

Human Computer Interaction (In English)

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Interaction Design Process

Hi everyone, I am Ritwik Bamba and I am your teaching assistant for the course Human Computer Interaction. This is the tutorial on Interaction Design Process. So first we will look at what we have actually covered so far. In the previous tutorials we have covered good design versus bad design and what makes a design good. As you can see on the picture right here, this is actually a power socket that is designed such that multiple appliances can be used without any problems. And then for the next tutorial, we covered inclusivity and accessibility and some of the design principles, which included visibility, feedback, consistency, constraints, as well as affordance.

As you can see in the image here, The inclusive design is actually an intersection of accessibility, inclusivity, as well as usability, and thus improving an overall user experience. So now we just have an overview of what we're going to be covering today. We will be starting with what is interaction design, and what is involved interaction design, important principles around interaction design, what is a user-centered approach, some basic activities of interaction design, and some practical issues based. So what exactly is interaction design? Well, it is simply a multidisciplinary design field that focuses on interaction between users and digital products, systems, or interfaces.

It involves how new users can engage and experience a product with the goal of making the experience better, the interaction intuitive and efficient. It is often abbreviated as IXD. And as you can see what is going on in the picture here as well, what happened on the screen, what happened in front of the screen. An interaction design is actually an intersection of the UI, which is the interface, and the UX, which is the user experience, and hence making up interaction design. What is it then? It involves the behavior and structure of interactive systems and also implementing them that helps designers develop useful digital products.

As you can see in the diagram right here, interaction design is actually a multidisciplinary field which includes user experience design, human computer interaction, sound design, visual design, content, information architecture, architecture in general, industrial design, and human factors. So all these features actually make up interaction design. Now we have some principles about interaction design. They include

perceivability, learnability, error handling, as well as affordability. Now interaction design actually comes as a part of a UX design, as you can see right here as well.

Okay, now we move on to the most important part right here. This is actually how we understand the problem space around the users. The first thing that we do is exploration. What is the current user experience? How they are facing issues right now and evaluating the strengths and weaknesses of the systems currently available. And then we actually focus on why there is a change required.

I mean, you need to identify issues or specific limitations that may exist with the existing experience to justify improvements. And then we will see how this change will actually make a difference, how the proposed changes can enhance user experience and their satisfaction levels. As we move forward, we continue understanding the problem space by defining the problem space. Here we actually take up a very collaborative approach that involves the team to ensure diverse perspectives are included. And multiple viewpoints are also considered to encourage discussion, to uncover different angles, as well as to avoid biases and unsupported decisions, to have a unanimous decision.

Unverified assumptions are avoided. Assumptions that are not based on any data and just simply based on your heuristics, it is actually avoided. And you need to base your problem definition on evidence. Well, now we move on to a user-centered approach. So user-centered approach is built on three major principles, focus on users and tasks, empirical measurement, as well as iterative design.

What these all three actually mean are, the first principle that we include here is early focus on users and tasks, in-depth study of users and their cognitive, behavioral, and physical traits to understand their needs from the beginning. Then we move on to empirical measurement, where we observe, record, and then analyze users' reactions and their performance. with multiple scenarios, manuals, simulations, and prototypes. And then we move forward to iterative design. We continuously test the users, addressing the issues as they arise, and then repeating the tests to continuously improve.

And then this is what we were actually talking about in the picture right here. The four basic activities of the interaction design process are establishing requirements, designing alternatives, prototyping, evaluating. And hence, this approach is repeated iteratively to make a much better design overall and improve the user experience. In identifying needs and establishing requirements, we observe people and what issues they're facing We interview them regarding their problems, and then we also examine some existing solutions of the problem. Developing alternative designs.

Here's where we analyze our solutions. We sort and order our findings that we had achieved in our first phase. We find a user narrative, and then we do a task analysis, breakdown user flow into various subsets. As we come on to the prototyping part, we build interactive versions of the designs. We design the solutions according to design guidelines as well as principles.

And we consider the best techniques to enhance the user interactions. Last, we move on to the evaluation part where we give users an idea of our solution and test it. We take valuable feedback from the users to reiterate. And the process then goes on again to establishing requirements. As more and more feedback is given by the users, the designers reiterate and improve their design.

And then after we find a plausible product, we reach the final product here, which is the end solution of our interactive design process. Now we also have this double diamond of design, which basically includes all of the four basic activities. As we start, we discover the insights about the problems. As we move forward, we define the problem, what exactly challenges are faced by the users, and then we develop solutions and test. And finally, we deliver the product which is finalized and launched.

