important as the actual work that could be done. Another practitioner talked about UX/UI colleagues who went to college to study development after already learning code in high school. They just happen to have a good eye for design which helped them be successful UX/UI designers.

The actual attitude to work and learn and the quality of portfolio projects were deemed more important than the degree. The certificate from Google came up three times in interviews as an industry-standard certificate that will have value. A degree plus the certificate might be a powerful way to enter the field.

Preparing Graduates

The last theme of the data analysis addresses what qualities, skills, and portfolio projects students need from both educator and practitioner perspectives. Specific portfolio pieces and optimal attributes of graduates were explored from the lens of the educator. Traits and projects for ideal hires were investigated from the practitioner's viewpoint as well as the types of portfolio work practitioners look for when hiring new graduates.

Portfolio Projects

When approaching graduation, students begin to develop work that will fill their portfolios. They use this portfolio to secure interviews and jobs in the design field. The projects that make up this portfolio are their personal sales tool. The more impactful and

skillfully developed the projects, the better the portfolio, which potentially increases employment opportunities.

Projects that allowed the students to have experiences problem solving on their own and with a team and solving problems with real impact were discussed. When thinking about ideal portfolio work, one educator reflected, “I like to see a fully developed project, a beautiful laid out book, and that they really thought deeply about what they’re making” (Mary). This aptitude for critical thinking being evident in portfolio projects through the work presented will elevate the quality of a student’s portfolio.

Students who can think on their own are the ones who will be more successful, and one educator described facilitating that experience by assigning more independent and unrestricted work in upper-level courses. Another educator communicated that showing UX/UI work in portfolios in an interesting and clear way could create its own design challenge. He explained, “it is almost a whole other project trying to figure out how to show these really complex projects and systems in a portfolio” (Jarrett).
In addition to displaying these complicated portfolio pieces, one educator underlined the importance of showing a true skill set in a portfolio by showing functionality in the projects. Without the functionality aspect, it is just an idea. He explained:

> When you put something like that in a portfolio, for some weird, strange reason, you give the impression that you know how to do it. So, it’s misleading. So, when they have their portfolios, and they show their mock-ups with little images inside, and they say, I made this up. No, you didn’t. You made some nice illustrations of an idea. But that gives the wrong impression. (Frank)

Well-designed portfolios that show true skills and exemplify critical thinking through the work are what educators felt students needed for portfolios when they graduate.

Practitioners were questioned about what types of projects they look for in portfolios when hiring. Website builds were mentioned the most, along with projects that show UX/UI fundamentals and in-depth thought processes. Students seeking these jobs should have websites, digital applications, or digital-based work in their portfolios with an emphasis on UX/UI fundamentals. Describing what practitioners were looking for in student portfolios, Rick said, "I would look for any sort of projects that just to kind of go back to more fundamentals." The fundamentals included the wireframes and prototypes that led to their finished high-fidelity prototypes. Practitioners also wanted students to be able to explain the why of their choices and be able to answer specific questions about the research and user testing that is important to software product design. To support knowing fundamentals such as type and layout, one practitioner wanted to see several websites when looking at students' graduate portfolios:

> We want to see three or four full web builds and a lot of examples and how they were thinking about the process and how they're tying that narrative and lacing that concept through the whole thing. If it was somebody coming straight out of college, we just want to see that they had an understanding of concepts, that they had an understanding of type and layout, and that they knew the tools. (Matt)

Websites with strong concepts is what this practitioner felt was important projects in student portfolios.

In addition to seeing website and app projects in portfolios, Anna and Frank spoke about the UI of the portfolio being important to emphasize a student's design skills. Anna detailed:

> I know that those stand out for us a little bit. If we have, like, five portfolios, and there's one that the UI is outstanding . . . like, whether you went to Squarespace and downloaded a template, and then manipulated it on your own, we don't really care . . . we don't care if you can build your website at all. I think as long as it's clean and it evokes that you have an awareness of, like, composition and layout, we will judge your design skills a little bit through your portfolio. (Anna)

Anna's answer conflicts with Frank's. Frank felt it was important for the student to code their own website, but they both agreed that clean UI on the website without the distractions of moving objects was preferred. The website needs to function clearly, highlighting the students' process and work.

Multiple answers from practitioners again emphasized seeing the process in the middle that gets a designer to the best solution. One practitioner reflected, "it's that middle part [in] between. That's where I want to see most of your stuff. And then give me the pretty pictures at the end" (Josie). The process, the design development through critical thinking, was remarked on as desirable in portfolios projects.

Problem-solving came up reiteratively and again was mentioned when asked what practitioners looked for in portfolio work.

> Having your own idea, kind of, and do it and apply that process to it. They need to solve a problem, but a kind of a hard problem, like, how to manage multiple things. I mean something that's going to make them stand out and show that they

> actually know what they're doing—just having a good problem to solve. (Giovanni)

Creating individual work that presents original ideas and showing the process of resolving that idea was the focus of practitioner answers. Educators also highlighted problem-solving and students' ability to talk about their work and solutions.

The design skills are important, but for UX/UI jobs, the practitioners want to see the steps in sequential order and then the rationale written out. The practitioners mentioned several times that they do want to see a few websites in portfolios. Both practitioners and educators agreed that solving a complex problem, showing the decision-making and design choices through research and process, and explaining design choices with sound reasoning, is what they want to see in an undergraduate portfolio.

Ideal Qualities in Hires

A mix of hard and soft skills was discussed as ideal qualities in a UX/UI hire. Positivity, passion, and an eagerness to learn were listed as personal qualities. Understanding digital trends, UX/UI fundamentals and terminology, and the knowledge to work with digital assets were noted as hard skills that were important to practitioners.

