

Preparing Future UX Professionals

Human Skills, Technical Skills, and Dispositions

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ABSTRACT

The field of user experience (UX) is growing and rapidly evolving. As instructors who teach in and help design UX programs for students in higher education, we are interested in developing compelling and relevant educational experiences for our students who aim to work as UX professionals. To gain a better understanding of the current expectations for working in the UX industry, we conducted 64 interviews with 71 senior UX industry professionals to learn about their current practices and their expectations of what skills new employees need to be successful working in UX. In this paper, we present a subset of findings from the study that focus on desired skills (both human and technical) and dispositions of UX employees. We discuss the implications of this research for teachers and students and a call for future work.

CCS CONCEPTS

• **Applied computing**; *Education*; • **Human-centered computing** ~ **Human computer interaction (HCI)**; *Empirical studies in HCI*

KEYWORDS

User Experience (UX) skills, UX dispositions, UX pedagogy

1 Introduction

The field of user experience (UX) is growing and rapidly evolving. As instructors who teach and help design UX programs at institutions of higher education, we are interested in developing compelling and relevant educational experiences for our students who aim to work as UX professionals. Researching existing industry practices is a fruitful source of insights to inform program and curricula design concerned with technical and professional communication [1–5].

The interdisciplinary nature of UX attracts people from a wide variety of educational backgrounds; many are self-taught and/or have moved from adjacent fields [6]. UX spans a wide variety of roles that include design, research, content, product management, and development. A challenge of preparing students for UX careers is that UX practice is highly situated and context-specific [5] and is practiced differently across different organizations with varying levels of UX maturity [7].

Our primary contribution with this paper is to provide scholars and teachers insight into the skills and attitudes that burgeoning UX practitioners need to develop and highlight as they enter the field. These understandings are required for informing our teaching and providing ways to align students' preparation with industry expectations. To better understand current industry practices and what skills students need to enter into organizations and be successful, we conducted an IRB approved study using qualitative interviews with 71 senior UX professionals from 64 different organizations across varied geographic areas, primarily in North America. In this paper, we present preliminary findings from this study that focus specifically on the desired skills and dispositions needed for success as a UX practitioner. The paper is structured as follows. First, we argue for the importance of understanding existing industry practices to inform pedagogy by pointing to previous work in this area from both the technical and professional communication (TPC) and human-computer interaction (HCI) disciplines. Second, we detail the study methods and our approach to data analysis. Third, we focus on findings related to skills, both technical and human, and dispositions

that participants mentioned as being imperative for working as a UX professional. Finally, we conclude with implications for how the findings can inform current UX pedagogy and suggestions for future areas of research.

1.1 Understanding existing industry practices to inform pedagogy

Studying existing industry practices to inform pedagogy is common in academic disciplines focused on preparing the next generation of UX professionals. While UX is an interdisciplinary field that draws from many areas, we focus on two academic disciplines that are closely aligned with UX and are also the home disciplines of the authors of this article: TPC and HCI.

TPC has always been closely intertwined with UX [8], resulting in many scholars calling for more integration of UX into TPC Programs [9–11]. TPC also has a longstanding commitment to creating connections between industry practices to inform curricular design of its academic programs [12,13]. The career path for students in TPC has mirrored the broadening landscape in industry, including the shifts to UX [14] and component content management [15]. Researching existing industry practices is a fruitful source of insights to inform TPC program and curricula design. Salient examples include understanding how to better connect usability education with industry needs [1], the use of rhetorical appeals to support design decisions [16] and the rhetorical strategies of UX practitioners [5]. As UX is an ever growing and changing field, Getto, et al. argue that learning how to adapt and learn is more important for teachers and programs of UX rather than solely focusing on teaching tools or products and that UX programs should balance theory and practice [9]. Several scholars have argued for the importance of students working on client-based or service-learning projects and developing robust partnerships with industry to help students gain a more situated understanding of working in UX [9,10,17–19]. In the field of HCI, there has also been a small but persistent effort to study industry practices to inform pedagogy. Primarily, these efforts focused on how frequently practitioners used different methods [20,21] or what content areas should be covered in HCI curricula [22].

