

## Panel Article

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# Innovative UX Methods for Information Access Based on Interdisciplinary Approaches: Practical Lessons from Academia and Industry

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## 1 Introduction

Professionals in the field of User Interface (UI) Design or User Experience (UX) Design are in high demand worldwide because digital technologies have been deeply integrated into people's work and their daily lives (Pattabiraman, 2019; BLOC, 2015). Because of the interdisciplinary nature of UI/UX design, professional training at different levels is being offered at both academic and industry settings. In the context of information science, researchers stated that “many information and library schools introduced more UI/UX coursework into their curriculum” (MacDonald & Rozaklis, 2017, p. 268). At the tutorial workshop during the ASIS&T 82<sup>nd</sup> Annual Meeting (2019) in Melbourne,

Australia, the chair of the workshop assembled a panel of UI/UX instructors from both academic institutions and industry to discuss the theme “Innovative UI/UX methods for information access based on interdisciplinary approaches.” Particularly, the objectives were (1) to provide guidance, concepts, and terminologies for UI/UX curriculum redesign for an Information-Science School (iSchool); (2) to generate some directions, areas, or topics to help UI/UX instructors enhance the effectiveness of their teaching; (3) to address the interdisciplinary nature of UI/UX design and prepare the workforce to meet the market demand.

The panel consisted of Laura Ruel, Ryan Tyler, Qian Xu, Javed Mostafa, and Fei Yu. Fei also chaired the workshop and coordinated panel discussion. In addition, Hong Cui, Stan Karanasios, Anna Keilbach, and Ba Xuan Nguyen joined both workshop activities and discussions as participants. This article is a narrative of what the panelists and participants discussed at the interactive tutorial workshop.

## 2 User Interface/User Experience Design Education

### 2.1 Who Do You Teach?

#### Laura Ruel

I teach *MEJO 581.1 User Experience Design and Usability* at the Hussman School of Journalism and Media. This is a basic and broad overview class. It is very experiential and students learn by doing. The class started in 2004, and I have had students not only from my school but also from other schools including the School of Information and Library Science.

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**Ryan Tyler**

For the past 3 years, I have had the opportunity to lead our internship program. Each summer for about 11 weeks, we hire between 60 and 80 interns and teach them how to apply human-centered design techniques, frameworks, and best practices into the projects on which they work. These students range in age from high school students to undergraduate or graduate students. These participants usually have limited experience in UI or UX, but they are interested in bringing innovative ideas to the healthcare market. We are always trying to open the field to students from diverse backgrounds, especially making efforts to recruit more female and minority designers and engineers into the profession. Connecting with individuals like themselves in a profession they are passionate about is important for each group of interns because when they perceive such role models, their success becomes inevitable.

**Qian Xu**

I have been teaching in the Interactive Media Master program at Elon University since 2010. So far, we have graduated 290 students in the past 9 years. UI/UX-related knowledge and skill are mainly covered in one of the four required courses and their capstone projects. More than half of the current students are females. This program is currently the most diverse student population on the Elon campus. Their undergraduate majors are very diverse, such as journalism, communication, graphic design, English, biology, psychology, computer science, and many more. Most of them are fresh graduates or young professionals with no more than 3 years of working experience that are not directly related to UI/UX. Some students join this program as a continuation of their education, while others consider it as an opportunity for a career transition.

**Fei Yu**

I have been teaching *INLS718 User Interface Design* at the UNC School of Information and Library Science (SILS) for 2 years. The student population has been a mix of different academic levels and disciplines. Most of my students are from SILS. I also have quite a few students from the Carolina Health Informatics Program and the School of Education. Most of them are interested in a career in UI/UX design. To better understand students' backgrounds, UI/UX interests, previous design experience and skills, and career goals, I conduct a student survey to collect data at the beginning of each semester. The survey data help me to identify students' needs and tweak my teaching methods and contents.

**2.2 How Do You Teach?****Laura Ruel**

I used a lot of eye-tracking research, relevant to students' usability work. I talked about it very early in the semester. The basic components of the class include (1) "Weekly UI" challenge – students' chance to be inventive and creative by working on their UI design skills week after week. Students are encouraged to think about user needs and sketch ideas before they use Adobe XD or Illustrator for prototyping; (2) First assignment – students work in small groups to compile a usability report following Krug's instruction (Krug, 2010) for a "real-world" local television site; (3) Second assignment – students put together an audience analysis and create personas through interviewing and observing stakeholders; (4) Third assignment – students go through ideation, asset organization, card sorting, flowcharting, and create user journeys, wireframes, and panels in Adobe XD; (5) Final project – students' choice of a project, which repeats (2)–(4) by applying the knowledge and insight gained throughout the semester. In addition, students will work with *UserTesting.com* to evaluate their design. Students' final project is an excellent portfolio piece to demonstrate the UX process.

