Human Computer Interaction (In English)

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Interaction:Lecture 3 Part 2

Hello, everyone. Welcome to the class of Human-Computer Interaction. In the previous lecture, we have studied about interaction. Primarily, we have studied what is design thinking, what is design process, what is the difference between them. We have also discussed a use case of Airbnb and how this design thinking and design process has helped Airbnb to turn just few million dollar company into a giant hundred billion dollar company. So next we are going to study what is interaction design process.

It is a process which focused on discovering requirements Designing the fulfill requirements, producing prototypes and evaluating them. Focus on users and their goals and involve a trade-off to balance conflicting requirements. Because often, user may have different requirement which may be contrasting, which may be basically opposite to each other. In that case, which one to choose? Generate alternatives and choosing between them is a key.

There are four approaches to do so. User centered design, activity centered design, system design and genius design. So let's go and study each about each of them. So a user-centered design process that places the end user at the core of every stage of the design, focusing on meeting their needs, their preferences, their limitation, and the challenges they face. So the goal is to create products that are highly usable, accessible, and aligned with the user's expectations.

and the key principles which are involved, empathy, iteration, involvement. In empathy, as discussed earlier as well, understand the user's needs, goal, and pinpoints. In iteration, it is continuous process. It continuously test, get feedback, refine the product, and in involvement, engage user throughout the design process. So the process involved in user-centered design is the research, design, test, and refine.

In research, you can conduct users' interviews and the surveys. In design, you can create a wireframe and prototypes with the user feedback. You can perform usability tests to gather insights, and you can refine to make adjustments based on the testing. An example is mobile phones were complex with the buttons and interfaces that were not user-friendly. So a user-centered design approach, Apple conducted in-depth user research to develop a touch-based interface that was intuitive, simple, and required

minimal learning.

And the outcome is, we all know, a revolutionary product that set the standard for smartphones, focusing on.. . The outcome is all we know, a revolutionary product that set the standard for the smartphones, focusing on seamless user experience with intuitive gesture. And this has turned Apple, again, such a guy, company.

So in Apple iPhone, the user-centered design elements are simplified interface, intuitive gestures like pinch to zoom, voice assistant like Siri, and easy to set up for new users. And the outcome is a smartphone that is easy to use for a wide range of users, focusing on seamless navigation and accessibility, which has contributed to the device's global popularity. And I believe you recall whenever there is a new iPhone launch, people in many parts of the world probably stand in the queue probably a day or two before itself to become the one of the first recipient of such iPhone. So next is activity. So the activity in the user centered design So write user-centered design elements and the outcome for the following, Airbnb, Dropbox, Amazon Echo, Duolingo, Instagram, and so on, based on the previous example that we discussed.

So the next is activity-centered design. It is a process that focuses on discovering requirements, designing to fulfill requirement, producing prototype and evaluating them, It focused on users and their goals. So it is a design approach that focuses on the task and activities user perform rather than individual users themselves. So the goal is to create an intuitive and efficient solution by understanding the key activities, that user engage in ensuring the designs support these activities seamlessly and the key principles involved focus on activities so prioritize the task user need to accomplish over individual and user preferences efficiency Streamline workflows to make completing activities easy and quick. And the context, consider the context in which activity occur to design more practical solutions.

And the process involved, identify key activities, analyze workflow and design solution. So in identifying key activities, we need to understand the primary task and the actions user will perform. as part of the workflow. So we break down each activity to understand the steps, challenges, and the requirements. And in case of design solutions, create features that directly support and enhance these activities.

Example is Microsoft Word, which focuses on core activities like writing, formatting, and editing documents. The design emphasizes quick access to the tools like font style, which is required in the writing and formatting. Layout option, again required in the same. Editing feature to streamline the writing process. Another example you can think of is Google Doc, where the activity is like collaborating document editing.

The activity-centered design approach is the design focus on making document creation, sharing, editing easy and efficient, prioritizing collaborative activities like real-time editing, comments, and version history. And the outcome would be the users can work on the same document simultaneously with features that enhance collaborative writing, and streamline the editing process. So the activity for you, write activity, activity-centered design approach, and the outcome for the following, Trello, Microsoft Excel, Fitbit, Adobe Photoshop, Express, and so on. Next, let's study system design. It is a process that focus on discovering requirement, designing to fulfill requirements.

System design is the process of defining the architecture, components, modules, interfaces, and data for system to satisfy specific requirements. And the goal is to create structured and scalable solution that meets both technical and the user needs efficiently and the key components involved architecture component and module interfaces and the data management so in architecture it defines the overall structure and the organization of the system how it will look like how the information flow would be and so on what activities actions will be taken Component and modules break down the system into smaller and manageable part because sometimes if you talk about the overall big system It's too huge to handle at the same time. For example, let's take an example of for example Paytm If you come up with the kind of architecture for Paytm, it's too big. It has so many things including payment including Travel booking including insurance booking including movie tickets booking, including fast tag, which was earlier and so on. But you can't solve all at the same time.

