Impact of UX Internships on Human-computer Interaction Graduate Students: A Qualitative Analysis of Internship Reports

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Objectives. Internships can bring a host of professional and academic benefits to students. Then, how do User Experience (UX) internships influence Human-Computer Interaction (HCI) graduate students' professional and academic growth? What are the challenges experienced by HCI graduate students during internships? We explored these two research questions.
Participants. Our study participants were 42 HCI graduate students who completed UX internships. They came from computing and related disciplines, including computer science, information technology, psychology, and design. Some of the participants' internship titles were Interaction Designer, Design Researcher, UX Programmer, and Business Intelligence Analyst.
Study Method. We conducted a thematic analysis on 42 graduate students' UX internship reports that were collected over 6 years to uncover themes in relation to our two research questions.
Findings. As for UX internship benefits, we found that students learned about the workplace culture (e.g., academia vs. industry/government on research design processes) and core UX technical (e.g., research, design, programming) and people skills (e.g., teamwork, empathy toward end-users); they also realized what they wanted in future careers after completing their internships. We also found internship challenges that were related to the internship program (e.g., the availability of internship opportunities), the host organizations (e.g., the quality of mentorship received), and remote working (e.g., difficulty over conducting remote usability testing).
Conclusions. We make practical recommendations for HCI educators, UX practitioners, and HCI graduate students on how they can work collaboratively to create a meaningful UX internship experience. These recommendations include researching the host organization prior to internships, providing comprehensive onboarding, and being transparent with internship constraints.

CCS Concepts: • **Social and professional topics → Computing education programs**;

Additional Keywords and Phrases: HCI education, UX internship, experiential learning, computing education

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1 INTRODUCTION

For many educators and practitioners across disciplines, experiential learning is seen as a necessity to promote professional and academic growth in students [19]. Experiential learning advocates learning by doing as opposed to the chalk-and-talk method of teaching [16]. It comes in different flavors, with internships considered as the most ideal form. Abundant research attests to the positive effect of internships across disciplines: marketing [88], biology [31], tourism [7], and business [22]. Extending prior research, we examined the effect of internships on graduate students who studied Human-Computer Interaction (HCI) and who completed an internship in User Experience (UX) practice.

In this article, we define HCI expansively to encompass computing and related disciplines that specifically focus on understanding the impact of ubiquitous computing on individuals. These disciplines include computer science, information technology, design, and psychology [64]. Both HCI and UX as a field are concerned with understanding and creating safe and enjoyable technologies [38, 44]; the latter contextualizes the former in practical contexts and investigates the relationship between users and organizations, mediated by products or services [58]. We asked two research questions:

Research Question 1 (RQ1): How do UX internships influence HCI graduate students' professional and academic growth?

Research Question 2 (RQ2): What are the challenges experienced by HCI graduate students during internships?

To address these two questions, we examined 42 students' internship reports that comprehensively described their internship experiences in their chosen UX profession.

Our primary contribution is providing rich narratives that outline HCI graduate students' academic and professional growth after UX internships. Pursuing careers in UX is popular among HCI graduate students [79], but research examining UX internship benefits and challenges has been sparse. HCI educators and graduate students remain uncertain on what they can expect in UX internships, and this uncertainty can influence their endeavor to design and sustain an effective UX internship program.

Overall, our study diversifies the existing literature by demonstrating internships as an effective experiential learning tool for HCI graduate students and also provides evidence for HCI educators who wish to integrate experiential learning to prepare their graduate students for the workplace. In what follows, we first explore the relationship between HCI and UX and discuss the literature on experiential learning in HCI and internship benefits. Then, we formally outline our two research questions and detail the study method and analytical approach to address the questions. Next, we present key findings highlighting UX internship benefits and challenges. Lastly, we discuss practical recommendations on making a meaningful internship experience.

2 RELATED WORK

This section presents a literature review explaining the relationship between HCI and UX and experiential learning theory and three popular forms of experiential learning in HCI and internship benefits to students of all disciplines.

2.1 Relationship between HCI and UX

Human-Computer Interaction studies the design, implementation, and evaluation of computing technologies that support human activities [39]. The field emerged in the 1970s against the surge of the PC revolutions and the popularization of office computers. Nowadays the term "computing technologies" encompasses various technologies, ranging from simple computers to

mobile phones and smart home devices. HCI takes input from a range of disciplines including computer science human factors and ergonomics, design, cognitive psychology, sociology, and anthropology. Yet, it remains distinct from other disciplines by offering a unique set of theories and research and design methods [77].

This interdisciplinary nature is to be celebrated. Each discipline takes on discipline-specific perspectives to define and create enjoyable and functional computing technologies [71], leading to the comprehensive understanding of all aspects—engineering, design, psychology—related to human and computer interaction. Moreover, with this interdisciplinary nature, HCI students become versatile experts on a breadth of skills (vs. the smallest experts on a few topics), and this training opens up diverse career paths that appreciate HCI students' user-centric approach. UX is one such field [79]. Against the backdrop of an ongoing conversation about what UX is [59] and how UX can differentiate itself from HCI [67], this article views UX as a subfield of HCI whose focus is more applied, with a tangible product and service mediating the relationship between the user and the organization [58].

UX studies how a person's experiences are formed before, during, and after their interaction with a product or service [38]. It is a subordinate field of HCI that contextualizes HCI theories, methods, and technologies in practical settings. As such, UX careers are highly attractive to HCI graduate students. In fact, most UX practitioners, be it designer, researcher, or content specialist, have HCI degrees [72, 79]. There are four major stages in the UX process: preliminary research, prototyping, usability testing, and development [26]. Depending on their specific role, UX practitioners are involved in one stage more than another stage. For instance, UX designers create more prototypes and sketches than UX researchers, who in turn conduct more usability tests than the designers. In response to the growing demand of HCI graduate students to fill in the future UX roles, HCI educators have adopted experiential learning techniques to teach UX [11, 47, 78, 87].

2.2 Experiential Learning in HCI/UX Education

Experiential learning techniques used in HCI/UX education are grounded in the experiential learning theory [85]. The theory defines learning as a transaction between the student and the learning environment [52]. The theory advocates for empowering students to be an active participant (vs. a passive participant) with their learning and breaks the assumption that lecturing equals student learning [85]. There are four distinct learning phases that students should go through in a sequence for meaningful learning to occur: Concrete Experience, Reflective Observation, Abstract Conceptualization, and Active Experimentation. Students should be first exposed to *concrete experience* of new knowledge where they are actively experiencing the knowledge (e.g., laboratories, field trips). Students should *reflect* on these experiences by noting the differences between and similarities with their prior knowledge. Then, students *abstract concept*; they make connections between old and new knowledge and form a new set of theories and generalizations. Lastly, students *actively experiment* by testing out new model or theory with new sets of problems.

