Modern Methods of UCD: Research & Introspection

CS-E4900 - User-Centered Methods for Product and Service Design

24th September 2023

1 Introduction

This essay aims to give a reflective overview of the on-field techniques used to gather insights for implementation of user-centered design (UCD). Firstly, the need for UCD is established through argumentative reasoning. Then, the distinctions in UCD and the significance of ISO 9241-210 is discussed. The next part of the essay focuses on the practices of gathering data for UCD where usual strategies for on-field work are explored. Summing the strategies in the 'Triangulation' methods follows this. Finally, emerging ethical concerns on where to limit UCD are touched upon using the case of social media applications.

2 Why User-Centered Design (UCD)?

UCD has emerged as a fundamental approach in contemporary design practices. As humans have been covering strides in technological advancements to solve complex challenges, the need for recognizing the user themselves during this process has also been established. Firstly, UCD places the user at the forefront of the design process, acknowledging that the ultimate success of any product or system hinges upon its ability to meet user needs and expectations (ISO, 2019). By emphasizing empathy and understanding of the end user, UCD ensures that designs are not just functional but also intuitive, engaging, and efficient to interact with (ISO, 2019). Many a times, this seamlessness is taken for granted, for example, for using ChatGPT, hardly anyone had to undertake a training or familiarization course just because of the intuitive design techniques (Skjuve, Asbjørn Følstad, & Petter Bae Brandtzæg, 2023). Secondly, UCD fosters innovation through a holistic exploration of user experience, encouraging designers to think beyond the surficial tangible elements and delve into the underlying motivations, behaviors, and emotions of users. This depth of insight enables the creation of solutions that are not only responsive to current needs but also anticipatory of future requirements, reaping social and economic benefits for multiple stakeholders – users, employers, and suppliers (ISO, 2019). Moreover, UCD contributes to increased user satisfaction and loyalty, thereby enhancing a product's market competitiveness and reducing costly post-launch revisions. An appropriate example to analyze here is of how Apple has emerged as a leading brand in establishing its identity on offering the best technology experience to its users (Dreamer, 2023).

In essence, UCD is a strategic approach that aligns best with bringing out economic, social, and operational efficiencies while reducing failure risks. An appropriate summation of the concept is formulated in the ISO (2019): "The human-centered approach can lead to increased human-centered quality (usability, accessibility, user experience, avoidance of harm from use)."

2.1 User Experience Design vs. Service Design

Two, often-mixed, modules of UCD are: User Experience Design (UXD) and Service Design (SD). As industry has transitioned from designing single use-case products to entire service experiences, so has the design field evolved. The mutual need for the 'human' aspect in UCD is primary in blurring the distinct focuses of UXD and SD.

Roto, Lee, Lai-Chong Law, and Zimmerman (2021) have further backed this up by research on the interesting intersection of the two UCD fields. As part of it, Likert

statement-based survey questionnaire from 197 participants revealed the distinction and overlap of the two fields. The definition of the two lies in the focus of the viewpoint. UXD is perceived as a finely zoomed-in aspect as part of the wholistic zoomed-out SD domain. This finding seconds the overall trend of technological advancement from single use-case products towards entire systems and services designs. Perhaps, a more appropriate positioning of these design fields is appropriately summed up by an SD practitioner participant of the survey by Roto, Lee, Lai-Chong Law, and Zimmerman (2021), who said, "UX design as a term is becoming obsolete, Experience Design includes ux, cx and service in traditional sense of the definitions."

Hence, a sneak peak towards the prospective definitions of these field can quite plausibly converge into Experience Design (EX) where it include every aspect of the software as well as the hardware world. A similar analogical field in practice is in the hospitality and tourism industry. Rightfully so, it is along the same design principles of designing premium experiences for tourists and guests during there stay. A recent trend in the Middle East and Asia is of stop-over trips from a few hours to a few days of totally experiential stays with perfectly attuned activities as part of the immersive experience (Kotsi, Johnston, & Pike, 2023). Hence, we can already observe several industries moving towards experience design as a field of design in products and services.