You have to break this into smaller components so that you can handle, for example, just payment part at a time. Interfaces, so determine how component interact with each other with users. And data management, so that manages the flow and the storage of data within the system. and the process involved, requirement analysis. So understand the needs and the expectation of the stakeholders.

Design system architecture that create a high level blueprint of the systems, components and all the interaction it has. Component design, so detailed design specifications for each component, which you have done the breakdown. prototype and testing so build prototypes and perform testing to ensure the functionalities iteration and refinement adjust the system design based on the feedback and the test result that you have received an example of system design is for example ride sharing application our favorite example uber ola and rapido So the architecture, it has a client-server architecture with real-time communication, including a front-end app, back-end server, and real-time database. And the component, it has user accounts, driver account, ride booking, real-time map, payment processing, rating system, and many others. And the interfaces, it has integration

with the map service like Google Map, payment gateways, say Google Pay, credit card, Razorpay and so on, post notification systems, data management, handling right data, location tracking, user history, and payment information.

So can you do the same for these systems? As an activity, I request you to probably go through the architecture, components, interfaces, data management for these systems. so the next one is genius design it is an approach to user experience design where experts rely on their own knowledge it's like they know everything they have enough experience to portray as a user itself so where experts rely on their own knowledge intuition and expertise to create solutions instead of extensive user research again which is time taking as well as costly process designer leverage their experience creativity and understanding of best practices to guide the design process so the key feature of design genius design include expert-driven, which relies on the skill, intuition and expertise of the expert designer that you have. Fast process, often much quicker than the user-centered design due to the minimal research and testing phases as indicated earlier. High risk and high reward. Success depends heavily on the expertise of the designer.

But what if the expert that you have may have the wrong assumption about the system or the user in that case it's too high and it may fail but if the expert indeed knows everything about the user and the problem i think it will be great iphone is one such example efficiency can be efficient when time or resource are limited so what are the benefit of Genius design, faster iteration and implementation can lead to highly innovative solutions, efficient when dealing with well understood problems. But there is no freelance, there is limitations as well. So the drawback of genius design is can lead to biased decision if the designer assumptions are incorrect, as I have indicated earlier. may not always align with actual user needs without validation and risk of designing in a vacuum without sufficient user feedback. And sometimes this could be very dangerous and this may lead to the product failure.

So this is the example of Apple's original iPhone Steve Jobs and his team relied on their vision their expertise to revolutionize the mobile phone market without extensive initial user testing and the aim to create a product the new user would love it based on the deep understanding of the tech and the user interaction probably another the reason probably they have not reached out to the thorough extensive initial user testing is probably that will be the leakage of the idea which is again quite crucial and that's why there is always a suspense in what the next iphone features will have will be what they will include so activity for you to find more example of genius design So what is involved in the interaction design? So just to summarize, understand the problem space, importance of involving user, degree of user involvement, what is a user centered approach, four basic activities of interaction design and simple life cycle of model for interaction design. So

let's go in details for each of them. So understanding the problem space, you need to explore what is the current user experience are they happy with the current system are they facing any challenges in the existing system if this is so then there is no need to build anything if they are happy but if not then there is opportunity for you to probably build something novel useful and fill the gap which existing system does not have so You also need to ask why the change is needed, because they're not satisfied, probably they're looking for something better. So how will this change improve the situation? Until you don't have answer for this, there is no point of going ahead. Articulating the problem space, so it's a team effort, it has no different perspective, avoid incorrect assumption and unsupported claims.

And the importance of involving users. So there is expectation management. So you can set up some realistic expectations so that even the user know what is going to happen. And there is no surprises because surprises may often lead to the disappointment. So no surprise, no disappointment, everything is expected.

Timely training, communication communicate what you are going to have but don't hype because if you hype too much and if your product does not meet the promises that you have made it is going to backfire ownership so make the users active stakeholders more likely to forgive or accept and can make big differences in acceptance and successful of the product so if you can make the users ownership all those and they are very happy with this they will be actively participating they tend to accept or forgive because they know the reality how much is possible what is not and can just make a big acceptance in and success of the product and what is the degree of user involvement should be so again there are several ways you can involve them So it could be full-time, constant input but lose touch with users. Part-time, it's a patchy input and very stressful. Short-time, inconsistent across project life and long-term, consistent but lose touch with users. So face-to-face group or individual activities can be done and online contribution from thousands of users. so you can take online feedback exchange systems you can use crowdsourcing design ideas citizen science to do so and user involvement even after the product release so user centered approach is based on early focus on users and tasks directly studying cognitive behavioral anthropomorphic and attitudinal characteristics empirical measurement so users reactions and Performance to scenarios, manuals, situations, prototypes are observed, recorded and analyzed.

