

Blending User Experience Design with Graphic Communication Curriculum

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Abstract

In this paper, we seek to explore and define where Graphic Communication (GrC) and user experience/user interface (UX/UI) design overlap, and how UX design benefits inclusion in GrC curricula. As the Graphic Communication industry expands its definition of itself to include not just print communications, but digital design and technologies, the need to redefine the GrC education is paramount to the growth of the Graphic Communication discipline as a whole. By researching several academic institutions, we at Cal Poly have created an example educational path that effectively incorporates UX/UI education seamlessly into the GrC curriculum.

User Experience designers are in fierce demand in the United States as companies are responding to consumers that no longer are interested in the novelty of technology, but instead demand new and enveloping experiences from their digital environments. (Burrow, 2017) The typical journey UX designers take to enter the field has changed. Previously, the path started with earning a Master's in Human Computer (HCI), but now there exists academic and non-academic options, creating confusion and an unclear educational/training avenue for prospective and entry-level UX designers. The traditional entry-point for UX designers is unclear as there is only one undergraduate degree dedicated to user experience design in the United States.

As the academy scrambles to determine the best departmental fit for UX/UI design, Graphic Communication departments are continuing to embrace the methods and techniques that fall into the UX/UI discipline, often without realizing how these are naturally encompassed in the field of UX/UI. GrC departments are perfectly positioned to claim stake to UX/UI undergraduate education because both are naturally interdisciplinary, combining topics from business, visual design, cognitive theory, usability and testing, experience design and computer science.

Academic Versus Industry Education

UX Versus UI Versus HCI Educational Paths

Academia is attempting to define UX design curricula in an undergraduate setting, especially since Google and the Savannah College of Art and Design (SCAD) teamed up in 2015 to start the first undergraduate UX Bachelor of Fine Arts degree in the United States. (Buzzard, 2016; SCAD, 2018) The SCAD/Google undergrad UX degree responds to critical comments about "today's college graduates [not being] equipped with the right combination of tools, processes, and experiences to successfully transition into UX jobs in digital product design", exposing how traditional universities have been slow to create targeted curriculum. (Buzzard, 2016) Part of the reason college graduates are not ready for the profession is because; 1) There are few universities that offer any courses in user experience design, 2) There is de-

bate about the best college/major to house the curriculum, and 3) Students attempt to enter the user experience job market with education in user interface design only, as that is the current precedence for undergraduate.

Other universities offer individual courses, and concentrations (like at Cap Poly, San Luis Obispo CA), but not full undergraduate degrees, plus the curriculum is often under debate of which college can stake claim. If modelled after the graduate Human Computer Interaction (HCI) curriculum, such as Iowa State University's, we see that the program is housed in the engineering department but is very interdepartmental and offers courses from the psychology, design, math, and computer science departments. (Anon., 2018)

HCI, and subsequently UX, are naturally interdisciplinary, where designers, developers, psychologists, researchers and executives collaborate. And because UX focuses on human-centered approaches, it makes sense for the curricula to be housed in either a liberal arts, architecture, or business setting, as opposed to the curricula landing in undergraduate engineering or computer science that tend to be more systems focused. In a quick look at several university's curriculum, we see that the academic path of UI design is not a strong model for UX education as it is often less interdisciplinary, and housed in art/design programs, with little to no outreach to other facets of the university. Plus, UI design often focuses less on the research and iterative stages before the visual design. However, it is often these programs that produce the current UX designers being hired today. UX curriculum benefits from an interdisciplinary approach encompassing business, technology, and applied methods, making it a perfect fit for any Graphics Communications department.

Bootcamps and Corporate Education

The state of UX education is in flux because the academy has been slow to create programs dedicated to user experience education, which spawned a proliferation of bootcamps, such as Center Centre and General Assembly, that offer specific UX education that often costs as much as an accredited university degree (anywhere from \$10k to ~\$60k for an intensive in UX). For example, Center Centre's yearly tuition is \$59,880 and the school is not an accredited institution. (Center Centre, 2018) There are many smaller, self-paced, online programs such as the Interaction Design Foundation, that are more affordable solutions, but do not boast the industry recognition and connections from the bootcamps.