Positivity, a soft skill, was mentioned multiple times as a desired characteristic by partitioners. One practitioner described how attitude could affect the work team:

> It is going to be adaptability, positivity for sure. I get excited that you are getting excited, that you're given work, and show that you really care and that you're thinking through everything . . . we don't really want you on the team if you're not going to be a self-starter. You got to be just excited to come to work and be positive. (Anna)

To further those support those feelings, another practitioner clarified the need for those characteristics by explaining how important being positive was to the culture of the team:

> I want you to be passionate about what you're working on. I don't want you to be so passionate that you get your feelings hurt if it's not good. I think that's a hard separation for a lot of people to make. [I need you to be] pleasant and respectful. I've worked in so many toxic environments. Like, for me now, it's even more important than the people that I go to work with come at it from a positive perspective. (Josie)

The ability to handle change and critique easily were all mentioned as soft skills that were valued. Being a pleasant person, being passionate, and having a willingness to work hard were also attributes mentioned.

Additional attributes mentioned by practitioners that are valued are flexibility and again continued learning. A practitioner illustrated the need for that attribute of continued learning:

> It's just there has to be a desire to always want to change and move in the web area, because as soon as you don't, you're going to be frustrated or kind of just left behind. And so, kind of coming into with that knowledge and knowing that whatever you're doing today might change tomorrow, that might be your project, or that might be just the whole general direction of the internet. (Matt)

Being naturally curious and asking questions came up several times in statements from practitioners and supported the idea of self-initiated and continued learning. One practitioner described that trait:

> I think the inquisitive nature is really helpful. Know sometimes, what you're doing is going to be subjective. So, you have to learn how to take criticism really well and use that to build yourself. Don't take it personally; we're here to do a job. So, let's build it right. And don't think you have the right answer all the time. (Sam)

Several other statements by practitioners supported asking questions as a skill. They need to be prepared to ask a lot of questions and not assume they automatically know the answer. Not being afraid to ask questions, being inquisitive, and having natural curiosity was mentioned as sought-after skill in hiring UX/UI designers. One practitioner made sense of that skill by explaining:

> Another huge thing is not being afraid to ask dumb questions, like really dumb questions. So many people will just say they understand because they don't want to be perceived as dumb, but like now, I intentionally ask dumb questions. Because if you're in that meeting together, and you aren't fully understanding, it is just going to make for a bad time. So able to ask good questions. (Giovanni)

Practitioners also noted that fresh graduates entering the field of UX/UI are not expected to know everything. Two practitioners remarked on the importance of having a mentor to look to for guidance on the job. Another practitioner mentioned they were not going to ask their junior UX/UI designers to solve complex problems as soon they start their jobs. When describing what to expect from a new graduate, a practitioner said:

> You don't have to be an expert in every part of the design software, but it certainly helps. I know that depending on where you are in it, wherever you are hired, there should be a system in place of more experienced developers, and in

> some cases, maybe more advanced UX people who are there who can sort of guide you on your way and to kind of help you take that road map to be a more seasoned designer and seasoned expert. (Rick)

Those remarks support having solid comprehension of design fundaments and portfolio can secure a freshly graduated graphic designer a job in the field of UX/UI design. It is recognized that the new hire will need to learn and acquire new skills for the job. Another soft skill mentioned was being perceptive of current practices in the industry, and how to design outside your own style for clients was cited as a notable trait. One practitioner described that perceptiveness:

> An understanding of just kind of good websites and where web trends are going, and also, an understanding of industry mood I think one of the biggest things that I've seen, definitely my portfolio when I came in, and then other portfolios, when students will come in is they can't really set a mood, they've got an initial kind of got a style, and it usually says more about them. (Matt)

Separating personal aesthetic preferences in addition to knowing how to research and understand client needs results in relevant design solutions by graduates. Learning how to research allows the designer to dive in and discover true user incites to measure the most effective design solution for the problem. Knowing how to assess those needs was described by a practitioner by stating, "our goal is knowing how to measure the most impactful things" (Giovanni). Being able to articulate those solutions both written and verbally was mentioned as important to support aesthetic choices. Another practitioner spoke of showing your value beyond visual design:

The only way you're going to get a seat at the table and escape the graphic monkey job is by showing your value and showing how you're affecting revenue because that's all they care about. Do the research and design. (John)

The end visuals are important, but then again, the process that led to those decisions is what the practitioners are seeking.

Thoughtful solutions to design projects were mentioned a few times as important to see for practitioners in portfolios. One practitioner described it as "being able to speak into the why of your design" (Giovanni). The ability to communicate with clients and talk about your work was valued.

Practitioners advocated for looking beyond the aesthetics of the finished design solution for substance and problem solving through research. UX fundamentals, including business basics and a good understanding of the software tools, were stressed. Knowing the tools, having an awareness for good visuals, being fluent in the terminology, and knowing basic industry skills did not garner as much description in the participants' responses as the soft skills. These soft skills can be harder to come by and are what make some graduates stand out more than others. Being inquisitive and the ability to ask good questions were mentioned a few times. Confidence and being fearless in front of a group of people were mentioned as important as a soft skill, though it was noted that it is a skill that is hard to train and educate.

Ideal Graduates

Qualities that educators desire to see in their ideal graduates were explored. Problem-solving was a top-quality sought in graduates for both practitioners and educators. Problem-solving through questioning and logical reasoning but also being able

to seek answers on their was described. One educator expressed the ideal graduate as "a person who does not think they have all the answers" (Mary).