2.3 Types of Experiential Learning in HCI/UX Education

There are three popular forms of experiential learning in HCI/UX education: project-based learning, service-based learning, and work-integrated learning. In project-based learning, students are presented with real organizational problems but do not interact with industry partners. Gorka et al.'s [32] capstone project for undergraduate students in Information Technology is a good example of project-based learning. In this project, students solved real usability problems faced by the leading manufacturer in pharmaceuticals in a classroom setting. The company wished to instill a security system that can provide physical and data security in their new manufacturing facilities, and students were tasked to design a new security system that met the requirements of key stakeholders. To enhance the realism of problem-solving, students received fictitious

transcripts from interviews conducted with key stakeholders who talked about their preferences and concerns about a new security system. At the end of the semester, students produced a comprehensive report that justified their design solution including the needs analysis of key stakeholders and the cost of equipment and installation.

In service-based learning, students partner with local communities to offer solutions to their usability problems [13, 25]. Roldan et al. [78] described a graduate-level prototyping course where HCI graduate students worked with external clients to ideate, co-design, and implement a STEM learning prototype with Arduino for middle-school children. MacDonald and Rozaklis [61] described their graduate-level information experience design course. In this course, students collaborated with a local museum to improve the museum experience for international visitors. The student team went through the major UX project lifespan: (1) requirement gathering, (2) design of a prototype, (3) usability evaluation of a prototype, and (4) implementation of a prototype.

Among the three, work-integrated learning provides students with the most immersive real-world experience. Internships and co-op education are popular forms of work-integrated learning. In internships, students take on work at their convenience. In co-op education, students alternate work terms and study terms and there is a fixed number of times that they need to take on work during the course of study (e.g., three work terms) [9]. In both internships and co-op education, students apply abstract theories and methods in specific contexts and they navigate through complex real-world constraints (e.g., limited research tool, client conflicts).

Prior work on work-integrated learning in HCI/UX education has focused on internships [3, 34, 43], although the lack of visibility of co-op education in published papers does not indicate its absence. Talone et al. [87] have expanded on these two forms of work-integrated learning by introducing a student-led UX consulting group. In this UX lab, students offer low-cost usability services to local communities at low cost under faculty and graduate student supervision. HCI educators, industry partners, and students rate internships as a more effective way to prepare students for post-graduation careers than other learning activities [23].

2.4 Benefits of Experiential Learning in HCI/UX Education

Experiential learning can equip students with UX technical and people skills at a greater depth compared to traditional teaching methods. Technical skill is the knowledge needed to complete a task, whereas people skill is the knowledge needed to work with others [65, 75]. Kabakova et al. [46] examined learning outcomes of graduate students who participated in community projects related to user-centered design (e.g., web redesign, usability assessment of an interface). From this experience, students reported to have developed people skills (e.g., project management, storytelling, empathy, collaboration) and user-centred design technical skills (i.e., communication with stakeholders, data management, and comfort with ambiguity in the face of wicked problems).

Similarly, MacDonald and Rozaklis [61] found that their graduate students and alumni showed improvement on UX knowledge, people skills (i.e., work in teams/clients, work within time/resource constraints, manage the messiness of real-world projects), and confidence in applying UX methods after completing community projects. In both studies, students felt more prepared for UX employment and more marketable to employers.

When it comes to the effect of UX work-integrated learning, Gray [34] examined the evolution of UX competencies in graduate students who had embarked on their first UX design internship or position over the period of 12 weeks. They found students developed the following seven UX competencies: (1) appreciating digital and analog tools to represent knowledge, (2) reconciling corporate reality/culture, (3) dealing with complexity, (4) communication skills, (5) leadership with UX design, (6) being active toward learning new skills, and (7) developing a designerly identity. Talone et al. [87] found three learning outcomes from students who participated in a UX

lab: (1) increased job marketability, (2) improved ability to work in a professional setting, and (3) improved people skills.

Against this background, research examining the impact of UX internships or work placement in general is nascent. To our knowledge, Gray [34] and Talone et al. [87] are two of a few studies that have done so. Are there nuances that can be introduced to their results? In non-HCI disciplines, for instance, a wealth of studies have introduced nuances under the student learning outcome "improved employability," including how host organizations keep students in the employment pool after completing internships [18] and how students with internship experience start with higher salaries [95] and obtain their first position faster than those without the experience [23]. Developing a similar nuanced understanding of the impact of UX internships can help HCI educators understand clear pros and cons of different types of experiential learning (e.g., UX internship vs. project-based learning) and inform their decision of which type of experiential learning to adopt in their classes.

Given this, we sought to understand how UX internships influence HCI graduate students' professional and academic growth (**RQ1**) and what challenges are experienced by HCI graduate students during internships (**RQ2**).

3 METHOD

3.1 Program Overview: Collaborative Learning of Usability Experiences Training Program

The Collaborative Learning of Usability Experiences (CLUE) training program is a usability training program primarily dedicated to HCI graduate students. It also supports the growth of undergraduate and postdoctoral students by giving them the opportunities to conduct usability research with the program faculty. CLUE is funded by a national funding agency's funding program that supports an innovative educational training program designed to prepare graduate students for careers in industry, government, and academia. CLUE is an independent training program; students participated in CLUE while simultaneously completing their home degree program.

There are four training components: UX Internship, Short Courses, Workshops, and Knowledge Transfer. Each training component has been designed to teach students with technical and professions skills that meet the demands of the UX industry. Through UX Internship, students work with leading UX experts from industry and government. They apply theories, methods, and technologies from classes to address real usability problems. CLUE has established partnerships with local industry and government partners who are UX experts within their organizations. The program provided a research assistantship while students completed an internship, and program industry and government partners did not have to cover a student's internship salary.

Students take on a full-time (4 months) or part-time UX internship (8 months), each lasting 520 hours in total. Students who take on a part-time internship schedule their internships to be spread across two school semesters (e.g., fall and winter). Students who take on a full-time internship complete their internships in one school semester (e.g., summer, fall, or winter).

Workshops and Short Courses prepare students for their internship. Workshops teach students professional and technical skills. Short Courses expose students to HCI topics that are outside of their major. Knowledge Transfer allows students to network and learn about effective communication in two ways: seminars and student-led presentations. Previous work has provided a detailed description of the program [29].

3.2 Study Participants

Participants were 42 graduate students from three Canadian universities. These students were on a thesis track and came from diverse graduate programs, including Information Technology ($n = 14$),

Table 1. Summary of Organization Information for CLUE Industry and Government Partners

Organization Sector	***n***	**Organization Sector**	***n***
Government Administration	5	Computer Games	1
Computer Software	4	Public Safety	1
Information Technology and Services	3	Real Estate	1
Aviation & Aerospace	1	Research	1
Design	1	–	–
Organization Type	***n***	**Number of Employees**	***n***
Government Agency	7	11–51 (Micro)	2
Private Company	5	51–500 (Small)	5
Public Company	5	501–1,000 (Medium Low)	1
Non-profit	1	1,001–5,000 (Medium High)	4
–	–	5,001–10,000 (Large)	2
–	–	10,000+ (Very Large)	4

HCI ($n = 12$), Psychology ($n = 2$), Computer Science ($n = 6$), Design ($n = 6$), and Cognitive Science ($n = 2$). Some of the participants' internship titles were UX Interaction Designer, UX Architect, Design Researcher, Human Factors Researcher, UX Programmer, UX/UI Developer, and Business Intelligence Analyst. The diversity in job tiles reflects the growing and evolving nature of this relatively new field [56].