1.2 Skills and UX

When considering the skills candidates need for career success, it is common for studies to focus on binary categories: (1) technical capabilities and knowledge of the individual and (2) interpersonal and intrapersonal capabilities of an individual. While there are a variety of ways to label these skill binaries, they are commonly referred to as hard/soft [23], cognitive/non-cognitive [24] or technical/human [25]. For this paper, we acknowledge but also extend these categories. The first two categories, technical and human, are those skills in which someone needs knowledge of to perform in a way that is visible to others. Technical skills are those related to executing discrete tasks successfully. Human skills are related to working with others. We also offer a third category, dispositions, which we define as character traits that define a person’s motivation for acting in certain ways [26]. They capture a person’s habits or tendencies, making them powerful predictors for future behaviors and attitudes.

A variety of studies and research has looked at skills UX practitioners need to be successful. Rosala and Krause’s 2019 industry report asked UX professionals to list the skills they found most useful [27]. They coded these skills as soft skills, which made up 50% of the comments, and included communication, empathy, listening, and teamwork. The hard skill category made up 22% of the respondents’ comments and included design, technical, research, and business. The breadth of skills required to be successful in UX are also presented in a large-scale survey from Putnam et al., which found that UX practitioners employ many skills that cut across different job roles [3]. For example, they found people who had titles related to UX research often engaged in design, and people with titles related to design often engaged in research. This finding is echoed by Rosala and Krause that identified that almost all UX professionals have both research and prototyping skills [27]. More specifically, the report identified that UX designers rated important skills to have include prototyping, research, visual design and project management, to name a few. UX researchers’ important skills include research, writing, group facilitation, and public speaking as the top skills.

The technical skills needed to succeed in UX often are combined with human skills. In a previous study on UX practices, Rose and Tenenberg assert and demonstrate how the work of UX professionals is fundamentally rhetorical and persuasive by nature [4] and provided an analysis of rhetorical strategies such as using research, data, and design artifacts in a strategic and savvy way that helps to forward particular arguments and design decisions within an organization. These results are similar to those identified through several ethnographic studies, which found also that UX professionals should be skilled in communication, collaboration, critique, critical thinking, and persuasion in addition to expertise in basic UX research and design methods [28–33]. Our work builds on and extends these results by seeking to identify the skill sets and qualities of new UX practitioners, as defined by industry leaders and hiring managers.

2 Methods

The study protocol was approved by all of our respective institutions' IRBs. We conducted interviews with 71 senior UX practitioners at 64 organizations. Next, we describe the participants, data collection and analysis.

2.1 Participants

We recruited participants through snowball sampling and social media, including word of mouth, professional groups related to UX, LinkedIn and Twitter. We defined senior UX practitioners as having at least five years UX experience with at least 6-months of that in leadership roles. Among our participants, the mean length of time in industry was 13.5 years; mean length of time at their current job was 3.75 years. All participants had college-level degrees. Most (63% - n = 45) acted in the role of a manager, 17 (24%) were individual contributors and the remaining nine (13%) acted as internal or external consultants. Most of the interviews were with people who worked at an in-house UX group (61% - n=39), 25 (39%) were with agencies or acting as freelancers or consultants (internal and external). Most participants (n = 61/64) lived in the US, in 14 different states: 22 on the east coast (New York, Massachusetts, Virginia/DC, Pennsylvania, Georgia and Maryland); 22 in the Midwest (Illinois, Ohio, Indiana, Michigan and Minnesota) and 17 on the west coast (Washington and California), see [Figure 1](#) for the distribution of the US-based interviewee locations. The remaining interviewees were in Europe (n = 2) and India (n=1).

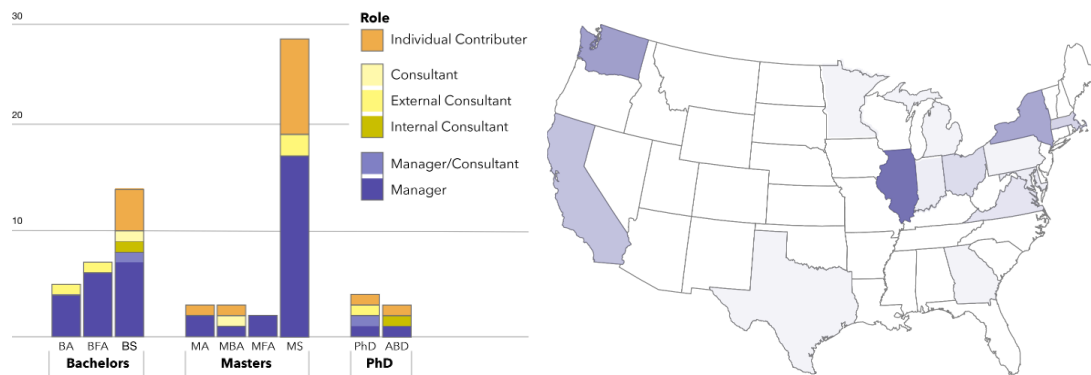


Figure 1. Degree by role (left) and geographic location (right)