Being articulate about design, in both written and verbal communication, was mentioned repeatedly. Self-motivated, having passion, and the ability to work on a team were also mentioned as necessary from educators and practitioners. Knowing the Adobe software, having those technical skills, and being current on the tools is critical. One educator noted through this response that as imperative as knowing the current tools are, that the ideal graduate needs to understand the importance of the mind to support problem-solving skills.

> They don't have to be a walking encyclopedia of each tool. But they are more problem-solvers and idea people. It's imperative the students know the tools, and they need to be current. But I think it's a must that the idea of graphic design is bigger than just the tools. (Martin)

Knowledge that being a successful designer is more than the software was noted as an ideal characteristic. One educator explained, "those fundamental skills of using your brain, using your sketchbook, and understanding that process are absolutely essential for anything" (Jarrett). Another educator also highlighted the importance of all communication skills, written, verbal, and listening, as well as the ethical implications and awareness of the impact of design. Melissa said the ideal graduate would be:

> An ethical person who is aware of the impact you can have with design, and that the choices you make have consequences and things like that. That their typographic and image-making, and aesthetic abilities are strong, as well as their ability to convey ideas both verbally and written. And that they understand user

needs and talking to people and working with people, rather than presuming that you know what is needed or coming in with the savior complex or something like that.

Thinking beyond the surface of the visuals to recognize the deeper connections of design and the effects it can have on the world is what she felt an set other students apart.

Another educator touched on the mental toughness, flexibility, and willingness to continue to learn that is required to work as a designer and the importance of teaching those skills to students to mitigate burnout. He made sense of the need for mental resilience by emphasizing open-mindedness and personal growth as crucial skills to develop. He suggested educators:

> Produce a student that's mentally resilient, that is flexible, that is open-minded, that is willing to onboard new technology when needed, that can exist in coexistent spaces with other people that is trustworthy and dependable. (Jarrett)

This statement with the cue words, willingness, dependable and resilience, encompasses that idea of successes through mental acuity and personal as important qualities for graduates for career sustainability.

Problem-solving and being curious surfaced again as a subtheme in educator responses to what they felt made the ideal graduate. One educator claimed that students who are going to be successful are the students who are self-motivated learners. She described these students as "the students that went above and beyond the parameters of the project" (Katrina). These students brought in examples of other design work, asked quested beyond clarification questions, and were thinking deeply about what they were

working on. She felt those were the students who went on to be successful after graduation.

Another educator described the ideal graduate as a student who is an unbelievable problem solver who can be put into a situation or asked to work out anything:

> It could be photography, 3D modeling, anything at all. They could take a challenge and solve it based on their conceptual skills and their problem-solving skills, and they could seek out and figure out what they needed to do on their own. You know, design is very, very important. But I think if you're a really good problem solver, you're a smart thinker, and I think your designs end up being really, really exciting. (Alicia)

Being creative and seeking out what they need on their own to solve a problem would be an ideas qualities of graduates seeking jobs in UX/UI.

The motivation to continually learn by asking and seeking answers as the field evolves will also be an important characteristic for graduates. Embracing change as necessary for UX/UI supports statements by Getto et al. (2016). The idea of constant change needs to be ingrained in the students as part of the job requirements beyond graduation and needs to be discussed in the classroom. Personal growth, mental perception, and critical thinking were mentioned as ideal by educators and making graduates stand out in their field.

Summary

The interview statements provided insight into the opinions and attitudes of participants as they reflected on their experiences and made sense of the skills, knowledge, and projects needed for students studying graphic design and who are

interested in UX/UI. According to Weick (1995), sensemaking is trying to make sense of experiences and rationalize what people are doing. It appears that both educators and practitioners agree due to the nature of our expanding digital interactions, more digital design principles and UX/UI methodology could be incorporated into graphic design curricula earlier and in more depth. For success in an ever-changing field, a personal desire to learn, critical thinking skills, positive collaboration in a team setting, a curious nature, and a good attitude were prominent characteristics identified by practitioners and educators that make for effective UX/UI designers.

CHAPTER V

DISCUSSION

The research sought to gather the experiences and opinions of both UX/UI practitioners and graphic design educators on UX/UI design curricula through interviews using the theoretical framework of sensemaking and qualitative data analysis. Attitudes on software, portfolio projects, UX/UI methods, and skills were explored to gain insight on best practices. The data were grouped into 5 themes: characterizations of UX/UI, challenges, methods of UX/UI, implementing curriculum, and ideal graduates. Multiple ideas and subthemes emerged within the themes from the data: continued learning and flexibility from both educations and practitioners, the similarities and differences of graphic design and UX/UI design principles, characteristics of successful designs, the ability to problem-solve, and the need for better and more formalized UX/UI training in higher education. These ideas support many of the arguments presented in the literature review. Due to the changing industry needs and the growth of UX/UI jobs for graphic designers, the research findings could guide class offerings, content, and projects for students studying graphic design to better prepare students for these emerging UX/UI jobs.

The first research question asked how UI practitioners perceive current UX/UI design and curriculum. The practitioners made sense of the current circumstances of graphic design curriculum by identifying critical differences in UX/UI design from print

design and perceived the need to incorporate digital foundations sooner and more in-depth.