And iterative design when problems are found in user testing, then you need to fix them and carry out more tests if there are still any issues are there or even the solution that you have given for fixing the test that may lead to some new problems. So that's why it requires thorough testing. So four basic activities of interaction design, discover requirements, designing alternatives, prototyping alternative designs and evaluating

product and its user experience throughput. So this is exemplify the user centered design approach. So where you require, you discover the requirements and then you discuss the different alternatives and based on the alternative probably you may need clarity on some requirement you can go back and go forth similarly once you have different design alternatives you can build prototype while building prototype you learn probably there are some new changes are required you can go back again come up with a more design alternative and after that you can basically build the prototype and once the prototype is there you can start validating and testing them and while evaluation you probably come across some issues in the system and then you go back and again discuss the design alternative for that and probably even get more requirements for that and this is a creative process that is happening and finally you end up with the final product So this is Google Design Sprint where it's a very quick thing, you can see that.

So it's simply start with unpack, sketch, decide, prototype and test. And this iteration keep going on and you end up very quick prototype. for this so another life cycle is like research in the wild so there you can see that how theory design technology and institute studies are connected and iteratively do that so some practical issues who are the users what are the users needs how to generate alternative design how to choose among alternative designs and how to integrate interaction design activities within the other lifecycle models. So it's not obvious because based on the study done by Sha Zhao ETL 2016, they've mentioned that 382 different types of user for smartphones, and that was in 2016. So now you can think about how many thousands of users, distinct types of users are there for smartphones.

So many products are intended for use by large sections of the population. So user is everybody and more targeted products are associated with more specific roles and the stakeholders basically larger than the group of direct users. Identify stakeholders, identify groups to include in interaction design activities. And also Users rarely know what is possible. They just basically have their expectation.

They just have their needs. They don't know whether it is feasible to fulfill or not. But that is the case. So users rarely know what is possible. So instead, explore the problem space, investigate who are the users, investigate user activities to see what can be improved, try out ideas with potential user, and focus on the people's goal, usability, user experience goal, rather than expect stakeholder to articulate the requirements. And how to generate the alternative design? So human tend to stick with something that works.

So considering alternative helps identify better designs. and where do alternative design come from so you can have flair and creativity research synthesis you can cross fertilization of ideas from different perspective user can generate different designs

product evolution based on changing use and seek inspiration similar product and domain or different products and domains are there you can get the inspiration from them where they lack what you can do and so on In research, that is primarily the part of, you can say, the literature review that you do. And balancing constraint and the trade-offs. And how to choose among those alternatives? Interaction design focuses on externally visible and measurable behavior.

So you can look for technical feasibility. So evaluation with the users and peer. So there are several evaluations that you can do. So prototypes are not static documentation because the behavior is the key here. So you can perform A-B testing, so where online method to inform choice between alternatives. Non-trivial to set appropriate metrics and choose user group sets.

You can also have some quality thresholds, so different stakeholders groups have different quality threshold. Usability and user experience goal lead to relevant criteria. and how to integrate interaction design activities within other models. So you can integrating interaction design activities in lifecycle model from other disciplines requires careful planning Software development lifecycle models are prominent, and integrating with agile software development is promising because it incorporates tight iterations, champions early and regular feedback, handles emergent requirements, and aims to strike a balance between flexibility and structure. Some key points here to note down is four basic activities in interaction design process, discovering requirement, design alternatives, prototypes, and evaluating.

And user-centered design rests on the three principles, early focus on users and task, empirical measurement using quantifiable and measurable usability criteria, and iterative design. So the summary is in design thinking, which is a user-centric problem-solving methodology focusing on the innovation and empathy. And the key stages involve empathy, define, ideate, prototype, test, and implementation with the goal of foster creativity and deliver impactful solutions. And in design process, a structured approach to solving design challenges applicable across domains. And the framework we use is double-dimensional model, which includes discover, define, develop, and deliver.

And the goal is to create effective and practical design through iterative development. And interaction design process, a process for designing interactive system focusing on user behavior and experience. And the key phases is again similar, research, conceptual design, prototyping, and evaluation. with the goal of craft intuitive and user-friendly interactions. Going next, so we are going to have a tutorial by Rithvik on interaction design process.

There will be a tool demo on Figma by Aditi, and in the end, there will be assignment three. For further readings, you can refer to these resources. Thank you.