There are also corporate educational systems and corporate universities created to tackle this educational gap. G.E. Digital has a successful "User Experience Leadership Program" aimed for students with Master's degrees in HCI (G.E. Digital, 2018) Facebook has launched "Facebook University" this summer (2018) in order to capture current university undergrads interested in learning applied work in the areas of engineering, analytics, and product design. (Facebook, 2018) The sustainability of corporate universities is questionable because these kinds of programs come with a hefty time and financial commitment on the part of the organization, without the assurance that employees will stay long enough for the company to reap the rewards of their investment.

Current State of Graphic Communication Education

In an industry fraught with change and disruption, the abundance of uncertainty remains to be the norm. Fortunately, the graphic communication industry has experienced some growth in print revenue over the past five years and has remained relatively steady with regards to profits. However, as publishing battles with e-media, organizations who remain nimble, strategic, technologically-astute, and open to the development of web-based, computer-oriented and mobile-oriented product design, are better situated to innovate to meet consumer demands. Similarly, change in industry yields changes in curriculum and the academy. Nothing has affected the Graphic Communication education sector more than this disruption, and as more universities begin to develop web and mobile oriented curricula, graduates are obtaining extremely high-paying jobs in the areas of HCI, UX/UI. This, in turn, provides newer and innovative opportunities for curricular changes.

In a recent study conducted by Richard Romano of Wha-theythink.com (2018), the prognostication of business outlooks as viewed through the eyes of executives representing the American printing industry revealed that 17% of the respondents believe that adding non-print media capabilities (which is inclusive of web design, app development, and social media management) is one of the biggest challenges for the coming year. (Romano, 2018) Additionally, 28% of the same constituency believes that the developing services that help integrate print into non-print marketing campaigns are significant business opportunities. (Romano, 2018) Similarly, 23% of the respondents are researching investments in augmented reality technology. (Romano, 2018) One company that has embraced moving away from strictly print and into the world of UX/UI and usability is Americhip. They specialize in incorporating things such as video, audio, and lights into multisensory printed marketing products. Finally, in this same study, when asked what positions they intended to hire in this fiscal year, 11% proposed graphic designers; 11% marketing and marketing communications personnel; 9% web design and development personnel; and, 3% mobile app developers. (Romano, 2018)

Blending UX and GrC

Defining HCI, UX and UI in the Context of GrC

Defining and differentiating the disciplines of Human Computer Interaction (HCI), User Interface Design (UI), and User Experience Design (UX or UXD) will help to underscore the importance of integrating GrC curriculum with UX/UI curric-

ulum. The HCI/UX/UI disciplines interconnect as “the central concept of HCI is usability, ease of use plus usefulness”, with UX/UI encompassing HCI. These disciplines are found within Graphic Communication, which can be summarized as the process of creating, producing, and distributing media and technologies that meet end-user needs. Graphic Communication is a hub of touchpoints that communicate through print, packaging, and digital interfaces and uses words, images, digital content to convey meaning and elicit emotion in the end-user. UX is a human-centred framework leaning away from a system’s approach, and presupposes if something is engineered that is not usable, then that product is equivalent to being non-functional and sets the stage for a user to have a specific interaction and experience with the product and all the touchpoints. UI is necessary for UX to function properly, but it is more concentrated and focused on look, feel, responsiveness, and interactivity as well as the thoughtful presentation of the product and how the user controls the product, creating an intuitive interface.