**Ryan Tyler**

Early in my career, I created online training courses which taught me a valuable lesson in taking complex information and breaking it down to what is most important for an end-user. Our internship curriculum currently focuses on three main parts: (1) Understanding the different parts of healthcare, the complexities of healthcare, and the opportunities for change that exist within the current state; (2) how lean and agile methodologies contribute to the best practices in delivering new experiences in working code; (3) the final focus is on human-centered design principles, best practices, and pragmatic frameworks that focus on product definition and ideation. We tend to update our curriculum yearly based on the feedback received from our managers and students. We use the Net Promoter Score (NPS) (Reichheld, 2003) to measure the success and likelihood that an intern will recommend the program to a fellow student. We utilize a common prompt, "I like, I wish, What if?" (Interaction Design Foundation, 2019) to receive and understand the constructive feedback that can help us to adapt the curriculum.

One unique aspect of our internship is that we connect our students with local subject matter experts from a variety of different disciplines. We call these groups "guilds" (Kaplan, 2019), which include technology engineers & developers, product & experience designers, agile

practitioners, data scientists, and clinicians and physicians. Our goal is to surround our students with industry-leading experts who can provide insight and answer questions as they develop and deliver their products.

### **Qian Xu**

Given the variations in students' backgrounds and career goals, I have been focusing on introducing the general knowledge related to UI/UX design in *IME 660 Interactive Media Strategies*. There are four modules in this course: introduction to user-centered design (UCD), understanding users, knowing the interface, and testing the interface.

To discuss key theories and concepts, I pulled contents from different disciplines, such as sociology, anthropology, psychology, information science, communication studies, and graphic design. I try to incorporate more hands-on activities and assignments that are closely related to the introduced theories and concepts. For example, in the module of understanding users, we looked at the theories related to cognitive processing, motivation, and emotion, and how demographics influence the uses of digital interfaces. Students are asked to conduct user research and create personas for a self-chosen interface. In the module discussing the functional features and content strategies for interfaces, students learned the theories of captology, affordance, information architecture, interactivity, and human-computer interaction. They are asked to complete a card-sorting exercise and an interface redesign project for a touchscreen kiosk by going through the process of creating sketches, wireframes, and mock-ups. The last module for *IME 660* is about testing the interface, which discusses various approaches to usability testing and user analytics. The accompanying activities include user activity data analysis and a usability test project for an interface of their own choice. This module-based teaching with hands-on activities and projects seems to work very well for a diverse student population who do not have pre-existing knowledge of UI/UX. However, I must admit that, due to limited class time, we can only provide an entry-level overview for many of the topics associated with UI/UX. We did update our course content every 3 years to keep up with the emergence of new technologies and UI/UX design trends. In addition to academic articles for reading, I started to include industry reports, white papers, and even well-written blogs to writing assignments, which worked well.

In the other course, *IME 695 Interactive Media Capstone*, each student is required to complete an original individual project for an interactive topic of their own choice. In addition to the final full-functioning product, I ask them to include deliverables in five areas that also align with the UCD process. At the project proposal stage,

students conduct background research and competitor analysis. Based on the user research, they generate personas. To develop a content strategy, they complete two or more deliverables related to information and function design, such as content inventory, sitemap, user journey, and task flow. The choice of the items to complete matches the nature of their respective projects. For visual and interaction design, they need to create all the items of wireframes, style guides, mock-ups, and interactive prototypes. In addition, interface testing is required to be done for mock-ups, interactive prototypes, and final product. The capstone project has received positive feedback from students because it provides several work samples to be included in their portfolios for jobs.

### **Javed Mostafa**

Information searching is heavily studied in iSchools and information field. The UI/UX research and practices have been influenced by searching, interpreting, exploring/browsing, and learning from information. Particularly, people conduct exploratory searches that purposely start with a broad scope to identify comprehensively coverage of a topic, to establish both major and minor themes, or to discover new clues and insights. One of the recent UI design research and practices at the University of North Carolina at Chapel Hill is PATTIE (Laboratory of Applied Informatics Research, 2019). PATTIE is an exploratory and spatial-semantic information retrieval system for digital archives in which search results were displayed through visualized clusters of topical information. Since spatial distances equal semantic distances in PATTIE, the visualization can instantly reveal the research landscape of a topic of interest (Ortiz, Kim, Wang, Seki, & Mostafa, 2019).

Regarding the UI/UX curriculum for an iSchool, it needs to achieve a good balance between theory and practice. Most importantly, we will teach design principles from a search interaction viewpoint, and design exercises based on low and high-fidelity prototyping using PowerPoint and Adobe XD. In addition, the curriculum needs to teach students to specify design problems and conduct design evaluation exercises using existing search interfaces and resources. For example, there are some online databases with good APIs to test UI/UX designs including NCBI Entrez and Medlineplus Connect for biomedical record retrieval.