Job titles were diverse; the most common were ‘Director of’ (e.g. User Experience, Design), ‘Senior’ (e.g. UX Researcher) and ‘Lead’ (UX Researcher, UX Architect). Most participants worked primarily in design (32% - n = 23), followed by both design & research (27% - n = 19) and primarily research (25% - n = 18).

2.2 Data Collection

We conducted the interviews in three formats: (a) remote video (n = 42), (b) phone (n= 9) and (c) in-person (n = 13). All interviews were recorded and transcribed; however, we had four technical failures where the recording did not save. Interviews typically lasted 60-70 minutes and participants were offered a \$30 (USD) gift card as a gratuity. The semi-structured interviews asked participants about working as a senior UX practitioner and included questions about their current position, how UX fit into their organization, how they communicated across different roles and teams, and about their organizations’ UX maturity. We also asked specifics about individual projects, hiring, and how accessibility fit into their organization’s design or development practice. Finally, we asked participants to identify patterns or trends shaping the field. Not all questions were asked of all participants due to time.

2.3 Data Analysis

In this paper, we focused only on discussion about new hires; our data analysis followed three steps. We started by individually inductively coding a subset of the transcripts (n = 18) using Atlas.ti. We focused our coding on identifying skills (technical and human) and dispositions. We then met to identify the categories that occurred most frequently and discussed our operational definitions. In the second step, we used those categories and operational definitions to

individually deductively code the remaining transcripts; we also continued to add codes that we identified as relevant in the remaining transcripts. In the third step we merged our Atlas.ti files and identified the most common categories in each of the three focus areas. To ensure reliability, we report only on those categories in which at least two of the three authors agreed were present in a participants' response to qualities they look for in new hires.

3 Findings

In this section, we report findings related to a set of questions related to hiring and skills. First, we present three categories of skills: technical skills, human skills, dispositions. We acknowledge that some items in each category could potentially fit in multiple categories. During analysis, we discussed and came to agreement on the categorization shown here, knowing that these boundaries could be drawn differently. Due to the extensive list of skills identified and the limited space here, we will discuss the top three items in each category and also list the remaining items with brief definitions. Second, we present findings related to the importance of and relationship of the skill sets according to participants. Findings are defined and supported by emblematic quotes from the interviews. Some quotes were slightly edited for readability

3.1 Technical Skills

We defined technical skills as observable skills related to typical UX industry practices. They are the standard skills a person is expected to be able perform in order to enter the UX profession. Using our rules of agreement, we organized technical skills into nine categories, see [Figure 2](#). The top four were (1) research, (2) design, (3) process thinking and (4) information architecture.

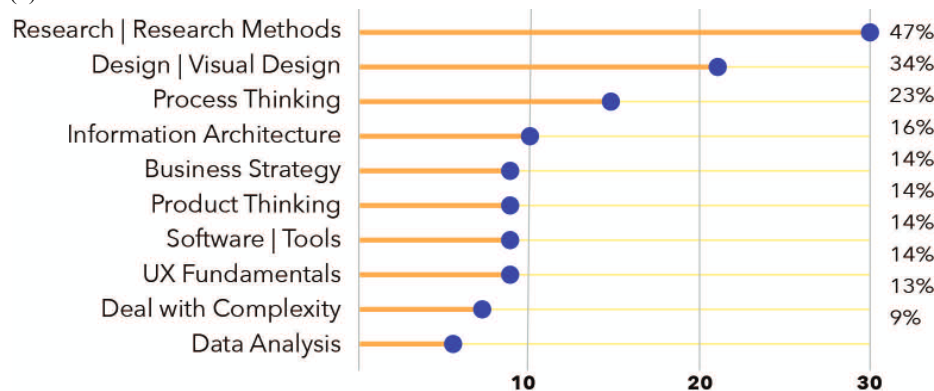


Figure 2. Technical Skills (Percentage indicates the number of interviews where a skill was mentioned)

3.1.1 Technical Skills: Research (n = 30/64 interviews).

We coded for research when participants voiced the need for new hires to be capable of designing protocols for and practicing diverse research methods that included: interviewing, observation, surveys, usability testing, heuristic reviews, employing analytics and conducting literature reviews. For example, P39 told us:

“I look for somebody who has a mixed methods background first. They can't just do usability tests or just do ethnography largely because we just can't support that level of specialization. Um, I want to know what problem they set out to solve.... what approach did they consider and why they arrived at the one that they went after?”