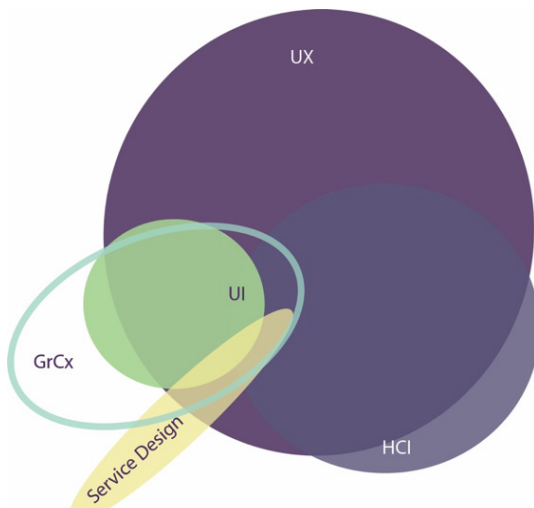


Figure 1: Exploring the relationship between Human Computer Interaction, User Experience Design, User Interface Design and systems versus human centered thinking. The diagram does not symbolize disciplinary proportion, but rather overlap.

Diagram created by Charmaine Farber 2018.¹

HCI is more theory and research based with UX leaning towards the methodology to produce usable items. (Hartson, 1998) User experience also incorporates research, although the type of research is geared towards framing a problem, where the intersection of business, technology, and end-users meet. (Medium, 2016) It is infamously difficult to define because “user experience is a general term that describes not only a professional practice, but also a resulting outcome” — it is a set of methods and also the desired outcome of creating a usable experience. (Buley, 2013) A UX problem can be thought of as a “project”, and the UX methods result in items such research (slanted towards ethnography), design (personas, scenarios, user flows, information architecture, etc.), and prototyping and prototype testing (often wireframes of screens that link together with hotspots). To iterate further, user experience concerns itself with the hardware and software used, the context the user is using a digital product as well as their goals and motivations. UX is more than designing an interface, it is the methodology, research and execution of understanding the entire experience — and this work comes before interface design and well after the interface is designed.

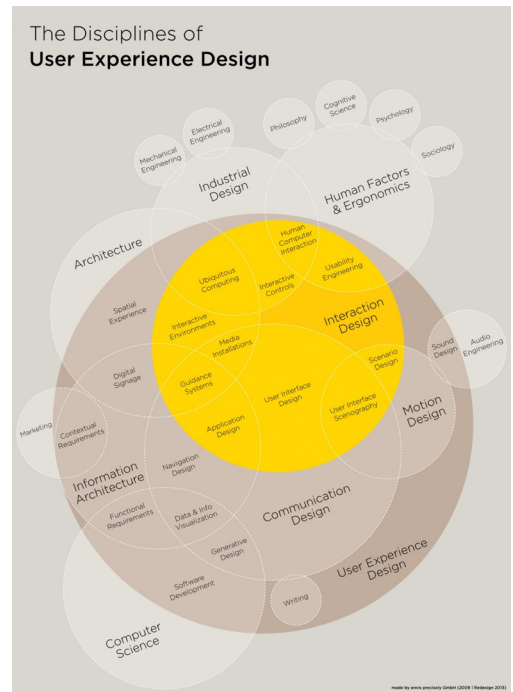


Figure 2: Depicts the interdisciplinary nature of User Experience Design. Many of disciplines are naturally a part of modern-day Graphic Communication. Diagram found at www.envis-precisely.com, 2013

UX and GrC Natural Overlap

The Graphic Communication program at the California Polytechnic State University has been heavily rooted in printing technology. Most recently, the faculty and staff within the department assessed the curriculum and discovered that a significant cohort (60%) of students each year are pursuing jobs in web development, app development and UX/U fields in general. Additionally, after conducting surveys with applicable companies (outside of the printing industry), we discovered that a great opportunity existed in the area of “front-end web design” and app development. Consequently, the Web and Digital Media concentration was renamed as User Experience/User Interface Design which now offers the following courses: User Experience Methodologies, Mobile UX, Web Design and Development, and Service Design. This leads us to suggest Graphic Communication Experience (GrCx) be the focal point of the curriculum with many touch-points rooted in the experience of the user.

