

Keeping the HF/UX Curriculum Current with the Critical Decision Method

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Abstract Vicious problems are problems that reinvent themselves. One vicious problem is how to educate the next generation of usability (UX) professionals. I borrowed a method from naturalistic decision-making research: the critical decision method (CDM). A CDM is an ethnographic approach that elicits the implicit knowledge of experts in their area of expertise. The methodology reveals the decision points, options, and outcomes with which a decision maker struggles. The decision points derive key attributes, meanings, and goals for the area of concern. UX businesses have a vicious problem similar to education: whom to hire for a UX position, who is qualified and who is not? I used the critical decision method to elicit required skills within the local UX market. These contributed to a reworking of the UX curriculum. The methodology and the results are discussed.

Keywords Curriculum • Usability • UCD • UX • Education • UX skills

1 Introduction

Each academic year educators face the task of updating the usability curriculum. One of the key challenges of this task is how to keep pace with the ever-changing skill set required for an emerging usability professional. As the discipline matures, new skills are required. Those businesses who hire for the emerging trends early can, and do profit substantially. UXers trained in these emerging skills also benefit by being eligible for the best opportunities. Thus, it benefits educators to adopt the latest industry trends if their students plan to enter industry upon graduation.

Discovering these trends is difficult. Online magazines tout the latest practices, yet if one is not currently practicing UX, it can be difficult to understand how these

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practices intertwine. Academic guidance in UX education has conflicting advice concerning the topics that need to be covered, the latest methodologies, and the best practices.

Cognitive Engineering researchers have created methodologies to address similar data collection challenges in naturalistic decision-making problems. Naturalistic decision making methods have provided insight into how professionals make decisions in the real world. In these studies, researchers collect information on the cues, goals, decision points, options, attributes, and meanings—which vary from profession to profession. Klein and colleagues [1] have refined a methodology originally created by Flanagan [2] to discover this information in a qualitative manner.

1.1 Critical Decision Method

Flanagan first described the critical incident technique (CIT) in 1954 [2]. He used the technique for a requirements analysis in which the purpose and the outcome of the task was well-defined. One of Flanagan's original studies elicited requirements for an instrument panel design. In Flanagan's original work, he suggests eliciting examples of extreme incidents as the ideal because it is more salient.

Klein's naturalistic decision making theory [3] relies on an adaptation of the critical incident technique and is named the critical decision method. The critical decision method (CDM) is used to explore how people use experience to make decisions in their field [4, 5]. Orasanu and Connolly cite eight factors which characterize a setting for a CDM. They state that these factors are ill-structured problems, uncertain dynamic environments, shifting or competing goals, action/feedback loops, time stress, high stakes, multiple players and organizational goals/norms [6]. A CDM is ideal for situations with incomplete and imperfect information such as hiring a new employee. According to Klein the CDM elicits information about the large corpus of patterns an expert acquires over her or his years of practice within the profession. The patterns help the expert to understand which cues are important and which are not [4].

Hiring an UXer for the real working world fits the definition of an ill structured, shifting, and dynamic task. Often, a good employee is nearly invisible as their behavior fits seamlessly into the organization. A bad employee is very visible because their every behavior and decision noticeably grates. While creating good employees is the goal of every educational institution, it is equally important to avoid creating bad employees. While this paper cannot guarantee a formula for either, it can recommend tools for use in improving the curriculum and aligning it to the local UX needs. These tools were used to discover the UX needs within a specific locale in the Silicon Prairie. A similar effort conducted somewhere else may produce different results.

2 Methods

First, I contacted professionals in UX within my local area, and explained the curriculum quality improvement project. I asked if I could take notes during our conversation and share what they told, to help determine what to teach UX students. One UX professional recognized the procedure immediately. However, understanding the purpose, this person did not mind. The results discussed are gathered from conversations with more than 25 women and men, all with five or more years' experience in UX practice and experience in assessing the employability of new UXers.

2.1 Questions

In general, I asked employers these loosely structured questions. The questions were designed to elicit stories.