3.1.2 Technical Skills: Design (n = 21/64).

We coded for design when participants emphasized the importance of new hires having design skills. While most participants spoke about design skills generally, some specifically mentioned visual design and interaction design. For example, P57 reflected on her desire to hire:

“Someone that is really good in interaction design and can do reasonably well with prototyping but not requiring highly skilled at that... and does reasonably well in visual design.”

3.1.3 Technical Skills: Process Thinking (n = 15/64).

We identified process thinking when participants spoke about the need for new hires to understand that creating technologies required a progression or some sort of structured course of action. A good example of the need to display process thinking came from P17:

“I know some folks like to see the process.... what was the outcome of this... Like you've made it great and beautiful, but did it get delivered? I think a crucial thing is people like to see that you can take the steps to achieve something...like the UX process.”

3.1.4 Technical Skills: Information Architecture (n = 10 interviews).

Several participants focused specifically on the need for new hires be knowledgeable about information architecture. For example, P34 discussed how his company was looking for ‘hybrid designer’ who also had skills in information architecture:

“We've moved away from these discrete disciplines of somebody who just does IA/interaction design in rough wireframes to somebody who does final fit and finish visual design. You're now employing more ...what would be hybrid product designers. So, they need to really understand the information architecture and information design thinking interaction models when it comes to a given UI, but also have the capabilities to leverage..existing, final fit and finish patterns.”

3.1.5 Other Technical Skills.

In addition to the top four categories, we also coded for the following additional technical skills.

- Business strategy – the ability to think about the company’s business model and how a product or service fits into that model.
- Product thinking – the ability to think through a product need and balance the needs of users and stakeholders.
- Software | Tools – being able to use different tools and technologies and work within software development paradigms like agile.
- UX fundamentals – having a breadth of knowledge of the skills required by UX professionals that included basics in design like sketching, wireframing and prototyping, and also research like usability tests.
- Deal with complexity – the ability to understand and dig into the complexity of a specific domain or design space and make it understandable to others.
- Data analysis – the ability to analyze and synthesize data to make decisions about design.

3.2 Human Skills

We defined human skills as demonstrable skills that involve engaging directly with others to achieve goals related to work. They tend to center around inter- and intra-personal relationships and the ability to explain and communicate details about projects. Using our rules of agreement, we organized human skills into nine categories, See [Figure 3](#). The top four were (1) approaching problems, (2) communicating, (3) collaborating and (4) storytelling.

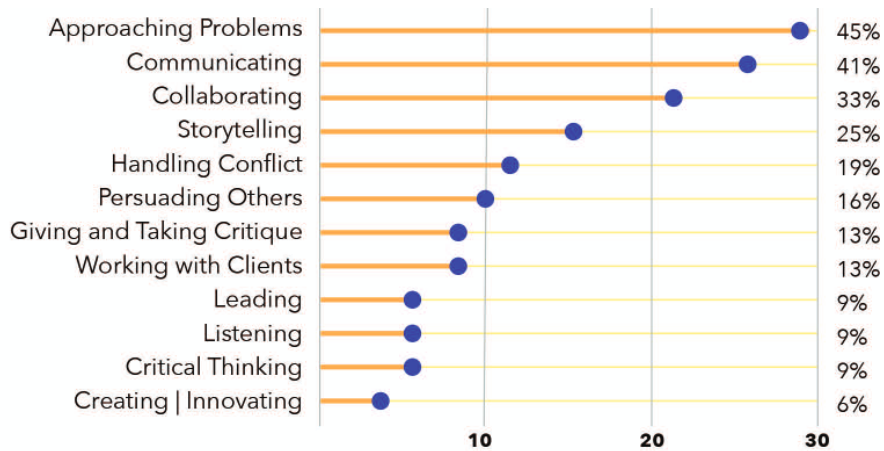


Figure 3. Human Skills (Percentage indicates the number of interviews where a skill was mentioned)