We found that more than 60% of our students are focusing on UX/UI topics within their concentration, and that students are gravitating to these concentration more than the more traditional GrC topics of study. (Table 1) Students in our Design Reproduction Technology concentration actually take the same courses as in the UX/UI concentration, having HTML/CSS and UX methods taught in our foundational, Freshman course, in a Sophomore level course, in a Typography course in their Junior year as well as two advanced UX courses in their Senior year — one dedicated to web and the other to mobile. Plus, some students in our Graph-

ics for Packaging concentration take a UX Methods course that directly applies to packaging user testing. Plus in a 2014 survey of Cal Poly GrC Graduates (0-6 years out), we found that 64% had “UX/UI” or “Web Development/Web Design” in or as their job titles (n = 119), demonstrating the shift in our curriculum that has taken place with more of a focus on human-centered, digital design.

Table 1: Undergraduate Concentration Distribution of Graphic Communication Students at California Polytechnic State University

Concentration	Number of students	Percentage of students
Design Reproduction Technology	91	30%
Graphic Communications Managment	61	20%
Graphics for packaging	54	18%
Web and Digital Media (UX/UI)	96	31%
Individual Course of Study	5	1%
Undetermined	86	
N=393		

According to the United States Bureau of Labor Statistics Occupational Outlook, by 2024 more than 30% of the U.S. economy's growth will be driven by user experience and user interface disciplines. (Davis, M., Kasabach, C., Pak, S., Saylor, J., 2018) Specifically, website and networked communication as well as software design, including the creative aspects. This projection, along with the current trend of the

US Bureau of Labor Statistics Projections for Employment

TYPES OF WORK		% GROWTH	# CURRENT POSITIONS	# NEW POSITIONS
All employment		7%		
Desktop publishing	• Print-based and online work	-21%	14,800	-3,100
	• Two-year degree			
Graphic design	• Print-based and corporate identity work	0-1%	261,200	+3,600
	• Four-year degree			
	• 20% self-employed			
Art direction	• Creative direction	2%	74,000	+1,800
	• Five years of experience			
Web design	• Networked communication	27%	148,500	+39,500
Software design	• Creative aspects of software design	17%	1,114,000	+186,600
	• Programming			

Source: US Bureau of Labor Statistics Occupational Outlook 2014-2024

Figure 3: Projection of the U.S. labour force from 2014-2024, created by AIGA and presented at the AIGA Leadership conference in Baltimore, MD, 2018. (Davis, M., Kasabach, C., Pak, S., Saylor, J., 2018)

majority of our graduates working in the UX/UI discipline, demonstrates the need for people with UX/UI knowledge is growing. This growth will continue in the coming years and graphic communication departments are perfectly situated to educate to suite this need.

UX Methodologies Augment the GrC Curriculum

As previously discussed, there are natural overlaps within user experience design and graphic communication disciplines, as both are concerned with engaging the user through visual and usable communication, both incorporate business and entrepreneurship, and both value innovation. User experience design is different than GrC in several key areas — it is a proponent of extensive, ethnographic user research to drive iterations of product ideas and prototypes, with the end user at the forefront of every decision and a part of every stage of the process. It is common to start a user experience design project by first watching how people interact with a current system available before creating a new system. For example, if a designer is to create a recipe mobile application, first they would physically be present in a prospective customer's home and watch that person make a recipe. The designer would probably digitally record this type of data, and repeat the process many times at several homes. (Moule, 2012) There are entire books on all of the methodologies used to discover more information from users/customers, and to frame the problem before defining the direction of the solution, and often these techniques take several months to employ in a corporate setting. The benefit of user experience design is that these techniques help to better steer a project and allow for catching costly mistakes earlier in the process. One of the results of UX research and design is a functional prototype — usually digital in nature but also package design and other usable items. The aesthetics, or design, comes after the UX steps are fully framed and tested with users, although in the spirit of UX, even the visual design is tested with the end user/consumer. Once the product is almost complete, it undergoes extensive testing, sometimes creating several more iterations. Another aspect of user experience design that is different than traditional graphic communication is that the approach to creating and researching is team-based — team members often work together to co-create prototypes and are all involved in the hypothesizing, problem-framing, and testing. The team will invite users and stakeholders to many of the key ideation sessions.