The program offers graduate students the opportunity to undertake internships in UX practice [28]. For this study's particular group of participants, industry partners came from sectors including design, computer software, real estate, and computer games; government partners belonged to departments in charge of aerospace research, public safety, general government services, and immigration and citizenship.

Each organization belonged to one of the four organization types: (1) government agency, which is a government unit that oversees and manages a specific purpose for citizens (e.g., Revenue Agency administers tax laws for the nation's provinces and territories); (2) privately held company, which is an organization type that sells units of stocks only to a few willing investors; (3) public company, which is an organization type that sells its units of stocks to the general public; and (4) nonprofit organization, which is an organization type that promotes social cause and public benefits [33, 63]. See Table 1 for a summary of organization information for CLUE industry and government partners.

3.3 Internship Reports

Our main data were participants' end-of-internship reports. After completing their internships, participants submitted the end-of-internship reports consisting of (1) place of the internship, (2) responsibilities during the internship, (3) effect of the work experience on the student's academic studies, (4) challenges and accomplishments, (5) strengths and weaknesses of the work experiences, and (6) suggestions to improve the experience.

We minimized self-report bias by neutralizing study questions [69]. Specifically, we neutralized and freed the evaluative loadings of six internship report questions by using word choices such as "*suggestions* to improve the experience" or "*describe* your internship responsibilities." All the questions were clearly non-evaluative in the sense that they did not categorize students' responses in the reports as "good" or "bad." In the past, this use of indirect question wording has been shown to be a powerful method to shrink self-report bias [4, 17, 66, 70].

Table 2. Participants' School and UX Internship Information

Student Level	*n**	School Year in Which a Student Completed a UX Internship				Internship Type	*n*	Internship Nature	*n*
		First Year	*Second Year*	*Third Year*	*Fourth Year*	Full-time	29	Onsite	37
Master's	30	9	21	1	–	Part-time	16	Hybrid	3
Doctoral	12	1	7	5	1	–	–	Remote	5

*This number represents individual students whose UX internship report was analyzed for this study. Elsewhere, *n* represents an individual UX internship report.

We have received a total of 45 internship reports for the past 3 years (2017–2020). Thirty-one reports were from master's students and 14 reports from doctoral students. Four PhD students completed two internships and each submitted two internship reports (resulting in 6 reports out of 14 reports from doctoral students). Each internship experience is highly contextualized and we treated each report as an independent unit of observation. Thirty-seven students completed onsite internships; eight students completed remote and hybrid internships due to the global COVID-19 pandemic, with public health measures beginning in March 2020 in Canada. See Table 2 for an overview of participant school and internship information.

Participants had to submit the internship report 2 weeks after their internships had ended. This program requirement was communicated consistently throughout their tenure in the program via in-person and email communication (e.g., New Student Orientation, mid-placement interview with the program coordinator). Students were assured their internship report would not be graded; they understood the report was an element to facilitate their reflection of internship experience, which is crucial for experiential learning [51]. Students were encouraged to keep a learning journal while completing their internships to help them write the internship report.

3.4 Analysis

We conducted inductive thematic analysis, a method appropriate to find themes across a dataset in relation to our two research questions [8]. We followed the established guidelines in analyzing the data using NVivo 12 [8]. First, the first author read the internship reports multiple times. This process facilitated "data immersion" where the researchers become deeply familiarized with the data and notice observations that are relevant to the research questions. Second, the first author assigned codes to the contents relevant to the research questions. The second author reviewed and redefined these codes, which we then grouped into broader themes based on their similarities. Both authors refined these initial themes in terms of the degree to which they were the central organizing concepts that captured the students' internship experience. Given the interpretive nature of our data, both authors engaged in group discussion to reach agreement on codes and themes (vs. computing an inter-rater reliability statistic) [82].

4 FINDINGS/RESULTS

We found three dominant themes in response to RQ1 and three dominant themes in response to RQ2. We detail each theme with exemplar participant quotes; each participant is denoted by a letter P, followed by a random numeric number and the year in which they completed an internship and whether they completed their internship in industry or government. Figure 1 displays the relationship between six themes found in the study.

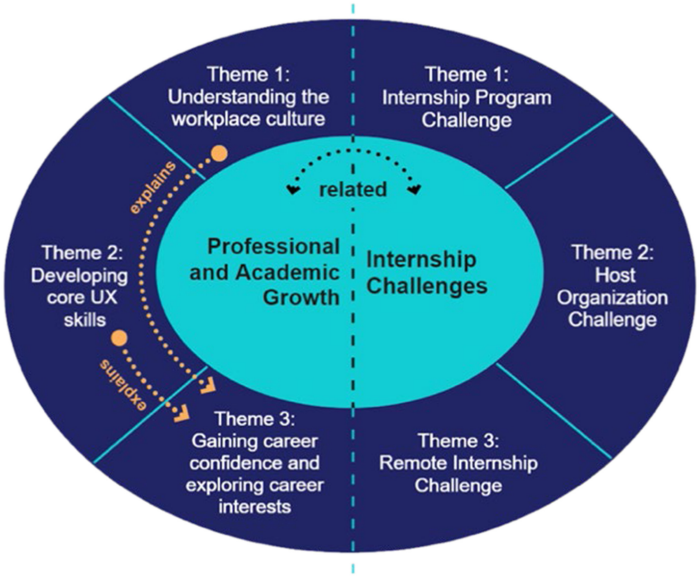

Fig. 1. Six themes found in response to RQ1 and RQ2.

4.1 RQ1: How Do UX Internships Influence Students' Professional and Academic Growth?

4.1.1 Understanding the Workplace Culture (Theme 1). Within this theme, we observed that participants developed an understanding of the workplace culture that was different from the academic culture on two aspects: general work process ($n = 22$) and research/design process ($n = 23$). In industry and government, the work process was transparent, fast-paced, and bureaucratic. It was transparent ($n = 10$) because everyone updated each other on "what everyone was working on" (P2, 2018, industry) and discussed "their progress and future plans for managing their projects" (P1, 2018, government). These status updates unfolded in weekly meetings attended by UX and non-UX teams. Work process was fast-paced ($n = 8$), with project deadlines set in "sprints," which is a work cycle that lasts 2 to 3 weeks for a given task. Participants found project deadlines were faster in industry and government compared to academia; their UX teams had "something new to test and ideas to implement into future products" (P1, 2017, industry).

Participants who interned at the government and large corporations found the work process to be highly bureaucratic ($n = 4$), where employees need to get approval from different divisions and directorates for every task; this caused frustration to some participants. One participant was developing interview questions to create a user journey map for the Social Insurance Number (SIN) application process, but "the questionnaire went under different reviews and modifications and finally got approved 1 month after we started developing it" (P7, 2018, government). Another participant had planned to launch a simple user survey but "the creation of questions took a few weeks to get approval from the lead design research team and to share it through Slack and email newsletter, additional weeks to get department approval" (P4, 2020, government).