### **Fei Yu**

*INLS718 User Interface Design* is designed to prepare students to participate in the design of information system interfaces. The major topics include universal design principles (Lidwell, Holden, Butler, & Elam, 2010), user research methods, user tasks, conceptual and mental

models, information architecture, prototyping, and methods for interface evaluation. Through my interactions with UI/UX designers in the industry, I realized that user research is crucial for a successful product. Therefore, I teach students user research methods and process, which helps them discover and identify the most important problem to solve. After user data are collected through user research, students also learn how to translate the data into actionable insights through qualitative and quantitative analysis. The deliverables of the data analysis include persona and task analysis assignments (e.g., hierarchical task analysis, scenarios, and use cases). For prototyping, students are required to adopt at least three different prototyping tools for three mini-design projects in addition to a semester-long class project. When they present their design prototypes, they need to share their experience of each adopted prototyping tool as well, which turns out to be a great peer-learning opportunity. For evaluation, since SILS already has a dedicated course *INLS719 Usability testing*, my class only introduces general evaluation framework and discounted usability testing methods from our textbooks (Sharps, Rogers, & Preece, 2015; Krug, 2014) like heuristic evaluation and cognitive walkthrough. In addition to the textbook chapters, students are required to read three assigned research papers weekly and discuss them during the class. I received positive feedback on the research paper discussion because some students were interested in reporting and disseminating their class projects in a formal way so that they can share with the public through a publication.

### 2.3 How Successfully Do You Prepare Students for UI/UX Career?

#### Laura Ruel

Over all the years, I have built relationships with local news organizations. They contacted me with requests for UI/UX design. Particularly, our students' work directly benefits those organizations that do not have the financial means for usability research and design. In addition, when students go to these organizations to present their design process, they receive real-world feedback. I would also like to emphasize the work of Indy Young in terms of dealing with not making personas stereotypes. I prepare my students with observation and interview skills in addition to design skills, which are all important for their career.

#### Ryan Tyler

I believe our training is important because it teaches students the importance of using new processes and

methods that enable them to solve complex problems better. We teach them different frameworks from across a variety of disciplines (including UX/UI) because it helps them to identify the value of what they deliver to end-users, in addition to the business they are serving. As they begin to understand the application of these frameworks, they will be better qualified to create new solutions and new ways to deliver technology within the healthcare market, and that in and of itself can become a game changer.

#### Qian Xu

There is always a question about whether we should prepare students to be generalists or specialists. I have been telling my students to position themselves in a T-shaped model when they are on the market. They need to choose one primary area that they have obtained deep knowledge from our program as their expertise. At the same time, they should be capable of knowing and doing a variety of related skills and learn to collaborate with other stakeholders. Depending on the specific industry that they enter, UX/UI may be the focus of their jobs or the knowledge and skills that complement their primary job duties. We do notice that UI/UX-related job placements have been increasing in recent years. More and more alumni also told us that the language of UI/UX has been adopted by their daily duties and showed appreciation for the assignments and projects completed in the UX/UI courses. Every semester, I have several alumni working in the field of UX/UI back to campus as guest speakers.

#### Fei Yu

Since most of my students have very strong career goals in terms of desiring more knowledge about UI/UX practice in the industry and internship opportunities, I have developed and maintained collaborations with a few working professionals in the industry through Carolina alumni networks. So far, I have invited five guest speakers from Nielsen Norman Group, Optum/UnitedHealth, Bank of America, Facebook, and Netflix to routinely join my classes either physically or remotely. Their industry experience and perspectives have been greatly appreciated by my students. In addition, every semester, I bring my students to the usability lab at the SAS Institute for a field trip. The students not only interact with the onsite UI/UX designers and developers directly but also participate in a usability testing for a working prototype of a SAS application. Most importantly, several graduate students applied for the internship or even full-time UX positions that they learned through guest speakers or the field trip.

## 2.4 Challenges in UI/UX Education

### Qian Xu

There are several challenges for the teaching of UI/UX in my program. First, how deep should I go for the subject matters covered by the classes? Given the limited time of our program, the practical goal is to provide students with an overview of this field and a taste of different activities and responsibilities commonly carried out by UI/UX designers. In more recent years, we do see students showing greater interests in UI/UX field. However, it is hard for us to find the room in the current curriculum to offer UI/UX design at an advanced level. In addition, the industry keeps evolving. The new topics, tools, and paradigms require instructors to stay up to date with what is going on in the industry. My own educational background is media psychology and media effects. When I started teaching UI/UX 9 years ago, this field was not even well known. Therefore, I had to learn a lot of things on-the-go. Our alumni and advisory board members are very helpful, but we would also like to be more connected with folks and experts in the industry to stay up to date.