2.2 Significance of ISO 9241-210 in UCD

In designing experiences, it is imperative to underline the basic tenets that make up the foundations of UCD. A few principles have repeatedly emerged in UCD that have helped formulate the commonalities into an international standard, ISO 9241-210. The standard includes 6 distinct features of UCD and discusses the sustainability view in design (ISO, 2019). The need for this standard was crucial, in my opinion, because of the abstractions and subjectivity in the design field. Hence, to make sure quality is not compromised in the haziness of abstract ideas, creativity, and design freedom, such a standardization effort was imperative. These principles will be highlighted in the essay where appropriate as well.

3 Understanding the Human Connection (Why behind "Why?")

For as long as the known human race exists, communicating has been the primary method of information exchange. A crucial tool in communicating, is through asking questions. EXD, UXD, SD, and UCD are all levels of abstraction upon the basic root idea of communicating needs and issues, according to my point of view.

This concept is analogous to a systems design course I undertook, where we were made to understand levels of abstractions in technology. The figure 1 (Schirrmeister, 2019) below gives an overview of the levels of abstraction we have reached, starting from transistors and capacitors to high-level programs and software that we notice all around us these days.

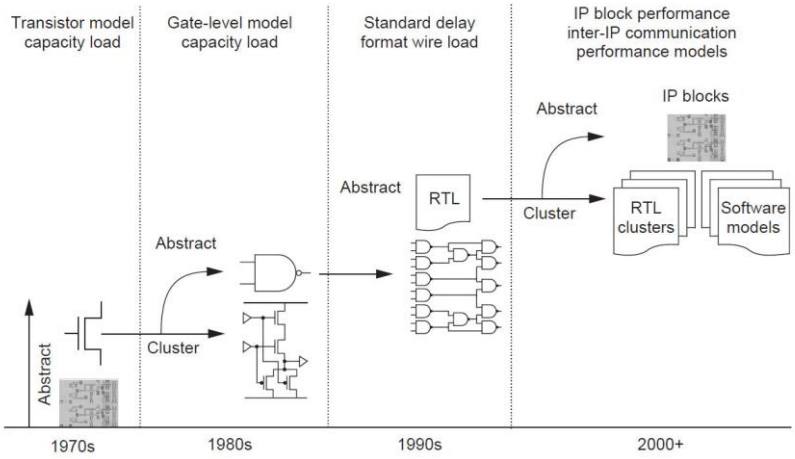

Figure 1: Abstractions in Systems Design (Schirrmeister, 2019) vs. Communication

Similarly, we have reached a higher level of abstraction in communication to reach the concepts of UCD. For ease of comparative understanding, I have also included a self-curated diagram in figure 2 as a plausible abstraction hierarchy of communication that can be compared with the systems design analogy presented above.

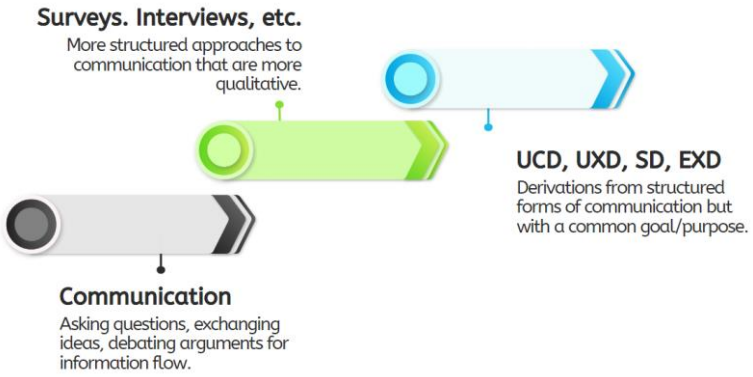

Figure 2: Abstractions in Communication with respect to UCD (Own Reflection)

3.1 Asking the Right Questions

Moving a level deeper into the UCD abstraction, we reach ‘asking questions’. This is the primary element to meaningful engagement for information derivation in UCD, i.e. understanding the user and their needs. However, for better UCD, better questions need to be asked and hence better questionnaires need to be formed. While seemingly, everyone can ask questions, however, derivation of worthwhile data requires careful planning. Considering the flipside, Boynton and Greenhalgh (2004) write, “The great popularity with questionnaires is they provide a “quick fix” for research methodology. No single method has been so abused.”