Participants also learned the research and design process was different in industry and government compared to academia. Some participants were not used to finding information using non-academic sources ($n = 5$). When tasked to identify future business opportunities, one participant focused solely on reading academic papers but "was not finding what the company was looking for" (P2, 2017, industry). As such, their supervisor directed them to explore other

competing organizations' websites and "their methods, case studies, career postings and so on" (P2, 2017, industry). The use of non-academic resources, however, was not enough for later stages in research. One participant expressed that "research at the government is not as deep as in an academic institution" (P7, 2018, government) because they only had access to non-academic sources such as encyclopedias and government publications (e.g., Statistics Canada), which did not explain their user study results in depth. As a result, they "felt like my data was not significant and meaningful to the project."

Some participants felt loss of autonomy in the research and design process ($n = 6$). First, in industry and government, projects were client and authority driven (vs. student driven), and some participants did not react well to this loss of autonomy ($n = 2$). One participant found that "conducting usability testing on the government forms was boring and repetitive" and it was not possible to evaluate other government products and services (e.g., websites) (P2, 2020, government) as their UX team's research agenda was set by the team's partners. Another participant said, "I think it would be tough for me to lose the freedom of being able to choose what I study" (P10, 2019, industry). Second, there was loss of autonomy in participant recruitment. In school, participants recruited their study participants in many ways (e.g., social media, undergraduate research pool), but this freedom was not possible for those who interned at the government. Some faced strict internal policies that did not allow researchers to recruit real participants and had to resort to recruiting people from different departments ($n = 4$).

Third, some participants struggled to adopt an organization's particular design framework into their work ($n = 11$). For instance, one organization encouraged all student interns to adopt its own research framework, which introduced a set of guidelines and particular activities for every research stage, from project idea initiation to prototyping and user interviews and data analysis. Using this framework was essential to communicate with designers, developers, and offering managers involved in the project. Participants found this use of framework "almost like a religion I was forced to believe in as it depended on my job to do so" (P1, 2019, industry) and made the creative process of research like "a recipe book" (P4, 2020, industry).

4.1.2 Developing Core UX Skills (Theme 2). This theme highlights participants' development of core UX technical and people skills. All participants experienced something new: new colleagues, new research and design methods and tools, and new research area. This exposure to new experiences pushed them out of their comfort zone to develop core UX skills. Their learning occurred gradually: (1) participants received training on basic UX principles and learned about the organization (e.g., products, internal structure); (2) participants shadowed and observed their mentors "in action" and witnessed real usability testing sessions; (3) then participants took on small-scale projects (e.g., redesigning an organization's page); and (4) they later assumed greater responsibilities that required their participation at each stage in the UX process (Figure 2; this figure has been reproduced from P7's internship report (2018, government) and the researchers added the first three steps, i.e., Defining research questions, Conducting background research, Identifying user needs and pain points).

While working on projects, some participants applied their classroom knowledge and prior work experience to further refine the skills ($n = 25$). One participant said, "Although I had taken a usability testing course and have conducted testing for my thesis work at University A, I still learned many new techniques and methods to improve my experimental testing skills. For example, in addition to following a script, it is also a good idea to have a second person to take notes during a test session" (P2, 2017, industry). By the end of internships, participants developed hard skills that fell into five categories: research, design, research software and tools, collaboration tools, and programming languages (Table 3).

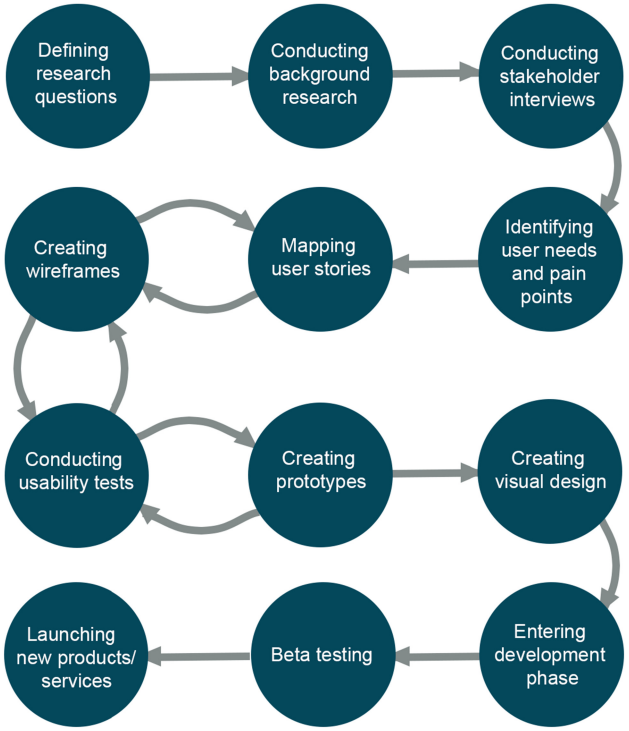

Fig. 2. UX research and design process.

Table 3. A List of Core UX Technical and People Skills Learned by Participants

Category	Description of Core UX Skills
Research	Personas, Journey Map, Gap Analysis, User Interviews, Focus Group, Usability Testing, Prototype Testing, Heuristic Evaluation/Expert Review, Competitor Analysis, Survey, Card Sorting, Affinity Diagram, Thinking Aloud Testing, Field Study, Qualitative and Quantitative Data Analysis, Task Analysis, Metrics Analysis, Affinity Diagramming, Eye Movement Tracking, Facial Expression Analysis, Accessibility Evaluation
Design	Protypes, Wireframes, Sketches, Storyboards, User Scenarios
Research Software and Tools	R Studio, Muse EEG headband, Tobii eye tracker, Figma, Balsamiq, Adobe Photoshop/Illustrator/XD, InVision, Sketch, OmniGraffle, Chrome Web Developer Tools, Optimal Workshop, UserTesting.com, Snagit, Fireshot, Qualtrics, Mikogo
Collaboration Tools	Slack, Airtable, Mural, Atlassian Jira, MindJet, MindManager, Trello, Zingtree, Miro, Wrike, Azure DevOps Services, Zoom
Programming Language & Platforms	Python, Java Script, HTML, C#, Visual Studio, Microsoft's Mixed Reality Toolkit, Angular, MATLAB, Oculus Quest

Participants also acquired core people skills. First, they developed empathy toward their users and understood what it means to create *user-centered* products and services ($n = 8$). One student was improving the government services for vulnerable populations (e.g., First Nation people) and they came to realize how a poor UX design that fails to take into account these groups' unique situation makes government services inaccessible: "It is essential to recognize the difference between edge-cases, which are incidental or the result of unpredictable factors[,] and those that are the result of systemic barriers caused by poor UX design or failure to adequately address the needs of particular client groups" (P6, 2019, government). Another participant who was designing a website interface for antivirus software called Deep Security learned that an interface should be friendly to all users of varying knowledge on antivirus: "I started out with a belief that the users were strictly security experts who monitored Deep Security all the time on big screens. Halfway through my placement, I learned that they were not all highly technical users (although the vast majority seem to be technical)" (P2, 2018, industry).

