Human Computer Interaction (In English)

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Hands-on Prototyping Techniques

Hi everyone, I am Ritvik Bamba and I am the teaching assistant for the course on human computer interaction and this is the tutorial on prototyping. So first we will be looking at what we have covered so far. So far we have covered good design versus bad design, what makes a design good, which was followed by inclusivity and accessibility and the design principles including visibility, feedback, consistency, constraints, and affordance. And then we looked at how inclusivity, accessibility, along with usability come together to form an inclusive design. Then the next part we covered was the four basic activities in the interaction design process, which started with identifying the needs and establishing requirements, which was followed by designing the alternative designs, Then we moved on to building the interactive versions of the designs, which is known as prototyping. And then we have evaluation part where we evaluate the designs.

And then the process goes on and on in a cycle. Finally, we get our final product. The next thing that we covered was the double diamond of interaction design. We started off here.

 and then we diverged while we learned everything about our problem. Next, we converged and narrowed down to just one problem, which forms the part of our problem statement. Then we again diverged where we considered every potential solution for the problem, and then finally converged down to find the perfect solution for our problem, which is our end product. Next, we discussed user personas, how to make user personas, and empathy mapping. As you can see here on the right, we have an example of a user persona which includes the demographic information, name, picture, his core needs, motivation, pain points, and finally, a small quote that describes his personality in short.

 Next, we have the mental model, conceptual model, information architecture. Then we covered what is cognition, cognitive load, what increases cognitive load, what decreases cognitive load, etc. And then we finally discussed Miller's and Gestalt's laws, distributed, external, experiential, and reflective cognition. This was it for the last classes. Now we move on to this class where we are going to be starting prototyping.

 So what is prototyping? The first thing that we need to discuss about prototyping is how

do we actually define prototyping and a prototype? First, a prototype is simply a representation of conceptual design for the users and designers and maybe other stakeholders as well. Prototypes are in early models of a product which simulate its design and functionality. Prototyping, on the other hand, is the experimental process of making prototypes. The team builds prototypes of varying degree of fidelity, from low fidelity paper prototypes to high fidelity digital models, which closely resemble the final product. For example, prototypes made from cardboard, foam, They may be software-made prototypes of physical products.

Videos may be made. They may be made of clay, paper, hidden people, websites, sketches, index cards, and much more. This is a typical representation of a prototype right here. When we say prototype, most of us actually talk about the lo-fi designs, which we are going to be looking at later in this lecture. Okay, so about prototyping, well, designing interfaces must prioritize simplicity, effectiveness, and more importantly, the ease of use.

Tasks like element arrangement, page layout, and feature accessibility require extensive experimentation and iteration. Prototyping in the various stages of low, middle, and high provides tools to turn ideas into tangible forms, which enables easy visualization without repeatedly altering the final prototype. Now here comes the important question. Why prototyping in the first place? Well, first of all, a prototype helps an organization or an individual to identify and formulate the main requirements and specifications. There may be moments where the organizations or individuals may be like, oh, here's something we forgot.

So we need to avoid that and hence prototyping. Then they also need to evaluate interfaces effectiveness for communicating the conceptual model that it was intended to be resembling. Whoops, users didn't understand that. You need to avoid these situations as much as possible where the user's mental model coincides with your product's conceptual model. Well, here comes some advantages of prototyping.

First, save time and money. We don't waste time coding or building the wrong thing. Before we start building the final product, Prototyping is a great idea which helps the team save money as well as efforts. Further developed conceptual and physical design. Well, as we prototype, some evaluations happen and that ultimately leads to a much better overall design of the product.

It also helps in communication. We discuss ideas with the stakeholders. As you would forward new prototypes in front of stakeholders, they help us identify possible issues that may creep in, which were previously ignored. Then we move on to what are the major types of prototyping? Well, in short, there are three types of prototyping, low fidelity,

middle fidelity, and high fidelity. As we are going to be referring to them in the further parts of the slide, we refer this to as low-phi, mid-phi, as well as high-phi.

 For the sake of convenience, we are going to be using these shortened names throughout our presentation. First, we look at low-phi or the low fidelity design. It is simple, basic, and a sketch-like representation of a product or interface, which is primarily used to convey functionality and the overall layout without focusing on the detailed design elements. It is a very superficial view of how the product is going to be looking like when it is completed. It is an early stage approach in the design process, which allows for rapid iteration and feedback.