The practitioners interviewed gave very lengthy responses and seemed genuinely excited to share and talk about the responsibilities of their jobs. Words such as "curiosity" and "passion" came up repeatedly in practitioner responses. These attitudes support the finding of Roy et al. (2018) who listed innate curiosity as one of the skills needed for success in UX/UI. Practitioners seemed eager to share knowledge that would help any individual interested in UX/UI as a career. A study by Fleming-May et al. (2010) presented in the literature review indicated insufficient support in higher education to support students seeking UX/UI roles beyond graduation. The practitioners expressed the need for better trained graphic designers in the area of UX/U by using the phrases "not offered" and "start over" when making sense of the type of educational training needed for students. This highlights opportunities for higher education to make changes to benefit students interested in studying UX/UI and graphic design.

Practitioner participants expressed that graphic design programs could improve UX/UI design training and aid in producing the type of employee they need; however they are outside education and do not realize the limitations of resources. This opinion supported Gülsen et al.'s (2019) research that traditional design curricula were not meeting the need for fully-fledged UX designers. In turn, that finding would bolster the conclusions of Wilson (2014) that design curriculum and courses be reviewed to fulfill the needs of industry. Even with the reevaluation of graphic design curricula to meet changing needs of the industry, design foundation remained at the core of knowledge needed for success in the field of graphic design.

Comprehensive knowledge of design foundations and Adobe CC, which are industry-standard software, are considered basic knowledge for graduates and practitioners. Graphic design students must continue to gain a solid foundation in that software before moving on to the variety of tools available to a UX/UI designer. Mastering the Adobe software products serve as the building block and allows ideas to be communicated visually. Strong sentiment from the interviews was that other than the Adobe products, different software will come and go, and students must take the initiative to learn new tools as they emerge in the future. Practitioners are accustomed to onboarding new software rapidly as better tools become available for different solutions and acknowledge that is an actuality of the profession. At the time of these interviews, Figma was the software most frequently mentioned, and almost all the practitioners were positive about its use. Most practitioners had various software tools in their stack to complete various tasks on the job.

In addition to competency in the software tools, strong visualization is key to success as a UX/UI designer. Practitioners views on why graphic designers and training in graphic design made for strong UX/UI designers also substantiate this connection of visual design to successful UX/UI. It was conveyed in the practitioner interviews that they have colleagues who come from other discipline backgrounds. The made sense of the success because they have a natural ability for visual design, also known as a "good eye," rather than formal design training. The significance of visual design to UX/UI was endorsed by Getto (2014) and the four steps of best practices he described. The four steps (research, prototyping, usability testing, and maintenance) mirror the design school

method of project approach, research, comps and layouts, critique, and refinement. The link between these practices is evident.

There were many overlapping links in the graphic design and UX/UI methods. It was found that UX/UI projects have many principles equivalent to graphic design projects, such as a need for strong use of design foundations, including typography, color, and scale. UX/UI designers, however, have different responsibilities than graphic designers who want to go into other specializations such as branding or packaging. This interview process revealed several insights into those differences. One of the most apparent differences is that UX/UI projects require more research and the knowledge that one is designing products for people in a digital space. Designing UX/UI projects' interactivity is different from designing something that will be a static image. The digital products that UX/UI designers create can turn into very complex systems. UX/UI practitioners emphasized the mindset that the designer is not always the user and that the designer must make sense of the user needs and not let personal preference get in the way of optimal solutions. UX/UI designers must dive deep into research and behavioral patterns to make products seem intuitive to humans.

One of the important UX/UI practices that could be emphasized more in the graphic design curriculum is the research component. More emphasis on research of who the user is and their needs and not just focusing on visual components from the onset of the project is an area in which curriculum could be improved. During the interviews, practitioners repeatedly stated that the designer is not always the user and has to utilize empathy, research, and testing to make design decisions.

Understanding the industry-accepted methodology of working through UX/UI problems, beginning with identifying the problem, researching, mapping the user's journey, ideating through low-fidelity and high-fidelity prototyping, and then testing the product and showing functionality appears more important for students to understand than learning the latest software. Executing UX/UI methodologies can lead to more thorough problem solving through design. Understanding empathy and customer service were also mentioned as critical facets of UX/UI practice. Those practitioners in the industry want to see a full range of problem-solving and research to support both written and verbal design choices in student portfolios—not just UI layouts at the end. The layouts were referenced as the pretty pictures at the end, cake decorating, and chromes. They make sense of the finished UI layouts through analogies of what looks nice on the outside but is not always the core substance of the product. The practitioners wanted to see a complete understanding of the UX/UI processes to support the decision of the UI. The functionality of the UI was also a component mentioned by participants that needed more attention in graphic design programs.

Understanding UX methodologies, terminology, principles, and UX/UI design can require more research and testing than print design emerged as an issue and theme to address in curricula. However, design principles and design sensibility are still key to securing a job in the UX/UI field. Those foundational skills, such as typography, color, hierarchy, composition, and scale, support expected competencies as a UX/UI designer. Those skills are just a few ingredients in the recipe of UX/UI methods.

One area of UX/UI methods with differing opinions is the topic of coding. It was found that being code-literate and having a basic understanding of CSS and HTML was

viewed as beneficial but not an absolute need for a UX/UI job. The interview answers varied from not needing to know coding at all to being a must know. These variations depended on enacted cues – the experiences of some led to explanations that were different from others. Depending on the types of projects the designer works on, it seemed to dictate how much hard coding they needed to know. Coding was mentioned as a helpful skill for UX/UI by Roy et al. (2018). Consequently, working knowledge of code would be considered an asset and help to those working in the field. This knowledge was referred to as "code literacy" by several participants.

The second research question asked how educators who teach graphic design programs perceive current UX/UI design and curriculum. Educators seemed very open when discussing what the needs are from an educational standpoint to meet the needs of students and industry. Educators also appeared to be vested in evaluating curriculum to help create the best learning experience for their students.