Second, participants improved teamwork and communication skills ($n = 16$). In industry and government, a project is not just an interaction between a thesis supervisor and a student. Instead, a project requires joint efforts from UX and non-UX teams; these two people skills were especially important if participants were embedded in an organizational culture that did not fully value user-centered design and research. Participant 4's internship project exemplifies how other participants constantly negotiated and communicated with stakeholders to finish a project. This participant was redesigning an online tool for a real estate website. This project involved multiple teams: Product Management, Member Support, Training, Marketing, Legal, IT, and Quality Assurance.

Their redesign journey consisted of (1) participating in numerous meetings with Product Managers and Member Support teams "to discuss in detail the issues with the site and to share mockups and discuss further improvements to be made to the design" (P4, 2019, industry); (2) presenting proposed website design to all teams to address their concerns, including "how complicated it would be to implement changes on the back-end and whether the wording was suitable from a legal perspective" (P4, 2019, industry); (3) discussing with the Communications team about translating words appearing in prototype into French; and (4) sending the final prototype to the Quality Assurance team for testing before the final launch of the redesigned website. Many participants realized that design and research meant different things to different departments and they had to communicate strategically and clearly with all stakeholders at each stage of the project ($n = 8$).

Third, participants learned about important personal qualities to be successful in the workplace ($n = 5$), that is, being active. One participant felt bad about bothering their host supervisors and remained passive in asking for guidance (further discussion limited feedback in our discussion of internship challenges). Three participants defined that being active meant that participants had to bother their host supervisors for immediate feedback, actively communicate their ideas and offer solutions to obstacles, and undertake new work activities without any direct order (e.g., becoming a team's ambassador to promote their team's tools).

After internships, participants continuously applied these skills learned on their graduate thesis/dissertation and other research projects ($n = 8$). One student said, "I believe these new tools that were taught to me should help guide me through finding a problem and deciding how to address the problem in a user-centred way for my thesis. Going through the iteration process and learning the mentality and language of Design Thinking can help me iterate through my prototypes and come to refinement" (P1, 2019, industry). Similarly, another student said, "I got inspired by the ethnographic notes the [organization] researcher presented in his report to perform a type of ethnography in my study" (P7, 2018, government).

4.1.3 Gaining Career Confidence and Exploring Career Interests (Theme 3). This theme highlights the impact of internships on participants' future career direction and confidence ($n = 7$). Internships helped some participants realize their hidden passion for a given position ($n = 2$): "Before coming to University A, I had no direct intention of becoming involved in the aviation industry. I am happy to say that this internship has helped me realize that this is an industry I am passionate and excited about" (P1, 2018, government). Internships increased their confidence they can become a UX practitioner ($n = 2$): "In addition to the skills, this experience gave me confidence that I can do this work. Even though I did many school projects during my studies, I was never sure how relevant they would be in a 'real world.' Working on [organization] and seeing it being launched gave me that confidence" (P9, 2020, industry).

Internships also eliminated career options ($n = 3$). One student who interned as a UX designer said, "I'm not sure I would like to focus as much as I did in my academic career designing screens. I think I would prefer to be more involved in planning and conducting the evaluation and analysis components of a project" (P2, 2017, industry). Another student became certain they wanted to pursue academia: "I am unsure if I am willing to dedicate a large part of my life to serving most companies' main goal—that is, making money" (P10, 2019, industry).

4.2 RQ2: What Are the Challenges Experienced by HCI Graduate Students During Internships?

4.2.1 Internship Program Challenge (Theme 1). Within this theme, participants noted their missed internship opportunities as one major drawback of CLUE. Some participants missed internship opportunities because available internship opportunities at the time of application were not as attractive as those offered in previous years ($n = 2$). Another participant missed internship opportunities because only a certain number of students in the program can be placed to government internship positions: "Had I known that the clue's program already met its quota for government placements, I would have applied to more industry positions" (P10, 2019, industry).

CLUE is funded by a national research council program, but this set-up did not influence the availability of government internship opportunities. They initially did not allow any government placements since the funding is meant to support industry placements. It was the program director and faculty who made government placements possible given the ready application of UX and HCI skills and knowledge to solve usability challenges in the government.

The training program had a full control of matters relevant to industry and government partners, including searching and deciding which partners can serve as host organizations. Hence, the availability of internship opportunities came from external factors related to program industry and government partners, and the program could not foresee these external factors and let students know about any potential changes. For instance, in some years, some positions were not available because partners did not have meaningful projects for student interns or they did not have an employee who could mentor a student. Some partners also closed their businesses and could not offer the same internship opportunities in the following years.

4.2.2 Host Organization Challenge (Theme 2). There were three recurring challenges related to the host organizations. First, some participants were not happy with mentors' mentorship ($n = 8$). Typically, mentors were involved in almost all the ongoing projects. As a result, participants received little attention and they did not receive immediate feedback on their work. One participant expressed, "For the first half of my internship, I was afraid of reaching out to mentor when I wanted more tasks and mentorship because I knew that she was busy and I did not want to go bother her. In turn, mentor forgot about me which she openly admitted during our final conversation" (P10, 2019, industry). However, limited supervision deterred their project progression; P10

was "disappointed by the amount of work that I completed during internship. I think that I would have accomplished a lot more if less time was dedicated to literature review part." For them, it was a combination of delayed security check (another challenge discussed next) and limited supervision that led to incomplete data analysis by the end of their internship.

Relatedly, two participants had their supervisors changed in the middle of their internships due to the organization's restructure changes. As a result, one switched to another organization and another was assigned to a new supervisor from the same organization. Supervisor changes enhanced the feeling of anxiety and prevented participants from being truly immersed with their projects.

Second, some participants mentioned the need for a better onboarding process ($n = 10$). Some participants had to go through an intense screening process (i.e., security check) ($n = 2$), and this process "took over a month to get an email address and an access card" (P1, 2018, government). Another student was "not permitted to work in the main office area with everyone else and worked in unoccupied room alone and spent the first month solely dedicated to conducting literature review" (P10, 2019, industry). For other participants ($n = 8$), better onboarding meant helping them understand business language and the organization's products and services and complex internal structures. They initially struggled with "industry speak and difficult to follow conversations. Colleagues at times used acronyms that were unfamiliar to me" (P14, 2018, industry).

Lastly, there were challenges related to internship projects ($n = 7$), and these challenges all centered on students not being assigned to work on a proper UX project. For one student, they were initially assigned to administrative tasks (e.g., translating English to French, booking meeting rooms). While the issues were resolved through student-initiated or program-initiated conversation with mentors, the disappointment was apparent: "The way the internship was presented to me was that the student would be working on developing a project and was in a way the lead of that project… . [T]he only time I felt I was in the lead of a project was when I got to design the internal process flow for [the SIN internal process] project, besides that I never really felt like I was in the lead" (P7, 2018, government).