 They are often created using simple tools, which may include paper, pencil, or basic digital wireframing softwares, or something physical like cardboards, foam, etc. Lo-Fi prototypes are meant to be rough, quick to build, and easy to throw away. That allows for a higher degree of iterations. What are the purposes? First is the proof of concept. Second is that it is rough but flexible.

 Flexibility is a really important part of the Lo-Fi design. It facilitates communication with the users early on. It allows the individual or the organization to communicate with the stakeholders so as to go forward with the design. It can also be useful for generating and narrowing down to the requirements. As the stakeholders communicate with the design and they continue using it for a bit, they can narrow down the requirements that they wish to continue with.

 What are the ways that low-fidelity prototypes can be achieved? Well, the most common ways are storyboards, paper prototypes, and clickable presentations or wireframes. Well, storyboarding, as it sounds like, we simply create a story, we create a user flow on how a user is gonna be completing their tasks. It may look like we click an application, then we move on to the sign-in, we click on the product, and then finally get to the final screen where we use the product. Then we move back to the previous screen once again, and then finally back to the home screen, continuing our daily tasks. Then we have paper prototyping, where we make paper prototypes for each function.

 These are meant to be flexible but rough, allowing for greater degree of feedback and iteration. We can also create low-fi prototypes in form of clickable presentations, or as we call them, wireframes. Wireframes can be made by sketching or by basic digital wireframing softwares like Figma. Then we move on to medium fidelity prototypes. These have very limited functionality, but the clickable areas are present, which present the interaction and navigation possibilities of an application.

Midfire prototypes, they bridge the gap between basic sketches and detailed designs, which helps the designers offer a clearer representation of how the product is going to be looking and some basic visual elements. What are the benefits? The prototype with a computer, a midfire prototype is very easy to prototype with a computer. It is engaging for the end users as they're included in the design process early on. And while the app is taking shape, they can get a space to put in their feedback and thus improve the design. They can simulate some of the features.

Well, the midfire prototypes are interactive to some degree. but not all features of the interface. And it can help test more subtle design issues that may have creeped in during the earlier phases of the design. Well, it does have some pitfalls as well, which may include that some people may actually blinded towards the major representation faults. Midfire prototypes also have some pitfalls.

These include blinding people to major representational flaws because of their tendency to focus on the minor details. The users may feel that the design isn't complete because it does not include the higher degree of visual elements. Users are also reluctant to change and challenge the designer because the process has gone through a little. And the management may also be blinded into believing that it is real and hence criticize the designer for not making a good enough design while it is just the mid fidelity design. How a typical mid fidelity design may look like is this.

We have limited functionality and clickable areas, but there are no colors present in the prototypes. We do have some contrasting colors in form of accents. This is just to give a brief idea of how the product is going to be looking and to improve the overall usability of the MidFact prototype. It does not include all the functionalities or the interfaces, but the basic functionalities are usually present in the medium fidelity prototypes. Finally, we move on to high fidelity prototypes.

Well, a HiFi design is a detailed and a polished representation of a product. It captures the final look, the feel, and interaction of the product, and hence providing a realistic review of the end product. It encompasses accurate visuals, interactions, and animations. It has a very in-depth view of all the features, is interactive throughout, and represents how the design is going to be looked at. It is created using advanced design softwares and HiFi designs are often used for user testing, presentations, and as a reference for developers during the implementation phase.

HiFidelity designs are given to developers to implement the final product. These include all the tiny bits and pieces of the designs and includes all of the functionalities that the final product is going to have. High fidelity prototypes are computer based and usually

allow realistic user interactions. They take you as close as possible to the final presentation of the true user interface. High fidelity prototypes are a representation of how the final products are going to be looking like.

The major purposes are that it is more familiar to users because it contains all the interactive features. It pinpoints specific components to test. Well, using a high-fidelity prototype, you can test each individual component separately, which helps testing better. And the biggest benefit of high-fidelity prototype over mid-fire prototypes is that it is much more presentable to the stakeholders. This is how a typical high-fire design would look like It includes all the functionalities as the original product.