The educators identified that changes in technology over the years have added to the perpetual need to update the curriculum and be flexible and ready to change. The need to learn new skills is not a new idea for graphic designers, hence the title, Old Dog New Tricks, for this research. Likewise, the necessity to reevaluate the curriculum was also not a new idea for educators. The educators who participated explained that assessing curriculum was ongoing and had to be adjusted every few years to keep pace with industry needs. Because the change to the curriculum was needed so often, the educators had made sense of the need to adapt frequently proving the experience of creating flexible course names and descriptions.

Being current on the latest software is important to most educators so they can instruct their students on current industry standards. Staying current requires educators to be life-long learners. Again, because industry standards are continuously changing, the idea that educators must embrace the necessity to update their skills set perpetuated interview data. Most educators had made sense of this need, regularly taking continuing education courses, and participating in online learning.

To adjust for this need of teaching design with more emphasis on digital design, educators were changing how they approach introducing UX/UI concepts by making changes to how they teach graphic design through vocabulary and project types. Educators want to increase the amount of digital design training they provide their students and agree there is room in the curricula for changes. They are providing more opportunities in the classroom for students to create digital products such as apps and websites. To make sense of this need for change, educators are introducing UX/UI terminology sooner and using the language of UX/UI methods into graphic design classes, building on the design foundations students were already learning.

The strength of studying graphic design foundation is that students learn how to set up a strong base for working out complex communication issues that can translate to software architecture visually. The combination of mapping complex information and having the skills to curate a product's aesthetics makes for robust UX/UI design. This strength has allowed many designers to transition into the field of UX/UI without formal UX/UI training in a higher education setting.

The last research question sought to answer the recommendations for implementing the discipline of UX/UI into current graphic design programs to better

prepare students for these emerging jobs. Both the educators and the practitioners acknowledged that the industry and roles of graphic designers are changing. The opportunities for students to work in the digital space and UX/UI are increasing with the job growth in this field. Educators made sense of this change in the graphic design field by acknowledging they will have to continue to embrace change and create more instances for UX/UI practice.

To gain practice in the full scope of a UX/UI project, educators mentioned client-based projects as a beneficial experience for students. Practitioners mentioned having projects that partnered with real clients as favorable to see in a portfolio. Because both practitioners and educators agreed that these types of projects were beneficial, client-based work was seen as favorable and supports the research results by MacDonald and Rozaklis (2017) and Yu et al. (2020). Projects that are based on app and web design are recommended for student projects from both practitioners and educators.

In addition to the right type of projects and software competence, the ideal skills for students interested in UX/UI design were explored. The combination of hard and soft skills that educators and practitioners indicated ideal graduates possess from graphic design programs possess are being passionate, curious, dedicated, hard-working, and flexible. These types of graduates make good hires for UXI/UI designers. These students are problem-solvers, code literate, and versed in the methodology and principles of UX. These qualities and areas of knowledge also parallel what was reported by Roy et al. (2018).

The data presented in this study does align with the arguments made in the studies presented in the literature review. The Sosebee and MacDonald (2018) findings cited the

importance of the visual component in visual and graphic design in UX/UI design but found a lack of addressing the visual component at the university level. Graphic design programs at the university level can benefit by filling this need.

Recommendations

Graphic design programs appear to be good at exposing students to various employment avenues and specializations as designers, including UX/UI. The educators seemed to know already that they had to be malleable in the course offerings and be ready to change from year to year. Yet, they also understood that the underpinning of all successful graphic design projects, no matter the medium, is built on the groundwork of design foundations. Those principles do not change. One educator said, “We can only vaccinate the students” (Frank), meaning you can only expose them a little to so many things with the time educators have with students in higher education. After that, it will be up to the student to decide what niche specialization they want to immerse themselves in and determine their career path. This opinion reinforces the idea that graphic design programs provide solid foundations for many specialized tracks, and the student will determine the career avenue once they graduate.

Embracing Change

This perpetual need to learn new skills and tools was a powerful subtheme. Both educators and practitioners indicated that designers must continue to learn or become obsolete. This need to be adaptable to change should be discussed in the classroom as a reality of the profession. Embracing this idea early on and making it part of the classroom dialogue can make that an accepted actualization for students. Educators need to make it clear that learning will not end with the completion of a degree. If a designer is not

learning, they are not changing and growing. If a designer does not change and grow, the work will become stagnant. Design students should be encouraged to seek out learning experiences on their own to grow their skill set. Students should recognize they will continue to learn even after they graduate and be proactive in continuing self-education in the areas that interest them.

Embed UX/UI Earlier

Gaps in the current curriculum were evident. Both educators and practitioners recommended that emphasis on digital design should be introduced earlier in graphic design programs and more embedded into the curriculum. Discussing the confusion around the terms UX and UI and how they overlap from a designer's standpoint could help move education and the industry forward.

The participants interviewed for this research recommended providing at least two courses more specifically to digital design of any form. More digital interaction design and specific UX/UI classes were advised. However, not all design students are interested in the UX/UI specialization track, complicating curriculum changes. Schools and programs of various sizes and resources would all have different approaches and ways to accommodate students. Bridges (2013) pointed out that "graphic design was trending towards digital technologies where traditional requirements of graduating graphic design students are not as clear cut" (p. 17). There is not a one-size-fits-all for graphic design curricula. Nevertheless, the need for introducing the principles and methodologies earlier in the course sequences was well defined.