This is the double diamond design which is widely used for identifying a problem and developing a solution. We'll spend a few more minutes on this. As you see right here, we diverge here about learning about the problem and we include various perspectives to ignore all the biases. And then we converge again to narrow down to one problem and this is where we reach our problem. And then again we diverge to give potential solutions for the problem and once we reach the perfect solution, we again converge to find the perfect solution.

and this is basically our end product or solution. So next, well certain XA researchers follow different paradigms which may include five stages of the interaction design process. More or less, they are the same. It's just a different breakdown of the four activities. These may include a comprehend phase where we gather user insights and then we analyze to uncover various design opportunities.

Then we identify the users, the user personas to help clarify the target audience and guide the design focus. The next stage we move on is ideate. Here we brainstorm a wide range of creative ideas and methods using mind maps, wire framing, and prototyping that helps us explore various solutions. The next we come to is prototype. Here we actually make some simplified versions of the products from wireframes to interactive models.

And those are created to test and to refine the design concepts through an iterative

feedback process with the help of users. Again, we move on to the evaluate part where the prototypes are tested by the users and the data analyzed and the feedback is actually used to again improvise on the solution. The insights from this phase actually guide the improvements that can be done in the future to help improve the user experience. Well, some more researchers have made some more models for the same. The first one by Rogers and Marshall, We start, we can basically start from anywhere in this model and we will end up with a great solution, but mostly it is like we identify a problem, we then brainstorm on the ideas and then we create the potential solutions and then improvise on this using our feedback.

Using this, moving forward, we also have the Google Design Sprints again more or less the same we understand we define the sketch we decide and then we prototype and validate and the process then moves again the process is iterative as more and more feedback gets with the designers they improve the designs and now we have the five in dimensions of the interaction design The first one is the words, the textual information that is provided to the users. The second is the visual representations, the graphical elements, the interfaces like images, fonts, iconographies. The third dimension, we have the physical objects in the space. These are actually the physical products or devices that the users can actually use to interact with the product. The next we have the elements that use up time, which includes videos, animations, or moving graphics.

The fifth is actually the behavior, the user behavior that is needed to help the interaction work and the system's behavior. why we actually study the five dimensions is that it actually helps interaction designers to understand what is actually involved in the interaction design which is the words the visual representations the physical objects the time and the behaviors so now we come to some of the important principles around interaction design these include ux how to match the user experience and expectations. The next is consistent design, how we maintain consistency throughout the application to create more intuition among the users so the users don't stress about using an application. Then we have functionality, which is actually one of the most important principles that we actually follow a functional minimalism. Cognition, as you studied earlier as well, we need to.

.. The next principle we see is cognition. We need to reduce cognitive loads and mental pressures to understand the application for users. We also need to create engagement so that the users don't get bored. We also need to give users control that allows them to trust and explore the application. Then we also have perceivability, how users can invite interactions through their intuitions.

Learnability, how users can make interactions easy to remember and they don't, again,

increase their cognitive load and focus on intuition rather than remembering. Error handling, we need to take care to prevent errors and if they actually occur, we need to detect them and recover them. And the last is affordability. How we can simulate actions from taking inspirations from user.

The last we have is affordability. How we can simulate actions by taking inspiration from user. The last principle we have is affordability. How we can actually simulate actions by taking inspiration from user and physical world interactions. Now we move on to the three major characteristics, which include focusing on the users, specific usability and user experience goals, and then interaction. It is just in a nutshell what we have studied so far. We need to take the opportunity to interview the users and to get their insights and feedback.

Then we need to identify the problems. They should be clearly defined, documented, and updated, which basically helps us in tracking progress and choosing between various alternative designs. And lastly, we have iterations where repeated refinements can improve the user experience. Now we move on to some practical issues and these questions, the following questions must be answered if you are going to be able to do interaction design in practice. Well, we need to know who are the users, what do we mean by the needs and how do you generate alternative designs and then choosing among these alternatives.

Okay, let's start through an example. Imagine that you want to design a product that helps you organize a trip well we have some hints here we can have an idea of how the trip may look like is it a business or a vacation trip and then what needs to be done planning the route booking tickets and various other requirements that may be needed for an app that helps you book a trip now we need to think of different activities and how they fall into different phases. The first is ideation. We check the competitors, how comprehensive or restrictive services can be. For example, the visa requirements. You may need to check for various visa requirements before you can be checking the flight tickets to the same country.