It contains all the visual elements, interactions, color schemes, as well as all the usability features from signup. OK, well, we need to look at what are the key differences between lo-fi, mid-fi, and high-fi prototypes. We're going to be looking at various aspects in which they differ. The first is their purpose. Well, low FIs are early brainstorming concepts and allow for quick iterations.

Mid FIs are usually refined layouts and will help test user flows. High FIs are usually designed for usability testing and stakeholder approval. The next is the Level of detail, low-fi is very minimal, mid-fi is moderate, while high-fi is very high because it contains all the visuals, icons, colors, as well as typography. Well, it is very intuitive to realize that low-fi, mid-fi, and high-fi are bifurcated on the basis of their level of details.

Next we have the design elements. Low-fi usually have hand-drawn design elements or simply drawn digital shapes. They also have labels for key elements. In a MidFi, we have a grayscale UI. A UI does exist, but it is very basic. Placeholder text and images and functional navigation.

Some navigation is present in MidFi, but not all interactions. In a HiFi, all the visuals are fully polished. the colors are accurate, the fonts and images are inserted as per the final product. And the product has all the interactive features that the final product is going to look at. Now we need to look at the tools which are used to make lo-fi, mid-fan, hi-fi.

Well, simply lo-fi can be made on pen and paper or simple tools like Figma. For MidFi, we use digital tools, which include Adobe XT or Figma or Sketch. For HiFi, we have advanced tools like Adobe XT or Figma once again, but various HiFi prototypes can also be created using code. Feedback focus, well, lofis actually give you the most scope for feedback and allow for iterations. In the MidFi, we have the usability of layout can be given feedback upon.

Finally, on feedback, the focus is on the visual elements, the final look and feel, the interactions, and the animations. As for the audience, well, the major audience for LoFi is the design team and the very initial user testing to test the product. MidFi is usually reserved for stakeholders and users for intermediate feedback, while HiFi prototypes are usually given out to the stakeholders, clients, as well as the end users for a final validation. As for the interactivity, LoFi is very minimal, or in most cases, it does not offer any interaction. MidFi offers some basic interactions like clickable areas, while the MidFi differs from the HiFi in the sense that HiFi contains every single element that is going to exist in the final product.

This includes fully interactive buttons, visual icons, shapes, et cetera, and thus simulating a real application. These are some examples of how low fidelity, middle fidelity, and high fidelity prototypes make difference. You see the major differences is the details that exist within the prototypes. The low fidelity is very basic and rough. As for the middle fidelity, it contains some interactions, but it is mostly focused on giving the users an idea of how it will look like once it is created, thus allowing for a feedback while also giving the users a chance to interact with the user interface by giving out some basic interactive features.

As for the high fidelity prototype, well, it contains most of the features, or should I say all of the features that the app is going to contain for the product. It contains all the visual elements, the icons, images, clickable areas, and all the interactive features that one expects from a fully functional application. Another example we have is how The buttons are given simple crosses as for the designs in the middle fidelity prototype. Simple icons may be used to signify. As for the mid-fab prototypes, buttons may be given simple icons to signify the functions of them.

It may also contain some clickable areas and interactive features. Finally, as for the high-fidelity prototype, it includes all the features that are going to be present in the final product. Okay, this was it for the lecture. Now we move on to the in-class assignment, where you need to design a low-fi, mid-fi, and a high-fi prototype for a mobile food delivery application. For this, you need to focus on one key user flow, which is browsing and ordering a meal.

Pause this, take some minutes and complete the activity. Okay, now we are going to be discussing what a low-fi, mid-fi and a high-fi may look like for a food delivery application and how they may differ from each other. Well, for the low-fi, it contains simple buttons which do not contain any level of details and well, they also may not be interactive. As for the MidFi, it has some clickable areas. It is interactive to some extent while still being a basic design allowing for iterations and thus improving the design. The

HiFi design is a full-scale functioning prototype of the app, which includes clickable areas, visual elements, icons, buttons, as well as every single interactive feature that is going to exist in the final application.

You can refer to these for the resources if you want to know more about low-fi, mid-fi, and high-fi prototypes. This was it for the tutorial. Thank you so much.