An aptitude for problem-solving was pervasive in interview responses. Problem-solving was mentioned in every interview as a response to some question and repeatedly

mentioned as a characteristic needed to be both a successful graphic designer and a successful UX/UI designer. Problem-solving is such a vital component of all design. Because UX/UI problems can be complex systems, a majority of the problem solving occurs in the middle project rather than on final compositions. The importance of developing critical thinking skills will develop better problem solvers. Problem-solving is the action part of critical thinking. Using one's brain to understand the process of critical thinking requires dedication. Those who thrive in either design field, graphic design, or UX/UI must have that aptitude and determination.

User Testing

Placing priority on problem-solving and showing that process work in graphic design portfolios for graduates needs to be emphasized. Showing more in-depth processes on design solutions in projects was sought by practitioners when viewing student portfolios. There appeared to be a lack of time taken to actually test the outcomes, with the focus remaining on the aesthetics. The functionality of designs comes from user testing and troubleshooting. Projects showing functionality when presented in a portfolio and not just static design UI screens were deemed key in portfolios of those seeking UX/UI jobs. This step is often not fulfilled because graphic design programs are normally so focused on the end look.

Opportunities

The lack of user testing in projects opens up the opportunity for graphic design students to partner with other disciplines across universities such as computer information systems, computer science departments, or possibly even statistical analysis through data research classes. Getto et al. (2016) and Vorvoreanu et al. (2017)

highlighted the potential for multidisciplinary collaboration on UX/UI projects. The length of some of these UX/UI projects needs could go beyond the length of one semester, and teams of students could work together on these prolonged projects. The opportunity for UX/UI projects outside of the classroom could cross over to extracurricular activities and bring different areas of universities together for research. Practitioners also identified business and business objectives as areas that they wished to receive more training in their undergraduate design programs. Adding business objectives to the design curriculum could help students understand those needs in a real-world setting. Engaging with business students on projects could also show the value of design to those in business concentrations through successful partnerships. These partnerships could provide more cross-discipline collaboration at the university level.

Successful Students and Programs

Just as a website must be responsive to screens of all sizes, education leaders must also be responsive in their programs. For education leaders in the field, it is their duty to prepare students with the best education and leave higher education graphic design programs armed with the skills and knowledge to compete for the best jobs and set them up for successful careers (Bellers, 2017). Graphic design programs that do not adjust to fulfill this need for improved UX/UI focus will possibly suffer from lower enrollment numbers and decreased quality of students. With the profession of graphic design widening and being a conjunction for various industries, the boundaries of what a university should cover are in a state of constant reevaluation (Beller, 2017).

It is important to note that many practitioners mentioned that a four-year degree was not an absolute requirement for the job and not as important as some think, although

still helpful. The UX Google certification was mentioned as being a recognized industry credential. Graphic design programs in higher education will need to be aware of the student interest in this field to remain competitive with certificate programs. Graphic design educators agreed that these methods have been in the curriculum before but need to hardwire the methodologies of UX/UI across curriculum earlier and in more detail. Practitioners supported the fact that graphic design programs are an excellent place for UX/UI methodology to be taught. Individuals who study graphic design tend to make successful UX/UI designers. Educators and practitioners agree that graphic design programs at the university level would be wise to embed UX/UI methodology into their programs to a greater extent or even possibly offer UX/UI as a specialty, minor or stand-alone degree track.

As jobs grow in the UX/UI field, more emphasis will be placed on designers' choices to ease the use of digital products for humans. In *User-Centered System Design: New Perspectives on Human-Computer Interaction,* Norman and Draper (1986) wrote that skillful designers make large parts of this burden vanish by adapting the artifact to the users. The skillful designers of the future are sitting in classrooms today. Educators must be responsive to prepare students for future jobs and meet the needs of industry yielding value to graphic design degrees in higher education.

Limitations of the Study

A variety of topics were covered in this thesis project through the interview questions. Because the interview questions covered a broad range of topics and subjects, they could have been more refined for a narrower focus. In retrospect, it would have been more beneficial to ask both educators and practitioners the same set of questions in order

to have one set of responses for the same question to result in more clear-cut answers that could have been compared and contrasted. Limiting the interview questions to curriculum, portfolios, or skills and knowledge of graduates could have also narrowed the study's focus.

All participants interviewed lived in three areas of the U.S.: Texas, Colorado, and Virginia. A study with more interview participants from various parts of the U.S. could have different results due to demographics and a higher concentration of tech-related jobs in other areas of the United States, such as San Francisco, California, or Austin, Texas. All participants had degrees in graphic design or a related field and taught at four-year universities, and those with UX/UI certificates from different disciplines only were not interviewed.

Future Areas for Research

Following this qualitative study, a quantitative study with similar questions could be conducted with a large sample size to determine if a broader audience holds information found in these research themes. Graduates who apply for UX/UI jobs could be interviewed to study their experiences with the interview process and what types of jobs they obtain. Another study could review UX/UI job listings and examine how many times UX/UI are listed together to explore the varying job responsibilities. Additional research might examine the employer's business size to see if that dictates if the designer is doing UX, or UI, or both. Additionally, women's roles as UX/UI designers could be explored, as only two were women of eight participants in this study.

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Appendix A

Consent Form

West Texas A&M University

Informed Consent to Participate in Research – Qualitative Interviews

Study title: Old Dog, New tricks: The shift from Graphic Designer to UX/IX Designer in Higher Education Graphic Design Curriculum

Researcher[s]:
Dr. Nancy Garcia, Assistant Professor of Media Communication, West Texas A&M, PI/Thesis Chair
Dinah Hodges, graduate student, Department of Communication, West Texas A&M
We're inviting you to take part in an interview for research in Graphic Design relating to UX/UI. This survey is completely voluntary. There are no negative consequences if you don't want to participate in the survey. If you do not have any knowledge of UX/UI you may not want to participate in the study.