There are several ways questions can be asked, ranging from closed ended (multiple-choice, true/false, ratings, etc.) to more open-ended (describe, list, etc.) (Boynton & Greenhalgh, 2004). Depending on your research objectives for UCD, the choice may vary case to case.

A particularly relevant technique used in modern day marketing and UXD are the A/B testing methodology. In it a user group is test with two variations of a design to

observe the extent of the desired action and then measure the effectiveness of the designs in question. It is essentially a more visual type of questionnaire.

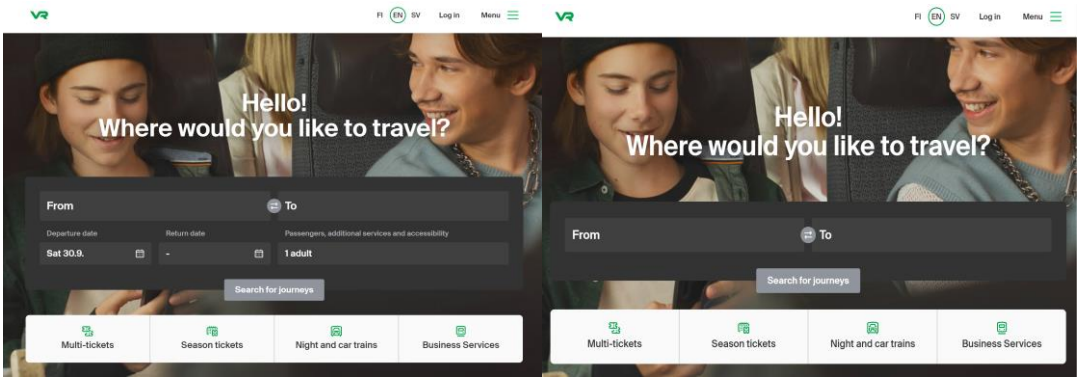

Figure 3: A/B Testing "Questionnaire" by VR (VR, 2023)

A recent example in figure 3 is of my excursion visit to Columbia Road design agency where we were given an overview of how the design process works. In it sometimes the design choices a much more complex than can be put into words and hence other sensory experiences such as visual experiences are induced in tests such as A/B testing to understand effectiveness of human behavior for a certain action. One of the cases shared was of VR trains in Finland which was exploring A/B tests for the layout of the 'Hero' section of their website to measure which was more effective. This again relates to an important aspect of designing the right questionnaire, physical layout of the questionnaire, which researchers rarely spend time on (Boynton & Greenhalgh, 2004).

3.2 Asking in the Right Manner

The structure of asking the questions also need to be highly focused and appropriate for the purpose. For instance, different types of toolkits exist for different types of user insights derivation, e.g. questionnaire based survey (Roto, Lee, Lai-Chong Law, & Zimmerman, 2021), interviews for in depth insights (DiCicco-Bloom & Crabtree, 2006), or other visual activity based derivations (Gaver, Dunne, & Pacenti, 1999).

Additionally, structure of the method employed is also quite relevant. The standardized method involves one-for-all technique where all the participants are given the same questions to prevent any bias. The semi structured and less formal approaches are best derived from the research on qualitative research interview by DiCicco-Bloom and Crabtree (2006).

Semi-structured interviews strike a balance between structure and flexibility, offering a predetermined set of open-ended questions while allowing for spontaneous probing and follow-up inquiries (DiCicco-Bloom & Crabtree, 2006). This approach ensures that key themes are addressed while permitting participants to express their thoughts and experiences in their own words. Semi-structured interviews are particularly useful for exploring complex hypothesis and gaining in-depth insights into participants' perspectives (DiCicco-Bloom & Crabtree, 2006). On the other hand, unstructured interviews are characterized by minimal pre-determined structure or questions (DiCicco-Bloom & Crabtree, 2006). Instead, they provide participants with the freedom to discuss topics of their choosing, preferably in a setting of their choosing as well, such as their workplace. Unstructured interviews are often more exploratory in

nature and are valuable when researchers seek to uncover unexpected insights or when studying topics with limited prior knowledge (DiCicco-Bloom & Crabtree, 2006).