Then we have What type of the tour is it? Is it a budget tour? Is it a backpacking trip? Or is it a luxury tour? You also need to understand the user priority, whether they need to relax, go around, have some fun, or just enjoy the natural beauty. Or it may be something like exploring the cities as well. Now we need to see at the flights and the budget, there may be various things that may need to be considered while designing. Like days of the trip, cuisines and feedbacks. And last but not the least, the use of ML and AI model recommendations can also be incorporated into the same.

And then the design preview. Well, the home screen may look like something like this, which may include the logo, the consent for location, the Moto holiday app, the signup screen, and a basic tutorial for using the app. What different tabs will be given in the home screen? Maybe the search button or the destination where one needs to go. Some photos of the location, some user reviews, some feedback. And what do you need to take there? These may be the tabs in the home screen. Okay, so brushing up on what we have done so far, the four basic activities, discovering requirements, designing alternatives, prototyping, and evaluating.

And what are the three principles of user-centered design, focus on users and tasks, measurements using quantifiable and measurable usability criteria, and then we have iterative design. Now we look at some more examples for the same. So the problem statement that we have here is you want to develop a design that facilitates personal development and productivity improvement. You may be given some hints for the same, the goals, the lifestyle changes one may need and the different pieces. Take a minute, think about it, what you may need in an application that helps facilitate personal development and productivity improvement journeys.

The goals may be to enhance focus, improve time management, boost motivation, and achieve a fair work-life balance. The lifestyle changes may be habit tracking, task management, goal setting, mindful practices, and digital well-being. And the different phases for the same can be setting the goals, tracking progress, overcoming obstacles, and then celebrating the achievements. Now we come to the ideation part. We look at the competitors, we look at the services, we look at user priorities, limitations, recommendations, and finally feedback.

We need to see what the competitors have been doing, how comprehensive or restrictive their services are, we may need to look at the services that may be provided by the application, what kind of issues the users have been facing, what are the user's priorities to improve focus, track their time or achieve better work-life balance, what limitations can be with the existing habits or some mental health concerns or any personal schedules. Finally, we get to the recommendations part where daily routines can be suggested, tasks can be broken down, mindful exercises can be done, and focus techniques can be practiced. Feedback and monitoring is the last part of the same where we regularly track the progress. Adaptive feedback can be given based on the user's performance.

Now we move on to the design preview. The home screen may include the logo, the motto, the sign up and login, and maybe some sponsors to generate some extra income. The following tabs can be included in the home screen. The task management, focus timer, goal tracker, habit builder, mindfulness, and reviews for feedback by the users that

have been using it. And now we move on to a class activity. Choose a simple task, ordering coffee via mobile app, and do the following tasks.

You need to do some user research, you need to define requirements, some basic prototyping, and then test these considerations. Take a few minutes, do these steps, and then we will continue. Okay, now we discuss what may actually be included in the steps. The first is user research. Well, user research includes who are the key users, what are their primary goals, and what are their primary challenges.

Well, the users can be busy professionals or students or just coffee enthusiasts who order coffee on the go. Their goals may be to place an order quickly and easily, customize their drinks, and wait times can be reduced. What challenges they face right now, maybe there may be not enough customization options. There may be issues with the navigations in the app, in the menu. And we need to also ensure that the order is correct without having to spend too much time on it.

Then we move on to defining the requirements. The requirements may be a clear menu with customization options. Users should be able to select their coffee type and make customizations. And then finally, they also need to have an order status tracking screen where the users can be given real-time updates when their order is ready for pickup. We move on to the prototyping portion where We make a basic sketch for the app. The top section may include the location to select the pickup point.

The menu grid may include coffee options, some popular ones. The customization may also be included when the coffee is selected, a pop-up of years to customize the drink. And then the bottom section may include the order summary that leads to a checkout with an estimated pickup time. Lastly, we have the testing considerations. We need to look at how navigation and customization can work. The order completion, how long does it take for the user to complete its order? And is there any step that is unnecessary or includes confusion? And finally, we also need to include some tracking information.

Does the user feel informed about their order status? And do they understand the pickup time and the location details? These are just some of the sources that can be referred if you want to read more on the topics. This was it for the tutorial on interaction design processes. Thank you so much.