What is the purpose of this study?
The purpose of the study is to examine UX/UI job titles and curriculum in undergraduate graphic design programs in 4-year universities and what is needed to prepare graduates for work in this field.

What will I do?
The interview will be conducted by the graduate student, Dinah Hodges. They will be held in person or over Zoom. The interview will be recorded and transcribed by the researcher via Zoom. The interview will take about 45 minutes.

- Risks are minimal. Any reference to your specific comments will be replaced with pseudonyms.
- Breach of confidentiality: There is a chance your data could be seen by someone who shouldn't have access to it. We're minimizing this risk in the following ways.
    - We will store all electronic data on a password-protected, encrypted computer.

Possible benefits: To help inform and develop college curriculum.

Estimated number of participants: 5-10

How long will it take? 45 minutes

Costs: None

Compensation: None

Future research: Your data won't be used or shared for any future research studies.

Funding source: Self

Confidentiality and Data Security
We will collect the following identifying information for the research: Your name, email address, and job title. This information is necessary for follow up questions if necessary.

Where will data be stored? On the researchers' computers locally.

How long will it be kept? 5 years

Who can see my data?

- We (the researchers) will have access to name, email address and job title. This is so we can analyze the data and conduct the study.
- Agencies that enforce legal and ethical guidelines, such as
  - The Institutional Review Board (IRB) at WTAMU.
  - The Office for Human Research Protections (WTAMU)
- We may share our findings in publications or presentations. If we do, the results will be aggregate (grouped) data, with no individual results – or – de-identified (no names, birthdate, address, etc.).] If we quote you, we'll use pseudonyms (fake names).

Questions about your rights as a research participant, complaints, or problems: Contact the WTAMU IRB (Institutional Review Board) at AR-EHS@wtamu.edu

IRB# 2020.10.006
IRB Approval Date: 11/16/2020

Agreement to Participate
Your participation is completely voluntary, and you can withdraw at any time.
To take this survey, you must be:

- At least 18 years old
- Work as a UX/UI designer
- Teach graphic design or visual communication in a higher education setting

Appendix B

Interview Protocol for Educators

I interviewed eight educators currently teaching graphic design at the higher education level using a semi-structured interview. The questions will ask how to plan projects and coursework around the need for training in UX/UI. Risks to the participants are minimal. I will record the interviews, digitally store locally, and transcribe. Questions will only be related to work and curriculum. Any reference to the interviewee will be replaced with pseudonyms.

Introduction/Script:

Hi, my name is Dinah Hodges and I appreciate you taking the time to visit with me about your experience. I am a graphic designer and graduate student at West Texas A&M researching experiences and current practices of UX/UI design in higher education graphic design programs. This interview will focus on your experience and opinion on UX/UI curricula in graphic design. We will talk about 45 minutes to an hour. There are no right, or wrong answers and your opinions and experiences are valuable to my research in this area. You will be recorded, but I will use a pseudonym for your name. I will ask some structured questions followed by unstructured questions that may come up based on your answers. The information will only be used in my thesis research.

(*Rationale for question is in italics*)

1. Please provide a pseudonym for your name or one will be assigned to you, description of occupation, how many years worked in industry and how many years you have been in this role? *Demographic information and ensure they are qualified to participate.*
2. What do you think the terms UX, and UI mean? *There is confusion surrounding these terms.*

3. Describe the industries you associate with the term UX/UI? *Do they feel it can be any industry or only technology?*
4. Tell me, have you taught or plan to teach any UX/UI specific courses?
    a. Do you plan to incorporate UX/UI in your current graphic design courses? I would like to know what has been happing and what might be planned in the future if it is incorporation into existing courses or new courses.
5. In your experience, what types of software do you think are important to teach college students to prepare them for employment as a UX or UI designer? *Are they using Sketch or Adobe XD, Figma or sticking with traditional Adobe CS tools?*
6. Describe the type of curriculum changes you feel maybe needed into higher education graphic design programs to prepare graduates for these types of jobs*? Do they feel that changes to curricula need to be made or will they continue to focus on design thinking and human centered design theories as graphic design basics? Do they feel more interdisciplinary approaches need to be formed?*
7. In your experience, what types of projects do you think are important for college students to prepare them to apply for employment as a UX or UI designers? *Are they individual or collaborative projects based in research? Is the emphasis on software use? Have they had any client driven partnerships?*
8. Describe the changes you anticipate to your specific program curriculum in the future to incorporate UX/UI? *Do they think changes will be made to closer match industry needs?*
9. Describe the types of projects, if any, you like to see in your student's portfolio when they graduate with that are digital design, such as websites or apps that relate to UX jobs? *Do they think UX/UI specific projects are important?*
10. In your experience, do you think UX/UI should be offered as a minor to graphic design students or as a separate area of concentration? *Do they feel like UX/UI is a different concentration area than graphic design?*

11. Can you explain your curriculum and how it is set up?
12. Describe your ideal program structure? *Does it include specific UX/UI classes or classes emphasizing complex problem-solving and design thinking*?
13. Can you describe your ideal graduate from your program?
    a. What type of skills do these graduates have?
14. Tell me, has your institution had any challenges in hiring qualified faculty to teach the classes that involve any digital design or UX/UI? *The field is relatively new, practitioners come from a wide variety of disciplines and tech salaries remain high.*
15. Describe how you stay current on graphic design trends and technology? *Do they self-teach based on industry needs, go to conferences, or take continuing education classes?*
16. What other information or insights do you feel would be relevant to my research?