Relatedly, another participant was disappointed by the discrepancy between what they had been promised to do in the beginning and what they actually ended up working on: "I worked on other projects that were not as centred on UX/UX design as I hoped initially" (P3, 2017, industry) and described "more of an exercise for industrial design." This failure to meet the promise happened as their host organization could not secure the contract from their clients by the time students had joined the team.

4.2.3 Remote Internship Challenge (Theme 3). As a result of COVID-19 and the subsequent mandatory lockdowns of the host organizations, several participants completed their internships remotely ($n = 5$) and hybrid ($n = 3$). One major challenge was related to technology, and participants and their teams eventually figured out solutions ($n = 3$). For instance, one participant's UX team initially struggled to remotely conduct usability testing, but "we decided it was best if participants would share their screens and talk through as much as they could for the sessions" (P2, 2020, government). Another participant who was developing new VR data visualization faced a challenge of getting feedback because their team did not have a VR headset: "I had the equipment necessary, but my peers also needed the Oculus Quest to test the prototypes and provide better feedback." To mitigate this, their "[organization] purchased a second Oculus Quest that was sent to [a client representative] so that I could have input from an end-user perspective" (P1, 2020, industry).

Surprisingly, most participants reported their remote internship to be positive for two reasons ($n = 4$): (1) the host organization has had a long history of remote working before COVID-19 and had "already had a Work From Home friendly culture and the transition was an easy process"

(P4, 2020, industry), and (2) the host organization maintained a sense of togetherness through using Slack and Zoom. Participants appreciated their team's effort to communicate and provide emotional support: "Daily, we communicated through slack and email and weekly through a video meeting .... Having constant communication with my team helped me better adjust to working remote" (P2, 2020, government).

5 DISCUSSION

5.1 Central Contributions to the Discipline

This study examined the benefits and the challenges of UX internships experienced by HCI graduate students of diverse computing and related disciplines. All study participants matured professionally by the end of the internship: they had a better sense of the workplace culture and developed core UX skills, and this growth in turn was associated with clarification of what they wanted in a future career. For most themes, there were no differences between students who completed internships in industry and government (i.e., all codes appeared consistently through both student groups). However, we saw a higher number of students who completed UX internships in industry (vs. government) under the theme "Gaining career confidence and exploring career options" (i.e., six students vs. one student). This finding could reflect that the nature of the work environment and typical projects involved in industry are more likely to nudge students to gain career confidence and explore career options than those involved in government. However, we want to be cautious in drawing such conclusion; the absence of participant expression in written reflections does not indicate that participants did not experience a given phenomenon [8].

Our contribution lies in providing a foundational guideline to HCI educators, graduate students, and host organizations on what they can expect in UX internships and how they can best prepare for them. Our study confirms and expands on prior research that has examined the impact of experiential learning in HCI/UX education, mainly service learning [46, 61] and work placement [34, 87]. While prior work has shown UX service learning is associated with empathy building in students, our work suggests UX work placement can equally help students develop a user-centric mindset. In UX practitioners, having a right mindset (e.g., being able to empathize and willingness to listen to other inputs, being open-minded) matters more than possessing various UX techniques [35, 80]. While both UX service learning and work placement can help students adopt the right mindset, would they foster the same depth of empathy? A student can have either a deep or surface level of empathy toward users, and it is a deep level of empathy that leads to active and sincere engagement with end-users [45].

Service-learning projects are more socially driven than UX projects taking place in industry. For instance, students involved in service-learning projects work with a hospital to design serious games for patients suffering from Parkinson disease [54]. In contrast, students work in industry are involved in client projects focused on generating profits for their business, which was the case for some study participants. Future research should examine whether service learning and work placement lead to different levels of empathy, as well as whether one type of experiential learning helps students to maintain their empathy toward users longer over another type.

From our results, we get a glimpse of the status of UX in industry and government. Some study participants were embedded in an organizational culture that did not fully value user-centered design and research. This pushed them to communicate strategically to get different stakeholders on board with a proposed user-centered design. This line of finding was also found in Gray [34] and Kashfi et al. [48], and it reflects the struggles over legitimizing UX as a unique discipline in both academia and industry. In some organizations, UX is just a buzzword and UX practitioners need to justify the need and importance of UX to the developers and clients [24, 55].

Students in UX internships may be placed in a situation where they need to constantly advocate for UX, leading to their eventual job dissatisfaction [55]. This highlights the need for adequate supervisor support as students navigate through a non-UX-friendly culture; supervisors should collaborate with students to establish a UX-endorsed culture in an organization. Gray et al. [36] described how the adoption of UX methods flows from individual to group, group to group, individual to individual, and group to individual. From the influence of an individual or a group, a person may come to use UX methods and even come to endorse the methods. While influencing non-UX team members to personally endorse UX methods might be challenging, supervisors and students can aim to have non-UX teams to see the value in using the methods. They can consider actions such as holding a monthly UX workshop where employees collaborate to address small-scale usability issues, showcasing the type of deliverables a UX team makes, or inviting guest speakers who are prominent figures in the field of UX.

Relatedly, supervisor support is crucial to help students make a smooth transition from academia to industry. Both our study and Gray [34] found that students learned about the workplace culture from UX internships. We expand on Gray's [34] results by adding several nuances: students learned about how corporate culture emphasized transparency, how they need to consider non-academic information sources, and how they need to adopt an organization's design framework even if they did not personally support it. Getting used to a new corporate environment was associated with frustrations in both our study and Gray's [34]. The experience of high internship frustrations can put students into a reality shock [12] and discourage them from entering the industry [91]. Supervisors should adopt appropriate mentoring strategies so that students can discuss various issues, including how to handle transitional challenges.

While supervisors can provide students with immense instrumental and emotional support, they can also become a source of internship dissatisfaction. A few study participants were not happy with their internship mentors because these mentors were involved in multiple projects. Could the program's set-up of paying for students' internship salary in place of industry and government partners have lowered some mentors' motivation to provide adequate mentoring? That is certainly a possibility; industry and government partners could have felt less pressure from a manager to make use of students' talents.

Against this possibility, we remain confident that most program industry and government partners provided good mentorship. In CLUE, there was a program coordinator who conducted a mid-placement interview. The coordinator met with each mentor and student independently at the mid-point of internships and discussed any concerns, and then all parties discussed as a group to resolve concerns. In these interviews, most students expressed satisfaction with their mentors. This interview has resolved mentoring issues for some of the students whose negative mentoring experiences we included in this study.

One goal of higher education is to help students to get a job upon graduation [49], and both service learning and work placement are the most direct way to achieve this goal. After completing UX service learning and work placement, students become more marketable [61, 87] and develop a designerly identity [34, 46]. The current study identified five main categories of technical skills (Table 3) and all of them neatly map onto the competencies desired in a UX designer [10], bolstering the argument of how immersive experiential learning (e.g., an internship) helps HCI students be prepared for the job market. Our study adds nuances by indicating that students also develop a general (vs. designerly) professional identity in which they realize which path they want to pursue (academia vs. industry). Our anecdotal evidence indicates that students improved their employability by being able to create a UX portfolio based on their UX internship projects. A few of these students maintained a good professional relationship with their internship mentors and these mentors wrote reference letters.