- Tell me about your best/worst intern
- What was her or his' best/worst performance
- When you interview, what has been the best/worst interview
- In your opinion, what is the best/worst UX educational institution
- What has been your overall experience with new UX employees

Then, after the discussion, I reviewed my notes and constructed themes. As the themes emerged, I identified categories of skills and rated them according to the emphasis with which I had experienced them in the discussions. This is a slight departure from the CDM methodology [7]. This analysis method was necessary to address the question; which skills need to be included in a UX curriculum [8]?

3 Results

3.1 Overview

Often, in usability studies, users will say something like, "this app works just like Google Maps." Throughout the discussions with employers no one said, "make your program like University State's program, it's the best." This suggested that there is no universally admired program and that there is room for curriculum improvement.

All of the discussions with employers centered on the roles of UX Researcher or Interaction Designer. When asked if these roles also created icons or "the look" for the application, most employers stated that they either had a graphic artist on staff for design decisions or they had user interface designers separate from interaction designers.

Several employers stated that some skills were poorly understood by academics. They would rather train that skill than try to un-train it. I recorded this response primarily for user testing. No one made this comment in connection to wire-framing, card sorts, or heuristic analysis.

I also looked for textbook suggestions or web resources but found no consensus. In both cases, I found a mix of answers. Some practitioners had been educated on the West Coast and favored Jakob Nielsen/Don Norman style fundamentals. Others had been educated on the East Coast and favored Jared Spool style fundamentals. Furthermore, others had a non-UX related background and worked their way into UX through graphic design or advertising. I was also surprised to find that while I considered UX to be a part of Human Factors, it was clear that many others did not; they considered UX to be a different profession entirely.

Prior to undertaking this project, I anticipated that I would get a list of software that the students needed to know and specific methodologies in which they should demonstrate proficiency (i.e. Heuristic Analysis). In some instances, specifics like this emerged, but overall the emphasis was on soft skills rather than hard skills. One person stated, “Software changes all the time. This week we are using OmniGraffle, but next week there could be something new. Students should be adaptable and be able to learn software fast.” Someone else stated, “As long as they know one prototyping program, one team communication program, and one visual design program, we can go from there. It is the initial effort in learning these types of programs that counts.” Another person stated, “We screen for the hard skills and hire on the soft skills.” In this context, soft skills are considered to be behaviors.

3.2 *Soft Skills*

From this perspective, it became clear that the curriculum overall needs to focus on soft skill development. Soft skills can take many months or years to master. The soft skills that the employers mentioned centered around four themes: process, development, interpersonal relations, and leadership.

Process. In terms of process, students need to be able to deconstruct something into its essential parts. They need to understand that it is great to have a prototyping program on your computer, but sometimes paper and pencil is a better set of tools because it breaks down barriers between the UX person and the client. The client can just as easily draw what she or he has in mind. This was also reflected in the discussion of design thinking. Adjacent to this theme is the understanding of determining the key problem and determining how to test it.

Development. In terms of development, agencies were using Lean. They stressed that all class projects should follow that model. Yet large corporations were using Waterfall and stressed documentation. Students need to be able to present and document carefully and thoroughly. Even in the Lean environments, the need for documentation has shifted to cell phone pictures and white board drawings but it has not gone away entirely.

As a UX professional, students need to demonstrate empathy toward both the stakeholders and the developers. Students need to be able to adjust their message to many different audiences, identify executables—when it is time to stop and test, or when can the testing wait. In contrast, how much testing, and how to do the testing, did not seem as important. Overall, employers stressed networking, collaboration, collegiality, working with the strengths and weaknesses of others, and learning new software rapidly.

Interpersonal Relations. Employers want students who can understand and deal with constraints or dependencies instead of complain or try to change them. Employers want them to understand what it is like to think like a programmer and be able to adapt to different development approaches such as Lean. The strongest point that employers stressed in this area covered how to negotiate and how to deal with pushback within an organizational structure.

Leadership. Several employers stressed that students lacked soft skills when it came to interacting with users. Students need to understand how to work with a wide range of people, most of whom are unlike themselves. They need to “respect the locals” and remember the acronym “LRQ- listen, respect, and question.”