3.2.1 Human Skills: Approaching problems (n = 29/64 interviews).

We coded for approaching problems when participants mentioned the importance of seeing how a potential employee would approach understanding and solving a problem. This category overlapped with many other skills that included asking good questions, listening, how they go about trying to find out more information about a problem or get to the heart of complexity. It also included the ability of a potential hire to articulate what they know, how they know it, and how they might find out more. For example, P46 reflected on wanting to hire someone who will explore and think creatively to understand a problem:

“It’s about how they’re able to explain how they understood the problem and how they engage others on their team to, um, explore the problem. If somebody is saying they executed exactly what was told, I don’t want to hire that person. I want somebody who’s gonna find holes and who’s going to be able to draw out insights from other people.”

3.2.2 Human Skills: Communication (n = 26/64).

We coded for communication when participants stressed the importance of being able to clearly communicate with others, whether that was in writing, in presenting their work or ideas, or during informal conversations with team members. P24 stated:

“Make sure they kind of, what they think they can kind of communicate in a clear, correct, you know, rational manner. So with that it kind of allows up to their presentation presence and you know, stand in front of the room and, you know, present to get their point across.”

3.2.3 Human Skills: Collaboration (n = 21/64).

We coded for collaboration when participants talked about the importance of UX professionals to be able to work well with others, both within their specific team or discipline but also beyond to work well with other disciplines such as developers, product managers, stakeholders and clients. P30 discussed how UX work is inherently collaborative.

“Should be a team player because UX doesn’t work in any silo. That’s not that person is not meant to be a UX person. He could be a developer or he could be, maybe a visual designer. But for a UX person, yes, he should communicate with the team and he should be able to tell a story in a meaningful way”

3.2.4 Human Skills: Storytelling (n = 16).

A key, yet distinct skill for UX practitioners that was mentioned by participants is the ability to tell a story. P15 talked about how storytelling can be seen when an applicant is sharing work from their portfolio:

“What the portfolio shows me is can they tell the story? Can they articulate it?... Can they put a story together that has a beginning, middle and an end so that I can understand what those challenges, actions and results are...and get a good sense of the person and how they dealt with those challenges and what actions they took and why they took them.”

3.2.5 Other human skills.

In addition to the top four categories, we also coded for the following additional technical skills.

- Handling conflict – the ability to work through conflict, look for solutions, and working to resolution.
- Persuading others – the ability to bring people along to your way of seeing things, being able to influence others and the product's direction.
- Giving and taking critique – the ability to provide helpful positive feedback on others work and also taking feedback on your own without becoming defensive.
- Working with clients – the ability to work with people external to the company or UX team to manage expectations and achieve success
- Leading – the ability to drive a project's direction and lead others within the organization.
- Listening – the ability to both give other people space to explain their ideas, going deeper by asking follow up questions.
- Critical thinking – the ability able to understand a problem and synthesize existing information.
- Creating | innovating – ability to approach a problem with a unique point of view.

3.3 Dispositions

We defined dispositions as character traits that define a person's internal motivations to act or behave under certain conditions. According to Faccione, dispositions are “namable and describable as a nexus of attitudes, intentions, values, and beliefs” [34] and can be viewed as distinguishing factors of a person's personality. We identified nine unique dispositions discussed by three or more interview participants; see [Figure 4](#)). The top four were (1) independent/self-starter, (2) open-minded/flexible, (3) curious and (4) passionate.

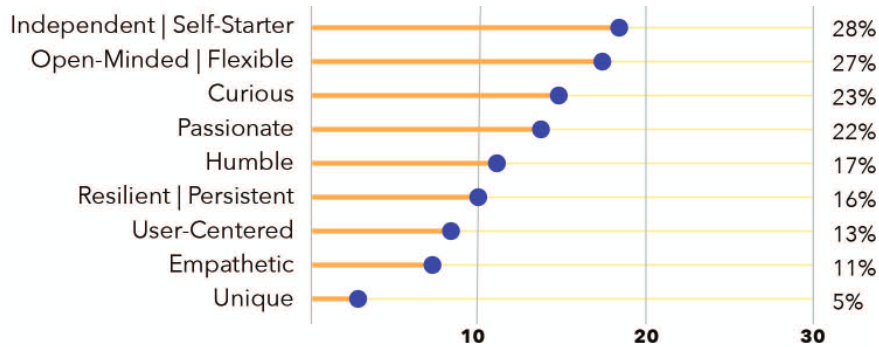


Figure 4. Dispositions. The percentage indicates the number of interviews where a disposition was mentioned