Learning did not stop after UX internships. Some students continuously applied the skills that they had learned from internships to complete their graduate thesis. This line of finding suggests, combined with prior research [15, 50, 83], the symbiotic relationship between classes and internships: students apply classroom knowledge to practice and develop skills during internships, and their applied knowledge is further refined back in classes. In prior work, the students in the program showed strong publication records [29]. Most students were first author and they published research on usability in collaboration with their thesis supervisors and industry partners. This piece of evidence offers additional support to how classes and internships reinforce each other's learning effect on students.

In addition to successfully replicating past studies, our study contextualizes these benefits to UX. This knowledge contextualization gives confidence to HCI educators on what they can expect as learning outcomes after graduate students complete UX internships, what kind of contents they can incorporate into UX training programs to prepare graduate students before UX internships, and what they can tell host organizations on how to best prepare mentoring HCI graduate students. HCI educators can incorporate the current study's identified technical and people skills in their courses. While HCI students have been increasingly asking for more UX training, universities have not adequately satisfied this demand [30], largely due to the lack of knowledge on what constitutes UX education and learning outcomes [26]. Our study is one of the few studies that contributes to filling in this knowledge gap.

5.2 Implications for Future UX Internship Programs

Internship benefits came with a set of challenges, and these challenges are a stepping stone toward creating a meaningful UX internship experience for the students, the host university, and the host organization. Getto et al. [27] noted the absence of courses dedicated to UX. When courses exist, they are offered as part of broader topics (e.g., New Media Writing) or offered as a "special topic" course; students in a special topic course are not offered any follow-up advanced UX courses. Given this observation, more and more full-fledged degree programs and relevant courses in UX are being created. For instance, Gray et al. [37] designed a 4-year undergraduate major in UX design. In this program, students learn four major UX competencies—technical programming, visual, user-centered design, and communication and psychology—and they participate in a cross-cohort industry-sponsored project.

When offering UX courses is not feasible due to internal or external constraints, HCI educators can consult our training program and recommendations so that they can still offer a meaningful UX education in an alternative form. Based on our findings, we now propose recommendations to each stakeholder (Figure 3).

5.2.1 Recommendation for Students.

- *Research the host organization prior to internships:* Study business terms and the host organization. An early start can reduce the anxieties that accompany the first weeks of internships and facilitate networking with the team.
- *Understand internships will not be perfect:* There will be frustrating events, be it delayed security checks, limited supervision, or bureaucracy. Learn to manage these unexpected and frustrating events in a healthy and professional manner (vs. bottling up emotions).
- *Take ownership of learning:* Do not be afraid to ask a lot of "what" and "why" questions to mentors and the team. Set learning goals and be active to achieve those goals by the end of the internship.

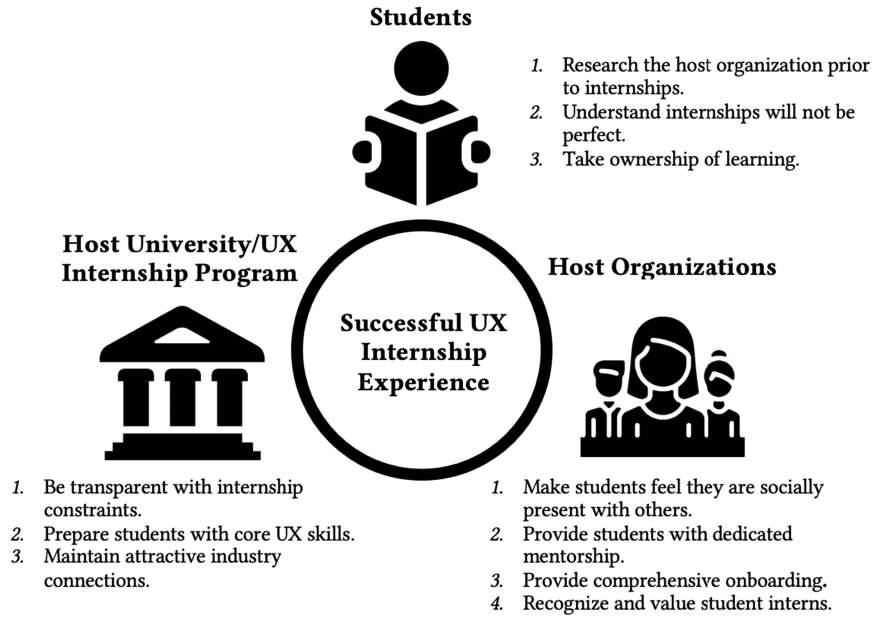

Fig. 3. Recommendations for successful student UX internship experience.

5.2.2 *Recommendation for Host Organizations.*

- *Make students feel they are socially present with others:* Our findings show that constant communication was the key to successful internships, especially amid COVID-19. Use widely available conferencing tools to make students valued team members.
- *Provide students with dedicated mentorship:* Assign students to a mentor who has strong mentoring capabilities. A mentor is someone who can give student interns psychosocial (i.e., making a student feel competent and offering friendship) and vocational support (i.e., giving guidance on how to complete a particular task) [57].
- *Provide comprehensive onboarding*: A few participants mentioned they were anxious and scared when they joined the team. To reduce their anxieties, prepare an information guide that outlines important information about the organization. Be frank in describing what the students can expect in a professional working environment so that students are not surprised when they face the organizational culture, which is different from school.
- *Recognize and value student interns:* Plan ahead of time the project students will work on and have a back-up project that is as equally attractive as the initial project if the initial project does not progress as expected. Provide students with all essential software and tools that they need to complete the project remotely.

5.2.3 *Recommendation for Host University and Internship Program.*

- *Be transparent with internship constraints:* Let students know important constraints affecting their internship placement (e.g., the number of students who can be placed in the government).
- *Prepare students with core UX skills:* We identified core UX skills practiced by leading UX practitioners. Incorporate this information into their classes to prepare students for

internships. This preparation is important as many organizations expect students to join the workplace with an established set of skills [41].

- *Maintain attractive industry connections:* Initiate and maintain partnerships with as many organizations as possible to create an attractive pool of placement options. To initiate the partnership, attend UX-focused conferences, visit local organizations to give presentations for potential academia-industry partnership, and contact "bridge people" who have been involved in academia and industry to facilitate networking with industry partners [42].

5.3 Study Limitations

Our study is not without its limitations. First, we examined students' internship reports that have been collected from 2017, and our findings, especially the core UX skills students developed, might not reflect the current practice of UX practitioners. Second, there is the potential of self-report bias presented in students' internship reports. For instance, students had an expectation that the program personnel will read their reports, and such expectation could have motivated some students to minimize internship challenges due to fear of punishment. Similarly, a few students could have shown their internship reports to their mentors, leading to under- or over-reporting of certain behaviors and thoughts. Data triangulation is the ideal way to control for self-report bias in which researchers draw from multiple sources of data [89].