### Ryan Tyler

I believe understanding research methodologies, creating informed information architecture, designing beautiful aesthetics and usability-proven workflows are all important components of a user's experience. If we are not considering all the parts of the journey, we might miss the root of our users' challenges, thereby creating solutions for the wrong moment in time. Therefore, UX education will shift to concentrate our collective efforts on better informing students of the full end-to-end consumer experience and design.

## 3 Workshop Questions and Discussion

### 3.1 Questions about the Textbooks for UI/UX Instruction

**Laura Ruel:** I use Steve Krug's (2014), *Don't make me think*. This book offers easy and practical steps that students can follow to conduct usability testing.

**Ryan Tyler:** I would like to recommend *101 Design Methods* (Kumar, 2013) and *Sprint: how to solve big problems and test new ideas in just five days* (Knapp, 2016).

**Javed Mostafa:** I would like to recommend two books, *Designing interfaces: Patterns for effective interaction design* (Tidwell, 2010) and *Search user interfaces* (Hearst, 2009), which combine design principles, practices, and implementation.

**Fei Yu:** I have been using three books in my class instruction: *Interaction design: Beyond human-computer interaction* (Sharps et al., 2015), *Universal principles of design* (Lidwel et al., 2010), and *Don't make me think* (Krug, 2014).

### 3.2 Discussion on the Entry-level vs. Advanced-level UI/UX Curriculums

**Hong Cui:** I felt that I learned quite a bit through the workshop. I feel quite encouraged that cutting-edge design principles are taught in entry-level courses. I like all the practical exercises students get to do in such a class. I wonder if courses could be structured in levels – entry to advanced courses, what different subject matters could be included in an upper level or more advanced UI/UX design course.

**Stan Karanasios:** The UI/UX education generally focuses on graduate students at the Master level.

**Fei Yu:** Although I do get a couple of senior undergraduate students each semester, *INLS718* is a graduate-level course. It not only introduces the basics in the field of UI/UX design but also discusses theories, design models, principles, frameworks, and methods. Students are expected to apply their prior knowledge gained in System Analysis (INLS582 or 382) to the learning and participation in this course. In addition, it is a prerequisite for INLS818, Seminar in Human-Computer Interaction. This course helps students with a combination of academic levels and backgrounds to acquire the essential knowledge and skills for UI design and to prepare some of them to move on to a higher-level HCI course.

### 3.3 Discussion on How to Make an ISchool UI/UX Course Unique? What Are the Most Important Theories or Contents for an ISchool UI/UX Curriculum?

**Hong Cui:** For a major event that happened in Tuscon, we collected event-related documents and information for archiving purposes. However, we could have taken the opportunity to make the event known to the world.

Therefore, in an iSchool, we shall develop a trendy project through the UI/UX design to show the direct impact and generate more publicity.

**Stan Karanasios:** Activity theory could be a very important theoretical framework for UI/UX design education as it increasingly being used to study information management and systems (Allen, Karanasios, & Slavova, 2011; Karanasios, 2018). I have spent quite amount of time undertaking research with activity theory and teaching it. For the growth of UX, it would be nice to have UX track of conferences or UX publications in *JASIST*, which will show community and students that this is the legitimate research field and a subdiscipline, which will drive the UX education to the next level.

**Ba Xuan Nguyen:** I would prefer using case studies in learning at an iSchool, and I think this method is good for the UI/UX curriculum. By comparing design examples of high and low-quality from the real world, students will understand that categorizing the content can help people to easily find what they want, especially in the context of information overload in our living world nowadays. This activity gives students some early experience apart from their internships in the information science field.

## 4 Conclusion

The discussion among panel speakers and workshop participants revealed many shared practices and experiences in UI/UX instruction across the academic disciplines and the industry. The common ground includes “project-led problem-based learning” model (Hanney & Savin-Baden, 2013), user research methods and deliverables, prototyping skills and tools, instructors developing relationships with organizations for projects and industry practices, collaborations between students and stakeholders for real-world UX experience (Lazar, 2011), and helping students to build a strong work portfolio for career transition or advancement (MacDonald & Rozaklis, 2017). The identified common ground confirmed the effectiveness of existing practices in teaching UCD and UI/UX related concepts. Nevertheless, new ideas, areas, and directions regarding UI/UX education in an iSchool also emerged from the workshop presentations and discussions, such as incorporating eye tracking into usability research, teaching design principles from a search-interaction angle, emphasizing activity theory as an important theoretical framework, and demonstrating the impact of the UI/UX education through an iSchool-specific project. Further, to promote UI/UX design in

information science, the workshop generated a couple of actionable items, including a special issue on UI/UX design in an iSchool-associated journal, or a UI/UX special interest group (SIG) in future professional conferences (e.g., ASIS&T Annual Meeting or iConference). The goal is to build a pipeline inside information science to nurture this new and important field so that it can grow to the next level.

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