Both semi-structured and unstructured interviews offer the advantage of rich, qualitative data, but they differ in their level of researcher control and participant autonomy, making them suitable for different research objectives and contexts.

However, the highlight of the research by DiCicco-Bloom & Crabtree (2006) remains in the fact that they acknowledged that, “the goal of finding about people and establishing trust is best achieved by reducing the hierarchy between informants and researchers.” In this he highlighted the element of reciprocation in building trust for gaining valuable insights which is seldom achieved in structured one-for-all approach. Again, a con of this approach is the difficulty in scaling the questioning process to several thousands of participants.

In my experience of building an AI-powered chatbot to act as an admissions assistant of Aalto University, I utilized semi-structed interviews. I did these observational interviews to assess the UI of my chatbot project in my bachelors and that I did by open ended experience observations but that limited my capacity to do it in a larger scale. However, the data was highly insightful and full of ideas for betterment that led to an iterative design process for my project which ultimately improved the UI immensely with iterative cycle over 4 months. It is also pertinent to mention that this experience culminated multiple tenets of the ISO (2019), including: basing the design of the chatbot upon explicit understanding of users (prospective students), tasks (simplifying communication and information retrieval), and environments (enabling multi-language globally contextual information related to admissions to Aalto online in a more human manner, i.e., chat); user involvement throughout the development (part of the observational interviews); user-centered evaluations driving designs (interview insights pushing design forward); iterative design sprints (multiple iterations in design led to a good prototype).

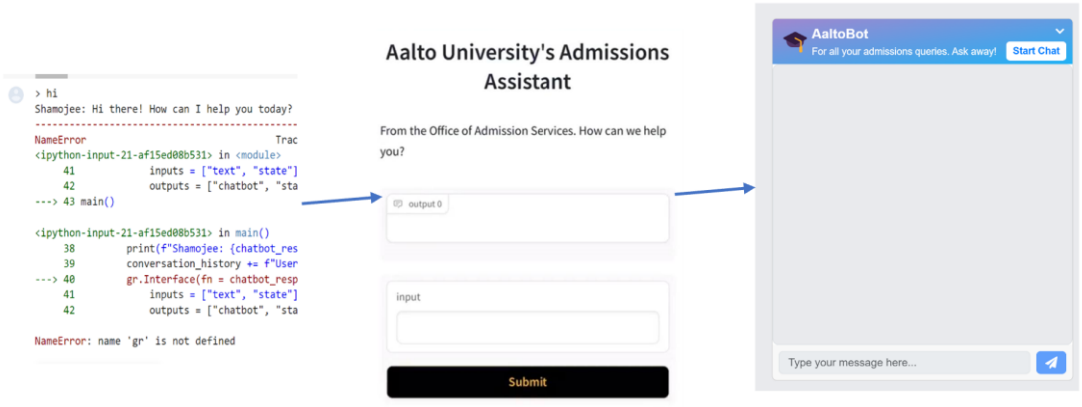

Figure 4: Iterative Design Process of my Chatbot Project Led By Semi-structured Experiential Observational Interviews

Cultural probes, another qualitative research method in design research, have also gained prominence for their innovative and holistic approach to understanding user experiences, values, and cultural contexts. Developed by Gaver, Dunne, and Pacenti (1999), cultural probes involve the distribution of creative and open-ended toolkits to participants, encouraging them to document their daily lives, thoughts, and emotions

through various mediums such as postcards, maps, objects, etc. Cultural probes serve as a bridge between designers and participants, enabling a co-creative process that goes beyond verbal communication. By eliciting personal and reflective responses, cultural probes help uncover hidden needs and desires that may not surface in structured interviews, making them a valuable tool in empathetic design processes that seek to create UCD deeply rooted in the cultural and emotional contexts of the intended users. However, it is also important to realize the limitation mentioned by Gaver, Dunne, and Pacenti (1999), "Although the probes were central to our understanding of the sites, they didn't directly lead to our designs. They were invaluable in making us aware of the detailed texture of the sites, allowing us to shape proposals to fit them."