In our case, we can offer an additional source of data to enhance the validity of some of our findings. Girouard and Kang [29] examined how program industry and government partners evaluated the students whom they mentored on five people skills using a 5-point Likert scale, specifically teamwork, independence, professionalism, dependability, and self-reflectional capacity after each internship.

In this study, the partners rated the students positively on all skills. They may have over-positively evaluated program students because they were concerned about how their honest review could negatively impact students' progress in CLUE. Prior work minimized this possibility by communicating to partners that their honest review of students would not influence students in any way. Moreover, partners understood that students in CLUE did not receive a grade, regardless of their performance, and their graduation progress from a home degree program was not influenced by their CLUE participation.

This line of findings confirms our current finding on the impact of internships on developing core UX skills in two ways (Theme 2 for RQ1): it directly confirms that internships improved the students' teamwork skill and it confirms the validity of our higher-level theme of the overall positive impact of internships on improving students' UX skills.

Girouard and Kang [29] also found that program industry and government partners expressed the desire to receive better guidance on how to mentor student interns, implying the presence of challenges related to mentoring the students [29]. This line of findings converges with the study participants' perspective on the host organization challenges specific to mentorship (Theme 2 for RQ2).

In light of our partial data triangulation, there is a clear need to collect additional data to validate other findings in the current study. We strongly recommend future work to adopt more comprehensive data triangulation, for instance, by conducting semi-structured interviews with the program faculty and partners and asking about their perspectives on the benefits of internships for them and perceived challenges of internships experienced by the students. We did not do so in the current study to provide focused and nuanced understanding of students' UX internship experience, a research area that is nascent.

Each program stakeholder holds different expectations when they enter an internship program. Employers expect incoming interning students to bring enthusiasm and a fresh approach and to

be adequately prepared for the placement. They want to be connected with other people within the university [84]. Faculty wants clear guidance on how to advise interning students and they want to be recognized for their time and effort in tenure reviews [90].

Beyond establishing partial data triangulation, we took several measures to increase the accuracy of students' internship reports, thereby strengthening the validity of our results as a whole. As described previously, we asked students six questions that have been neutralized and freed of evaluative loadings by using certain word choices (e.g., "suggestions," "describe"). The non-grading component of the reports further ensured that students can openly share their perspectives without worrying about incurring negative consequences.

In addition, we asked students to submit their reports after 2 weeks of completing their internships; this deadline combined with a learning journal facilitated students' accurate recollection and reporting of their internship experiences. Overall, our findings confirm prior research that has also investigated the effect of internships on students of different disciplines [6, 21, 68, 74, 81, 94], and this replication of results gives us additional confidence that our results are real and robust [86]. In future practice, we recommend the internship program to adopt both direct and indirect routes to minimize self-report bias, including asking students to submit internship reports anonymously and neutralizing the questions asked on the reports. We also recommend the internship program to reassure students that disclosing honest feedback in internship reports will not jeopardize their professional relationship with their mentors.

Third, our participants were embedded in the usability training program that had other experiential components (e.g., seminars, workshops), and participants participated in these components before starting and while completing internships. Hence, our themes uncovering internship benefits could reflect the combined effect of all experiential components (vs. isolated effect of internship).

Fourth, we acknowledge the limitation that comes with adopting an inductive approach to thematic analysis, which relies highly on the interpretations of the researcher(s). While we adopted the recommended practice to increase the credibility and reliability of our data analysis (i.e., developing a systematic codebook), our developed codes and themes are situated in both of our unique backgrounds, including our academic discipline.

Another related matter to data analysis is to what extent can we treat our data as a single entity—do internship reports from different years reflect different student experiences? Given the rapid advancement of technology, it is assumed that the UX field should change along with it. Yet available evidence indicates that the fundamental design and research principles have remained constant over the years. For instance, the top 10 UX activities rated as important by UX practitioners have remained the same for 8 activities across 2013 and 2019 [20, 79].

This observation is also reflected in CLUE's UX internship job postings submitted by industry and government partners; these postings listed the same UX responsibilities from 2017 to 2020. The unchanged nature in the fundamental design and research principles is understandable given that the most endorsed definition of UX, which can significantly influence what UX practitioners do, has remained the same across 2008 and 2013 [59, 60].

Looking at our data analysis, we assigned all codes to each year's internship report at a similar intensity (e.g., the code "developing technical skills" appears heavily across 3 years; the code "learning about the difference in conducting research" appears heavily across all years). This distribution of codes at a similar intensity suggests that the study participants' UX internship experiences were similar, and we remain confident in the appropriateness of our data analytical approach.

5.4 Implications for the Future

Our study opens up several interesting areas for future work. First, what would our findings mean for students who complete UX internships in different countries? The basic structure of internships is the same across many countries (e.g., China, United Kingdom, Australia, India): a student is placed in a professional work environment in a chosen field [2, 76, 92, 93]. However, our results may not be generalized across different countries for two reasons: (1) each country differs in how they define UX [73] and (2) each country differs in what they think are important UX/HCI topics that should be taught to students [14]. This difference in what are valued UX/HCI topics, coupled with unique cultural norms that guide interpersonal behaviors, can translate into different sets of learning outcomes and challenges for students who complete UX internships in other countries. For instance, we found that some students realized the importance of being active in approaching mentors. In East Asian cultures, being submissive (vs. active) is viewed favorably, as it shows one's willingness to favor and listen to a group's interest over one's interests [40]

Second, what would be creative methods to measure students' progress along the four learning stages defined in the experiential learning theory? In CLUE, many of the program elements were designed to guide students through each of the four learning stages. Yet our results do not inform whether students went through all four learning stages. There are many variations within internships. Some employers may not support students to engage in reflection on abstract concepts or active experimentation or even understand the assumptions of the theory. Students may also not apply their academic knowledge into UX practice (i.e., the abstraction stage), as they struggle to cope with the transition [34]. One major criticism of the experiential learning theory is the lack of empirical methods to measure students' progress through each learning stage [5, 53, 62].

With the experiential learning theory serving as the theoretical foundation for many HCI educators' experiential learning techniques, it would be important to investigate validated methods to measure student progress through four learning stages. In addition, it would be important to understand if students who go through the learning stages versus those who do not during UX internships experience different learning outcomes and challenges.

6 CONCLUSION

In HCI, one important academic goal is preparing graduate students to be ready for the workforce [1]. Internship is the most immersive form of experiential learning that can help HCI educators to achieve the goal. It situates learners directly in the reality that they study, and students grow professionally and academically. While many HCI graduate students pursue careers in UX, the field's knowledge on how UX internships impact its graduate students and what challenges these internships present has been limited. Our study addresses this knowledge gap. There are many interesting future works, including how individual differences of the student and the mentor interact to shape the internship experience (e.g., Are introverted students more likely to struggle with limited supervision? Do students learn better when they receive mentors of the same gender?) and what constitutes a successful UX internship program from the perspectives of the student, the host university, and the host organization. We invite researchers to advance our understanding on the relationship between experiential learning and HCI and UX education.

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