3.3.1 Disposition: Independent/Self-Starter (n = 18/64 interviews).

Since many UX professionals work in fast-paced environments and are assigned individual responsibilities, many participants described looking for candidates who are able to take ownership and work independently; as P31 said, “people need to be able to get in there to figure it out, right?” New hires need to show that they are self-starters and can be trusted to overcome obstacles and make decisions on their own. As P6 said:

“Because we're moving so quickly, you need to take full ownership and figure out how to solve a problem no matter what...I got somebody [who] was like, ‘Oh, nobody asked me to do that’ ...If it's something that we assume as a standard expectation, we really need you to be, ‘Hey, should I be doing that?’”

3.3.2 Disposition: Open-Minded/Flexible (n = 17/64).

We coded open-mindedness/flexibility when participants expressed a desire for candidates who are able to adapt to changing circumstances. While UX is a process-driven field, participants emphasized the importance of not adhering to a rigid methodology and being able to pivot when new information came to light. P29 explained how they identify this disposition in an interview:

“I just honestly, I see how well they embrace something on the fly because that tends to be a good indicator of how they'll react in the real world when things go off the rails, or not as expected anyway. You know, can you adapt? You know what, if I start asking them hard questions during,

you know, hypothetical conversation, they start to get all flustered and defensive, then they're probably not right."

3.3.3 Disposition: Curious (n = 15/64).

We coded for curiosity when participants discussed the importance of being inquisitive and “*trying to understand how things work*” (P37). Curiosity could be demonstrated in multiple ways: by describing projects in which they continually questioned and tested their assumptions; by asking probing questions during an interview; or, by discussing recent books or articles they read or podcasts they listened to. As P28 explained:

“It's just like, how does, how do you think about things? How do you work through that thought, who you talk to? When do you, when you get stuck, like, what do you do? ... [It's] their ability to learn, the yearning, the want to learn. Um, someone who self identifies as a lifelong learner is like, great. We want people who are curious, humble.”

3.3.4 Disposition: Passionate (n = 14/64).

We coded for passion when participants talked about looking for candidates who had a deep, personal drive for UX. Specifically, participants mentioned having a “fire or desire” (P22) for doing UX work, including talking and listening to people, figuring out the answers to difficult questions, and solving users’ problems. As P44 observed:

“I guess it's the difference between sort of a, um, someone who sees a design career as a way to make money, and that's interesting, and you know, like the least boring thing I could do with my life, versus someone who says, I just, I, I love making things and I love crafting the thing that I'm making. And so, I want to see that spark.”

3.3.5 Other dispositions.

In addition to the top four categories, we also coded for the following dispositions.

- Humble – the ability to be modest about one’s work and process and to not be a “design diva.”
- Resilient | Persistent – the ability to overcome adversity and work towards goals and ideas.
- User-Centered – exhibiting a tendency to think of users and make decisions and communicate ideas based on thinking through what would benefit users of a product.
- Empathetic – being about to empathize with users and their concerns and also empathize with the conditions of the internal stakeholders and team members.
- Unique – having an interests and skills beyond design, often showing deep interest or engagement that goes beyond work.

3.4 Skills that set candidates apart

Based on the findings reported above, UX professionals are expected to have a broad set of knowledge across many technical skills, human skills, and dispositions. In this section, we report findings related to the preferences of senior UX practitioners for the combination of these skills.

3.4.1 The strength of T-shaped candidates (n=7/64 interviews).

Many participants mentioned the importance of a UX professional having skills that form a T-shape, meaning they have broad knowledge in many areas, and deep knowledge in one particular area. P15 defines a T-shaped person in this way:

“Maybe somebody who's strong in design and knows a little bit of research, or strong in content strategy and knows a little bit of design. So, um, having those skills, it's definitely important. I think I've seen a little bit more of that rather than, right, you're the researcher and you're going to do this. You're the designer, you're going to do this, you're the content strategist and you're going to do that [instead]. There's some crossover.”

Another participant, P43 talks about the importance of the T-shape team member to be able to provide overlapping areas of expertise on a team

“Our designers are expected to do a variety of day to day tasks. I'm also looking for depth within, certain specific niche areas to balance the team out so that we can do a lot of cross training and learning from one another.”