This concludes my questions. Thank for you time and participation in my research.

Appendix C

Interview Protocol for UX/UI Professionals

Introduction/Script:

Hi, my name is Dinah Hodges and I appreciate you taking the time to visit with me about your experience. I am a graphic designer and graduate student at West Texas A&M researching experiences and current practices of UX/UI design in higher education graphic design programs. This interview will focus on your work experience and opinions on UX/UI curricula in graphic design. We will talk about 45 minutes to an hour. There are no right, or wrong answers and your opinions and experiences are valuable to my research in this area. You will be recorded, but I will use a pseudonym for your name.

The information will only be used in my thesis research.

1. Please provide your pseudonym for your name or one will be assigned to you, the type of undergraduate or graduate degrees you may hold, description of occupation, and how many years in the industry and how many years have you have been in your position. *Demographic information and qualification to participate.*
2. Talk to me about your position and your specific job responsibilities. *I want to know specific responsibilities associated with those holding UX/UI positions.*
3. What industries do you associate with the term UX/UI? *Confusion exists around the term and responsibilities.*
4. Tell me, when you were in college, did you take UX/UI specific courses or were they integrated into other courses? *How did this person obtain the skills and knowledge for their position?*

5. In your experience were you provided any on the job training or did you have to self-teach? *Did this person self-initiate the learning or was it provided?*
6. What software programs do you use at your position and what programs do you find the most helpful? *What programs will be mentioned the most, Sketch, Adobe XD, or Figma.*
7. Do you do any coding or does your organization have software developers who work on the back end of the digital design? *There is a perception the UX/UI involves coding.*
8. Describe the types of software you think is important to teach college students to prepare them for employment as a UX or UI designer. *What programs will be mentioned the most, Sketch, Adobe XD, or Figma?*
9. Describe the types of projects do you think are important to for college students to prepare them to apply for employment as a UX or UI designers. *Should they be website and apps, self-initiated or collaborative? Should they include the persona research and include wireframes?*
    a. *Do you look for these specifically in application portfolios?*
10. Describe the type of classes you feel need to be added to higher education to prepare graduations for these types of jobs. *Do they feel UX/UI specific classes are necessary or are advanced design process classes touching on UX/UI principals are sufficient?*
11. When you were in school, what do you wish you had received more training on? *Where do the practitioners now feel like their education could have been improved?*
12. In your experience, what skills do you think are needed for an entry-level UX/UI designer? *This can be soft skills or technology skills.*

13. In your experience, what knowledge do you think is needed for an entry-level UX/UI designer? *This is exploring whether design principals or software proficiency are important.*
14. Can you identify any desirable personal or professional characteristics of an entry-level UX/UI practitioner? *This question is to see if any characteristics of an ideal graduate cross over with educator answers.*
15. If you have been on the hiring side, how important was a bachelor's degree in a related UX field to your employer? *Are employers looking for bachelor's degrees in related fields or is a certificate or strong portfolio enough for employment.*
16. Do you have any other information or insights that you feel would be relevant to my research?

This concludes my questions. Thank for you time and participation in my research.

Appendix D

West Texas A&M University
ACADEMIC RESEARCH ENVIRONMENTAL HEALTH AND SAFETY

IRB Closeout/Continuation/Amendment Form

- **Submit completed signed materials** to the Office of Research WT Box 60217 Canyon, TX 79016 or deliver to Killgore Research Center, Room 159, **OR 2) scanned and signed PDFs** to ar-ehs@wtamu.edu

Title:	**Date:**
Old Dog, New Tricks: The shift from Graphic Designer to UX/UI Designer and How to Prepare Higher Graphic Design Education	1/18/2020

IRB Proposal # IRB# 2020.10.006

SECTION 1: INVESTIGATOR INFORMATION

Researchers/Advisors		Dept/College	Email Address	Mailing Address	Phone Numbers
Role	Name				
PI*	Dr. Nancy Garcia	COMM	ngarcia@wtamu.com	2304 Russel Long, Blvd Canyon, Texas 79016	806.651.2413
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CI*					
CI*					
e.g.	*Jane Doe*	*Ed/COESS*	*jdoe2@buffs.wtamu.edu*	*2901 4th Ave. Canyon, TX 79016*	*H 555.555.5555 C 555.555.1111*

Review Type (check one)	☑ Exempt	☐ Expedited	☐ Full Review

Sponsoring Organization/Funding Source (if applicable)	no funding needed

Appendix E

Interview Log

Participants	Date
Dave, educator	1/29/2021 11:39:00 AM
Melissa, educator	2/16/2021 10:43:00 AM
Mary, educator	2/8/2021 9:29:00 AM
Jarrett, educator	2/9/2021 10:59:00 AM
Martin, educator	2/4/2021 11:03:00 AM
Frank, educator	2/12/20215:59:00 PM
Katrina, educator	2/19/2021 10:15:00 AM
Alicia, educator	3/11/2021 3:08:00 PM
Sam, practitioner	2/5/2021 11:00:00 AM
Matt, practitioner	2/5/2021 2:58:00 PM
Rick, practitioner	2/5/2021 10:57:00 AM
Justin, practitioner	2/5/2021 1:28:00 PM
John, practitioner	2/12/2021 10:58:00 AM
Giovanni, practitioner	2/09/2021 6:36:00 PM
Josie, practitioner	2/10/2021 6:34:00 PM
Anna, practitioner	2/23/2021 11:00:00 AM