A recent example of experiencing cultural probes was in the international design business administration course where we had to paint using proprietary techniques by Taidesukellus that brought out our cultural inclinations, desires, and thoughts, in a documented manner while also coming up with a great portrait. Overall, I think the method of using cultural probes for research is certainly highly effective in an activity-based environment with a focus on group if the risk of a herd mentality can be systematically averted.

3.3 Asking the Right Person

The next and final step at this abstractive level of communication for UCD involves asking the right questions, in the right manner, to the appropriate people. This process is akin to identifying the 'target users' in entrepreneurship, however, with qualitative methods at a more in-depth level. "Finding the right man for the right job" is an appropriate proverb that fits this concept.

A method central to identification of the 'right' person is 'rapid ethnography'. In the case study by Millen (2000), where 31 organizations were interviewed with the goal of understanding customers solving real problems using technology, gives us clarity in picturing how interactive interviews lead to casual models leading ultimately to summaries using modeling software given time constraints. One key aspect to note here is, "One of the defining characteristics of ethnographic research is that it is situation in the field" (Millen, 2000).

Casual models in rapid ethnography remind me of mind maps that organize thoughts but, in this case, organize observations in a visual manner. This technique is also something I used in my bachelor's thesis of a chatbot design where to limit the scope of the thesis I first had to recognize the multiple avenues the research could cover, as shown in figure 5. Then, to limit the scope, I decided to set an observational meeting with by advisor where I then identified a casual model on top of a domain-wide map to organize all the thoughts related to chatbots and focus on a few select modules: approaches, characteristics, evaluation metrics, and custom knowledge data with respect to support-bots (Amaan, 2023). Holtzblatt and Beyer (1993) also present the idea of such diagrams like context model, physical model, and flow model to present the gathered data and approach in a more visual format, reducing communication frictions to a great extent.

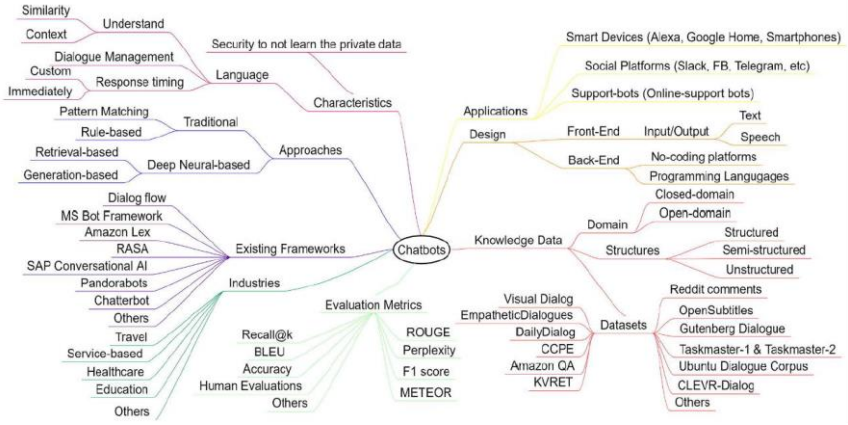

Figure 5: Domain Wide Map of Chatbots (Amaan, 2023)

Once we have executed rapid ethnography to reach some insights, we can move onto persona design. Do note here that for the case of UCD, rapid ethnographic data would be purposefully positioned to extract more ethnographic information about the user. The strong link between ethnography and personas is often understated, however, Pruitt and Grudin (2003) at Microsoft were sure to state, "Ethnographic data is likely the best source for developing realistic Personas when available in sufficient depth. Quantitative data may be necessary in selecting appropriate Personas, but does not replace observation."

Personas are crafted based on research data, including user interviews, observations, and demographic information, and are imbued with attributes, behaviors, and motivations that encapsulate the particular archetype of a real user (Pruitt and Grudin, 2003).

I would relate this concept best to a hypothetical situation we practiced as part of my Design Thinking courses. During discussions, field research, and prototyping, user personas were central to each aspect, kind of like the glue that helped us stay focused. However, coming up with a persona is what we would then take as an audition for an actor. So, we would do the role play of our ideal user and the team members would then note the overarching characteristics. To mitigate bias, we would also then have actual people fitting the personas outside of our team to shape a more prepared UCD.

