USER INTERFACE DESIGN

Week3: Conceptual models, interface metaphors, interaction types

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Outline

- Intended learning outcomes
- Conceptualizing interaction
- Conceptual models
- Interaction types

Intended learning outcomes

- Define and explain the concept of conceptual models and their types.
- Define and explain the concept of interface metaphors and their types.
- Define and explain the concept of interaction types.
- Able to select the appropriate interaction type for a given task.

Introduction

- When coming up with new ideas as part of a design project, it is important to conceptualize them (creating a proof of concept) in terms of what the proposed product will do.
- Conceptualization can be viewed as an initial pass to help define the area and also when developing responses to the design challenge and then testing different solutions at small scale.
- It involves understanding how users will interact with a product and designing the UI accordingly.

Conceptualizing interaction

- The process of understanding how users will interact with a product or service, and designing the UI accordingly.
- It involves considering the user's goals, needs, and expectations, as well as the overall functionality of the product or service.
- When beginning a design project, it is important to be clear about the underlying assumptions and claims.

❖Writing down your assumptions and claims can highlight those that are vague.

❖This helps one identify human activities that are problematic and working out how they might be improved through being supported with a different set of functions.

❖The following sets of core questions are intended to aid design teams in this process

- Are there problems with an existing product or user experience? If so, what are they?
- Why do you think there are problems?
- What evidence do you have to support the existence of these problems?
- How do you think your proposed design ideas might overcome these problems?

Reasons for conceptualizing interaction in UID

- To improve the user experience.
- To create a consistent UI.
- To make the UI accessible.
- To create a visually appealing UI.

Conceptual models

- A conceptual model is a representation of how a user understands the structure and behavior of a product or service.
- Conceptual models are important in interface design because they help to ensure that the UI is consistent and easy to learn.

- When the UI matches the user's conceptual model, the user can quickly and easily understand how to use the system.
- Once a conceptual model has been created, it can be used to guide the design of the UI. For example, the conceptual model can be used to determine the placement of buttons, menus, and other UI elements.

Benefits of conceptual models

- **Improved user experience:** Help designers to create interfaces that are more intuitive and easier to use.
- **Increased consistency:** Help to ensure that the UI is consistent throughout the product or service to give the product or service a more polished and professional look.

- **Enhanced accessibility:** Help designers to create interfaces that are more accessible to people with disabilities.
- **Improved design efficiency:** Help designers to be more efficient in their work through making decisions about the UI more quickly and easily.

Core components of conceptual model

- **Entities:** The objects that users interact with in the system i.e. web browser, entities might include web pages, links, and images.
- **Attributes:** The properties of entities i.e. the attributes of a web page might include its title, URL, and content.

❖**Relationships:** The connections between entities i.e. a web page might have a relationship with another web page if it links to it.

❖**Actions:** The things that users can do to entities i.e. users can click on links, open web pages, and enter text into forms.

Interface metaphors

- An interface metaphor is a set of user interface visuals, actions, and procedures that exploit specific knowledge that users already have of other domains.

- The purpose of the interface metaphor is to give the user instantaneous knowledge about how to interact with the user interface.

- Interface metaphors can be based on physical objects, activities, or concepts..
- Interface metaphors can be very effective in making user interfaces easier to learn and use.
- However, it is important to use metaphors carefully. If the metaphor is too complex or unfamiliar to the user, it can actually make the user interface more difficult to use.

Types of interface metaphors

- **Desktop metaphor:** Based on the physical desktop workspace. Users interact with elements of the user interface, such as windows, icons, and files, in a way that is similar to how they would interact with physical objects on a desk.
- **Direct manipulation metaphor: A**llows users to directly manipulate objects on the screen to perform actions.
- **Modeless dialogue metaphor: A**llows users to perform multiple tasks simultaneously.

- **Menu metaphor:** Allows users to choose from a list of options.
- **Natural language metaphor:** Allows users to interact with user interfaces using natural language.
- **Gesture metaphor:** Allows users to interact with user interfaces using gestures.

Reasons for interface metaphors

- **Ease of use:** When users encounter a new user interface, they can rely on their existing knowledge of the metaphor to understand how to interact with it.
- **Consistency:** When users are familiar with a particular interface metaphor, they can expect similar features and functionality in other applications that use the same metaphor.

- **Efficiency:** Interface metaphors can also help to make user interfaces more efficient making designers to reduce the amount of time it takes users to learn how to interact with the interface and complete their tasks.
- **Engagement:** Interface metaphors can also make user interfaces more engaging and enjoyable to use.