3.4.2 The importance of human skills (n = 49/64 interviews) and dispositions (n = 40/64).

During the interviews, participants stressed the importance of the skill sets that we coded as human skills and dispositions. They mention these skills as being underrated, but often making up the key attributes for success. For example, P15 was one participant who stressed the importance of these skills.

“I can't emphasize enough soft skills. Hmm. And uh, it's something that I don't think we think about a lot, but soft skills are important.”

Further, participants believe that the technical skills, like design or usability research are much more straightforward and something that can be taught, whereas the human skills and dispositions are both harder to teach and key to a UX person's success, as P16 mentions below.

“I believe that I can teach just about anybody to do the, do the usability, right. The, the mechanics of it, the how to do it, but they have to have some of the soft skills to actually be successful.”

4 IMPLICATIONS FOR TEACHING UX

In this section, we contextualize the findings from the study and discuss how these findings inform pedagogy for UX. UX is a growing field and there is a great deal of interest in UX research and design. According to Nielsen, there were over 1 million UX professionals working in the field in 2017 and he predicts that the field will continue to dramatically expand over the next 30 years [35]. In addition, there is a great deal of growth in for-profit, short training programs known as bootcamps that prepare learners for working in technical fields, including in UX [36]. However, given the relative lack of entry level positions in UX [14], new graduates face fierce competition for UX jobs, which are in demand, pay well, and have a great deal of diversity in terms of specialization.

As our findings show, UX practitioners are expected to have a wide variety of skill sets that cross the technical and human binary and extend into character traits, as represented by the category we call dispositions. New hires should not only know how to research and design, but they also need to be fluent with a variety of tools, technologies and software processes. Further, they need to have a breadth of knowledge across the UX spectrum including design, research, information architecture, visual design, content strategy and so on, and then have deep expertise in one or two of these areas as well, referred to as “T-shaped people,” a term popularized by Tim Brown from IDEO [37]. In addition to having both broad and deep expertise in design, they need to be highly skilled communicators and collaborators who work on multidisciplinary teams to build and create products and tame complexity. These findings echo other industry reports that list a long set of skills that UX practitioners are expected to have to succeed in their positions [14,27].

What our findings add to the existing knowledge on skill sets is the perspective of dispositions, and specifically the idea that a person's character or personality makes them more suited to be successful in securing and succeeding in a UX position. Throughout these interviews, we heard participants say a variation on the statement, “*I can teach someone to wireframe, but I can't teach them how to be passionate about UX*” This perspective implied that there are some people who are just better suited based on some innate qualities to be in a UX career. Early career professionals or students preparing for the job market might look at this list of identified skills and feel overwhelmed at the high expectations of skills and dispositions for working in UX. Further, fellow educators might share this feeling of being overwhelmed. However, we see these findings as a two-part call to action for educators.

First, due to the breadth of skills needed by UX practitioners, no one program or class can fully prepare students for UX careers. We as educators need to work together and across traditional disciplinary silos to help students gain a solid understanding of UX fundamentals and be prepared for the top of the T in the t-shaped skill set. Currently, academic programs that are preparing students for UX are still siloed; we have TPC, HCI, design, cognitive psychology, anthropology, just to name a few. Academics and programs are less known for being T-shaped but rather for having a narrow yet deep focus in one particular area. How do we expand and present students with an appreciation and practice across our disciplines? Currently there is a lack of places to do so. We see some encouraging movement in this area, such as the Educator Summit at the annual IXDA conference and the newly formed EduCHI community in HCI that brings together educators interested in working on developing a greater body of knowledge about teaching UX and UX pedagogy.

Second, as educators, we push back on the notion that it is not possible to teach soft skills and the qualities identified as dispositions. Further, we have a responsibility to make visible to students how crucial these skills are and how they may be even more important than learning technical tools or new research methods. What would it look like to craft our learning outcomes to engage in helping students develop as self-starters, to be humble or curious, and so on? There is work from composition studies that investigates how we intentionally cultivate dispositions [38], but little

in the case of UX education. At the moment, we are continuing to think through how these results impact our own practice as individual teachers and we invite others: peers in education and partners in industry, to engage and explore what it might be like to transform our educational practices that help grow the future of UX practitioners across the full spectrum of skills they will need for success.

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