4 Converging UCD Methods: Triangulation

Now that we have covered the prevalent methods of UCD for the scope of this essay, we will now sum the discussion with the convergence into Triangulation. It can be considered a level of abstraction in between methods (surveys, interviews, etc.) and high-level derivations (UCD, SD, UXD, etc.) as shown in figure 2. This is because 'triangulation' involves multiple methods (as discussed in section 2) to converge onto identification of problem areas of requirements for UCD (Wilson, 2006).

Triangulation techniques are between-methods and in-methods approaches to UCD research, which in other words means involving different methods or different variations of the same method, respectively (Wilson, 2006).

As an example, for my chatbot design project, I invoked both the observer triangulation and the user group triangulation. In the case of A/B tests, VR trains is

invoking the facilitator triangulation method. Whereas, introspecting the research materials for this essay, we notice a wide usage of research method triangulation utilized by Roto, Lee, Lai-Chong Law, and Zimmerman (2021), DiCicco-Bloom and Crabtree (2006), Gaver, Dunne, and Pacenti (1999), Millen (2000), and Pruitt and Grudin (2003) to explore their research questions with a human-centric design approach. I think in most UCD research work, triangulation and methods that entail it will suffice because of an underlying assumption by Wilson (2006), "the assumption behind triangulation is that the core requirements will tend to show up across methods, users, and environments".

In a team setting, the role of better internal UCD communication emerges which is explored in depth by Holtzblatt and Beyer (1993). Holtzblatt and Beyer (1993) present several models to execute this by having the intermediary of modelling languages for diagrammatic models so that the team works on improving a common model rather than pinpoint each other's work (which leads to misunderstandings).

As a computer science and design thinking student, previously, I have used Unified Modelling Language (UML) to shape relationships between classes and objects for designing of complexly related data structures. Hence, I truly understand the value of starting from a visual model to then mapping that to an application or a solution which is also discussed in terms of UI design by Holtzblatt and Beyer (1993).

Hence, a wholistic approach of utilizing triangulation methods in a team setting, better managed by modelling languages, would truly create an environment conducive to UCD meeting the standards set by ISO (2019).

5 Where do we stop? Addiction, Ethics, & More.

Now a days, we are getting so advanced with UCD that we are experiencing un-called-for side effects for these as well.

A recent study by Azizi, Soroush, and Khatony (2019), which involved a group of students in Iran, revealed worrying statistics that correlated social media apps usage addiction with academic performance. The study revealed that students more addicted to social media platforms had a direct negative impact on their academic performance and interestingly male students were far more addicted than females suggesting a gender based pattern as well (Azizi, Soroush, & Khatony, 2019). It is pertinent to note here that the addictive behavior is not a mere coincidence, instead, many social media companies employ psychologists and do focus group testing with the ultimate aim of 'bettering' UX (Schweppe, 2019). The metric they usually use to measure betterment is the usage statistic of their app, however, the more time the user spends on the app, the more ad revenue the platform is able to generate.

Hence, while UCD is evolving into ED, at the same time, grave ethical concerns have also started to emerge in this field. So while the aim of every UCD is to make the product or service more valuable for the user, it simultaneously runs the risk of turning it into an addictive cycle of usage. For the UCD professional, it may seem like success but at a societal level the implications turn far more sinister.

This calls for more policy level decisions as well to curb the tech-addiction with the root cause being excessive ED with a counterintuitive motive. In 2019, the Social

Media Addiction Reduction Technology Act gained traction in the US but was shunned for promoting the 'daddy state' (Schweppe, 2019). However, now we notice the addictive behavior around us to consume a lot of our time.

Nonetheless, in today's times, UCD is essential to every business. With so many benefits that we are reaping due to a more human centric world, we need to further broaden our skillsets to inculcate UCD in our diverse fields. While, simultaneously, also draw a line of moderation to empirically answer the question every UCD professional should ask: "Is it the time to stop?"

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