Interaction types

- Another way of conceptualizing the design space is in terms of the interaction types that will underlie the user experience.
- Essentially, these are the ways a person interacts with a product or application.
- Four main interaction types were identified according to preece, 2023;

Instructing

- Instructing is the use of instructions to guide the user through a task or process. This can be done through text, images, or videos.
- Instructing is a common interaction type in many user interfaces, such as tutorials, help screens, and onboarding flows.
- It can be effective in helping users to learn how to use a new product or service.
- However, it is important to use instructions carefully, as too many instructions can be overwhelming and confusing for users.

Tips for using instructing as an interaction type

- Use clear and concise language. Avoid using jargon or technical terms that the user may not understand.
- Break down complex tasks into smaller steps. This will make the instructions easier to follow and understand.

- Use visuals to support the instructions. Images and videos can be very helpful in explaining complex concepts or procedures.
- Allow users to skip or exit the instructions. Some users may already know how to use the product or service, or they may not need all of the information provided in the instructions.

Conversing

- Conversing is the use of conversation to guide the user through a task or process.
- This can be done through text, speech, or a combination of both.
- Conversing is a becoming increasingly common interaction type in many user interfaces, such as chatbots, virtual assistants, and voice assistants.

Tips for using conversing as an interaction type

- **Use natural language.** Avoid using jargon or technical terms that the user may not understand.
- **Responsive**. Respond to the user's queries in a timely and helpful manner.
- **Informative**. Provide the user with the information they need to complete their task or process.

- **Engaging.** Use humor, personality, and other conversational elements to make the interaction more enjoyable for the user.
- **Allow users to exit the conversation**. Some users may prefer to complete their task or process without conversing.

Manipulating

- Manipulating is the ability of users to directly interact with objects on the screen to perform actions.
- This is a common interaction type in many user interfaces, such as desktop interfaces, mobile apps, and video games.
- Manipulating can be very effective in helping users to learn how to use a new product or service.

Tips for using manipulating as an interaction type

- Use clear and concise visual cues. Give users clear feedback on what they can interact with and how they can interact with it.
- Make it easy for users to undo their actions.
- Provide feedback to users. Let users know when they have completed an action correctly and provide them with guidance if they make a mistake.
- Use affordances. How an object should be manipulated i.e., a button that looks like it can be pressed should be pressable.

Exploring

- Exploring is the ability of users to freely interact with a digital environment to learn and discover new things.
- Done through a variety of methods, such as using cursors, touchscreens, and voice commands to navigate through virtual spaces, interact with objects, and receive feedback.
- Exploring can be a very effective way to help users learn new information and skills.

Tips for using exploration as an interaction type

- Create a safe and inviting environment. Users should feel comfortable exploring the environment without fear of making mistakes.
- Provide clear and concise feedback.
- Use affordances. Affordances are visual cues that indicate how an object can be manipulated.
- Provide opportunities for discovery. Give users the opportunity to discover new things as they explore.

Responding

- Responding is the ability of a user interface to react to user input in a meaningful and timely way.
- This can be done through a variety of methods, such as providing feedback when a button is pressed, changing the appearance of a menu etc.
- Responding can be a very effective way to help users learn how to use a new product or service.

Tips for using response as an interaction type

- Provide clear and concise feedback.
- Make the response proportional to the action i.e. A small action for small response etc.
- Use animation and sound effects to make the response more engaging.
- Consider the user's input device i.e. If the interface is for mobile devices, make sure that the responses are large enough to be seen and tapped easily.

Other sources of conceptual inspiration

- They are intended to help frame, guide, and scope a particular research or design project and inform design and guide research.
- They include; paradigms, visions, challenges, theories, models, and frameworks

Paradigms

- Paradigms are sets of beliefs and assumptions that guide the design of user interfaces.
- They provide a framework for thinking about how users interact with computers and how to design interfaces that are easy to use and efficient.
- Paradigms are important because they help designers to create user interfaces that are consistent and predictable.

- In the future, we can expect to see new paradigms emerge as new technologies and trends develop. For example, the development of artificial intelligence (AI) could lead to the emergence of new paradigms for interaction design.
- AI could allow us to create user interfaces that are more intelligent and adaptive, and that can better understand and respond to the needs of the user.

Common paradigms in interface design

- **Desktop metaphor:** Based on the idea of a physical desktop workspace. Users interact with elements of the user interface, such as windows, icons, and files, in a way that is similar to how they would interact with physical objects on a desk.
- **Direct manipulation:** Allows users to directly manipulate objects on the screen to perform actions.
- **Modeless dialogue:** Users can switch between tasks without having to close or minimize any windows.