Curriculum Examples That Blend UX and GrC

Graphic Communication Cal Poly Curriculum

At Cal Poly in San Luis Obispo, CA, our curriculum has traditional print-based courses but expands upon the notion that the technology available today to communicate graphically resides not just in print on paper, but in packaging printing and design, printed electronics, graphic design, web and app design, user experience design, service design, alongside management and business concepts. We have four concentrations that build upon the core classes where students gain further specialization in Design Reproduction (Graphic Design), Packaging, Management, and UX/UI (formerly Web and Digital Media). We offer a Web Design and Development course (that emphasizes UX design), Mobile User Experience, as well as the first UX course at Cal Poly, User Experience Methodologies, and a new course in Service Design. The electives are interdisciplinary between colleges, including Human Factors (Industrial and Manufacturing Engineering Department), Solving Big World Challenges (Entrepreneurship), User Centered Interface Design and Development (Computer Science), and Introduction to Design Thinking (Engineering). (Cal Poly Graphic Communication, 2018)

Future Trends

At the California Polytechnic State University, a new and emerging phenomenon is taking hold through the College of Business's Center for Innovation and Entrepreneurship (CIE). In the CIE, students who are for the Summer Accelerator Program with a new and innovative start-up models are provided space, mentorship and a modicum money to work out their ideas and launch their business ventures. (Cal Poly Center for Innovation and Entrepreneurship, n.d.) The Accelerator is one of six in the country, and has been operating for 8 years, with 29 of its 63 companies going, and \$55M raised. The SLO Hot House Incubator, which falls under the CIE umbrella, has 25 of 33 companies still operating, with \$110M raised and 460 jobs created (statistics from internal documentation). What makes this Accelerator so applicable is that the majority of start-ups have sought out the expertise of Graphic Communication students for their design skills, knowledge of web design and app development, and their ability to coordinate integrate marketing communication skills for the branding and marketing initiatives. Because of this evolution, graphic communication faculty have been appointed to provide instruction for start-ups, with the premise that a well-designed website and mobile application yields consistent results—in addition to—a well-designed product that is tested in terms of access and

usability—also remains paramount to the longevity and ultimately, the success, of a company. The desired structural model of a start-up—as observed through the CIE—consists of an engineer/programmer, a business student and a GrC student (acting as user experience designer/researcher), conveniently referred to as the CIE Triumvirate.

Understanding the future requires us in graphic communication to understand change and react (or proact) accordingly. UX/UI is a driving force in the current and future U.S. labour economy, and graphic communication departments have the historic opportunity to own it as a fundamental discipline of the Graphic Communication field.

Research Methodology

UX Education Research Survey

We gathered quantitative analysis from 84 participants using the online survey vehicle (Survey Monkey). We analysed a user experience professional's educational path into the profession, as well as gender break-down. Specifically, we asked participants for information about their gender, job title (Table 2), the school or certification program attended/ methodologies learned, and the methods/techniques used in their current position in user experience. Even though we expected the participants would be mostly female, we discovered that 56% of UX professionals are male, 43% are female and 1% other, which contrasts our department's student gender make-up as ~94% female as of 2018. Seventy-four participants answered the question regarding the type of degree earned, and 67% working the field of user experience earned a Bachelor's degree, and 55% responded with interaction design being the main focus of study. In previous years, the typical path to any user experience position was through earning a Master's degree in HCI (from observing minimum requirements in job postings for UX designers). As the need for UX/UI professionals increases, the entry into the profession is now through a Bachelor's degree or online bootcamps. None of the participants earned a higher-education degree specifically in user experience design/research, even though all identified with being a part of the profession of UX/UI. Participants earned their degrees from varying colleges and programs within the university; design, psychology, human-computer interaction, business and computer science to name a few.