Employers stressed that a student’s skill with stakeholders was almost as critical as their skill with colleagues. Many students failed to understand a business model or the idea of a paying client. Students have become accustomed to lenient professors who fail to teach time management. Employers noted that students did not know when to lead development and when to follow development forward. This statement included how to get people to do stuff during meetings and during user testing, as well as what are appropriate behaviors and conversations in a workplace.

The themes related to leadership and perceptiveness were mixed—some employers stated that these were very important while others did not mention perceptiveness at all. Some employers stated that students must be able to read a situation during user testing or during an interview to determine when it is beginning to sour. Students should understand how to back away and how to rescue or prevent a bad encounter. Overall, the organization and the product’s reputations are vulnerable during user testing. Testing protocols therefore could not be rigorous enough.

In addition, employers addressed the need for students to see the deep meaning when reviewing the results after testing. Students often miss how the design relates to the primary goal of the application and to the client’s business objectives. The students need to understand the application from the stakeholders’ perspective. They need to understand what impact their design choices would have on each group of stakeholders. They also need to be able to tailor a design to fit the requirements of different user groups. They need to be able to lead development through processes that would help the developers to solidify design and understand the user.

3.3 *Hard Skills*

Software. In terms of software, employers stated that students should know a wire-framing or prototyping tool, a testing tool, and a team or communication platform to manage projects. They stated that these tools are currently in a state of flux. Some teams preferred one set of tools, but then the tools change, or the organization is unable to afford the high cost of a particular tool. Then, the UXers must all learn a different tool. However, employers stressed that all of the software within a particular category (i.e. wire-framing), operate in the same way. If a student understands one, it is easier for them to transfer to another tool within the category.

Hardware. Students should know how to use at least two platforms within the iOS, Windows, Android frameworks. Within the platforms, students should be familiar with the scalability between devices (i.e. mobile to desktop and the reverse). They should also understand how a single application or website changes between platforms. Their designs should be both scalable and platform agnostic.

UX Methods. Amongst all of the discussions, employers agreed that all students should have a toolkit of a few basic methods. These are:

- Prototyping
- Wire-framing
- Sketching
- Heuristic analysis
- Card sorts
- User testing

Agencies and small organizations stressed that students should have a design process. Students should know about patterns, how to plan a project, storyboarding, and how to annotate wireframes. In addition, employers sought students who could perform both High and Low fidelity testing, A/B testing, and conduct think aloud protocols during field-testing. Discussions with employers who worked for large corporations centered on personas, scenarios, and extensive ethnography. Yet those who worked in agencies or smaller firms stated that they often did not have the time or budget for extensive ethnographic work.

Other. Some employers wanted students who could develop surveys, conduct an interview, and lead a focus group. This theme was not universal across all employers. In contrast, the theme of being able to write a clear and concise report was universal. Nearly all employers mentioned a student's ability to present the same data in different ways to different groups of stakeholders or developers.

Personal Attributes. Students who enter UX should love technology and not be afraid of it. The student should be a good listener, a collegial team player, and have a good rapport with the public. Universally, the employers wanted students who were likeable and who had a positive presence when they entered a room.

Surprises. Over all of the discussions, the word "theory" was not mentioned at all. In fact, theory is what employers complained about most. They said that interns often come to work "with their heads loaded with statistical analyses and

experimental methods” and “with no idea how to apply it to the real world.” Above all, employers emphasized that students need to know how to do real projects with real development teams. Students need to be able to get the critical answers out of the development team and users quickly and simply. Students need to be able to identify problems, find the correct methodology to address the problem, and then understand the solution within the data.

Topics that never came up in the discussions were:

- affordances and constraints
- automation and situation awareness
- accessibility testing
- cognitive theory
- social psychology theory
- sensation/perception theory

Other surprising things that employers said were that each sector of UX required additional skill sets that other sectors did not. For example, in medical UX, the person must be able to watch an IV line as inserted into a patient by a nurse, and the person should be able to work with the large personalities in the medical sector. For accessibility UX, the person must be able to view accessibility modifications as a normal part of the development process. Employers who shared this information also shared that these attributes could not be faked; they could easily spot students who did not have skills in these areas.

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