- **Ubiquitous computing:** Predicts a world where computers are embedded in all aspects of our lives and we can interact with them in a natural and seamless way.
- **Natural language interaction: A**llow users to interact with computers in a way that is more natural and intuitive than using traditional input devices such as keyboards and mice.
- **Augmented reality (AR) and virtual reality (VR): A**llow users to interact with digital objects and environments in new and immersive ways.

Visions

- Vision is the ability to imagine new and innovative ways for users to interact with computers.
- Involves thinking about the future of technology and how it can be used to create more user-friendly and engaging interfaces.
- Vision is important as it allows designers to think outside the box and come up with new and innovative ways for users to interact with computers.

Common visions

- **Ubiquitous computing:** Predicts a world where computers are embedded in all aspects of our lives and we can interact with them in a natural and seamless way.
- **Natural language interaction:** Foresees user interfaces that can understand and respond to natural language.

- **Augmented reality (AR) and virtual reality (VR):** These technologies allow users to interact with digital objects and environments in new and immersive ways.
- VR can be used to create completely virtual environments, while AR can be used to overlay digital information on the real world.

Challenges

- While many technological challenges have been articulated through visions of the future, society itself is facing new challenges as the world changes.
- Designers are constantly under pressure to get the latest model by instilling alternative design values in society.
- Challenges include;

- **Designing for diversity**: User interfaces need to be designed to be accessible to users with a wide range of abilities and needs.
- **Keeping up with technology**: Compatibility with the latest technologies.
- **Balancing usability and aesthetics**: Need to be both usable and aesthetically pleasing.
- **Designing for the future**: It can be difficult to predict how users will want to interact with computers in the future.

Theories

- Theories are explanations and insights into how users interact with user interfaces.
- These theories can be used to design user interfaces that are more usable, efficient, and enjoyable to use.

Common theories

- **Social theory**: This can be used to design user interfaces that are more collaborative and engaging i.e. support communication and collaboration between users.
- **Activity theory:** Focuses on the relationship between users, their activities, and the tools they use (supportive of users' activities) i.e. tools users need to complete tasks.
- **Cognitive theory:** Focuses on the cognitive processes that users engage in when interacting with user interfaces i.e. interfaces that are easier to learn and use.

Roles of theories

- **Providing a foundation for understanding user behavior: i.e.** the cognitive, social, and emotional factors.
- **Guiding the design process:** Providing designers with a set of principles and guidelines.
- **Informing decision-making:** Designers can use theories to decide which features to include in an interface, how to organize, and how to choose the right words and images to use.
- **Evaluating design concepts:** Evaluate design concepts and to identify potential usability problems.

Models

- Models are simplifications of reality that can be used to design and evaluate user interfaces.
- Provide a framework for thinking about how users interact with computers and how to design interfaces that are easy to use and efficient.

Common models

- **GOMS model:** A cognitive model that can be used to predict the time it will take a user to complete a task using a user interface.
- **Mental models:** The representations that users have of how user interfaces work.
- **Task flows:** Diagrams that show the steps that a user needs to take to complete a task by identifying potential usability problems.
- **User personas:** Fictional representations of real-world users to better understand the needs and wants of their target users.

Tips for using models in interface design

- **Choose the right model for your needs.** Consider the goals of your project and the specific aspects of interaction when choosing a model.
- **Use models to inform your design decisions. Y**ou can use models to identify potential usability problems, to evaluate design concepts in your user interface.
- **Validate your models with users.** To ensure that they are accurate and representative of how users actually interact with user interfaces.

Frameworks

- Frameworks are sets of guidelines or principles that can be used to design user interfaces.
- They provide a structure for thinking about how users interact with computers and how to design interfaces that are easy to use and efficient.

Common frameworks

- **Nielsen's heuristics:** A set of 10 usability heuristics that can be used to evaluate and improve the usability of user interfaces by providing a set of guidelines for designing.
- **Design thinking framework:** Is a non-linear, iterative approach to design that can be used to develop innovative and user-centered solutions.
- **User-centered design framework:** Focuses on the needs and wants of users throughout the design process.

Tips for using frameworks in interface design

- Choose the right framework for your needs, Consider the goals of your project and the specific aspects of interaction when choosing a framework.
- Use frameworks to inform your design decisions.
- Validate your frameworks with users.

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Thank you

Next Lecture We Shall Look At

Cognitive Aspects in User Interface Design