Thirty-five participants answered the question regarding what skills and methods they use on-the-job, and the table below (Table 3) illustrate the breakdown of the top skills used as Prototyping (Sketch/Adobe XD/Figma etc...), interaction design, interface design, conducting user interviews, collabor-

ating in teams, creating user flow diagrams, mobile UX/UI design, and heuristic evaluation. Most of the participants (from a pool of 82 people), 53%, identified themselves as being a designer in some capacity, either Interactive Design or UX/UI Designer, and 20% being a Researcher/Strategist. Eight percent identified as C-Suite level and 6% as freelancer.

Table 2: Job titles from participants that identify with working in the profession of user experience and user interface design

Job title	Number of Students	Percentage of Students
Interactive Designer	13	16%
Researcher/Strategist	16	20%
UX/UI Designer	29	37%
C-Suite Level	6	8%
Freelance/Consultant	4	5%
Educator	5	6%
Other	6	8%

Table 3: Skills and methods most often used in user experience positions

Skills Methods Used	Number of Participants	Percentage of Participants
Prototyping (Sketch/Adobe XD/Figma etc....)	29	83%
Interaction Design	28	80%
Interface Design	27	77%
User Interviews	27	77%
Collaborating in teams	23	66%
User Flow Diagrams	22	63%
Information Architecture	22	63%
Mobile/Product UX/UI Design	21	60%
Heuristic Evaluation	20	57%

GrC/UX Education Research Survey

We gathered preliminary quantitative analysis from 11 participants using the online survey vehicle (Survey Monkey). We asked educators specifically in graphic communication and print technology programs to name the UX methods are used within their curriculum as well as the percentage of students entering a web/mobile/UX/UI/Design position. (Table 4) Sixty-four percent of GrC educators teach courses directly related to web/mobile/AR/VR and 54% of respondents claim that about half their students are entering a web/mobile/UX/UI/Design position.

Table 4: Break-down of graphic communication students entering a web/mobile/UX/UI/Design position

Percentage of students entering a web/mobile/UX/UI/Design position	Number of Respondents	Percentage of Respondents
>5%	2	18%
5% - 10%	2	18%
10% - 25%	3	27%
25 - 50%	3	27%
50% - 75%	1	9%

Conclusion

This research serves to guide a larger discussion about the intersection of UX/UI/GrC, and enumerates on the existing overlap as well as how the discipline of UX design can further augment the GrC curriculum. From our research we conclude that offering curricula concentrating on methods that a UX/UI designer needs as well as UX research skills throughout the undergraduate graphic communication educational experience will best prepare students to enter the profession of user experience design and research. And because there is not a clear path for undergraduate preparation for the profession of user experience, with only two bachelor's degrees specifically in user experience offered in the United States (Savannah College of Art and Design and Purdue University), the interdisciplinary nature of graphic communication programs makes it well-situated to house such curricula. We also note that many graphic communication programs are already embracing this trend and use digital technology to create experience design — with their students also understanding the touchpoints of traditional print media as it relates to the digital realm. GrC at Cal Poly is addressing this need for human-centered design professionals by offering expanded curriculum, including Mobile User Experience, User Experience Methods for Digital Innovation, and changing current offerings in web design to encompass product design and human-centered research, design and testing methods. We have added a second faculty member specializing in this area.

GrC should embrace that we are preparing students for the experience economy. The term “Experience Economy” was first coined in a 1998 article by B. Joseph Pine II and James H. Gilmore (Gilmore & Pine II, n.d.) in the Harvard Business Review as “the next economy following the agrarian economy, the industrial economy, and the most recent service economy”. Now a company’s experience is transmitted not just through print material, but also website, mobile, video

and social networks, making the experience of a cohesive brand more important than learning one, specific medium or media type. The concept of the Experience Economy validates the need for human-centered design and research, which makes understanding user experience methodology integral for communicating in our current economy. Graphic Communication curricula can benefit from using user experience methods as a hub that touches on all aspects of print, digital, visual design, graphic design, printed technologies and packaging curricula.

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