HUMAN - COMPUTER INTERACTION

CT273

Chapter 5: Prototyping

: Prototyping

Bui Dang Ha Phuong

Content

- What Is a Prototype

- Why We Prototype

- Fidelity for Prototypes

- Prototyping Tools

- Testing Prototypes with Users

What Is a Prototype

- A prototype is a manifestation of an idea into a format that communicates the idea to others or is tested with users, with the intention to improve that idea over time.

- Prototypes as "tools for traversing a design space where all possible design alternatives and their rationales can be explored … Designers communicate the rationales of their design decisions through prototypes. Prototypes stimulate reflections, and designers use them to frame, refine, and discover possibilitiesin a design space"

(Lim et al. ,2008)

What Is a Prototype

- A prototype can also be a paper-based outline of a display, a collection of wires and ready-made components, an electronic picture, a video simulation, a complex piece of software and hardware or a three

dimensional mockup of a workstation.

(Preece, Sharp and Rogers, 2015)

Why We Prototype

- Prototypes are useful when
    - demonstrating a concept in early design
    - testing details of that concept at a laterstage

- using as a specification for the final product

(Benyon, 2014)

- supporting designersin choosing between alternatives

(Preece, Sharp and Rogers, 2015)

Fidelity for Prototypes

- Low-Fidelity Prototypes

- Mid-Fidelity Prototypes

- High-Fidelity Prototypes

- Pros and Cons of Each Type of Fidelity Prototype

- The Five Dimensions of Fidelity Prototypes

(McElroy, 2017)

Low-Fidelity Prototypes

Low-Fidelity Prototypes

- A low-fidelity prototype does not look very much like the final product and does not provide the same functionality, e.g. a paper/cardboard model, storyboarding,sketching …

Some simple sketches for low-fidelity prototyping

An example storyboard for a mobile device to explore ancient sites such as The Acropolis

(Preece, Sharp and Rogers, 2015)

Low-Fidelity Prototypes

- Lo-fi prototypes have the following features:
  - They are more focused on the broad underlying design ideas - such as content, form and structure, the 'tone' of the design, key functionality requirements and navigationalstructure.
  - They are designed to be produced quickly, and thrown away as quickly.
  - They capture very early design thinking and should aid, not hinder, the process of generating and evaluating many possible design solutions.

Mid-Fidelity Prototypes

- Mid-fidelity prototypes
  - start to look like your final product in at least one dimension
  - a good balance between cost and value
  - start to incorporate visual design, interactions, functionality, and the final medium
- Mid-fidelity prototypes are useful because:

- They allow to test more detailed parts of the interactions.
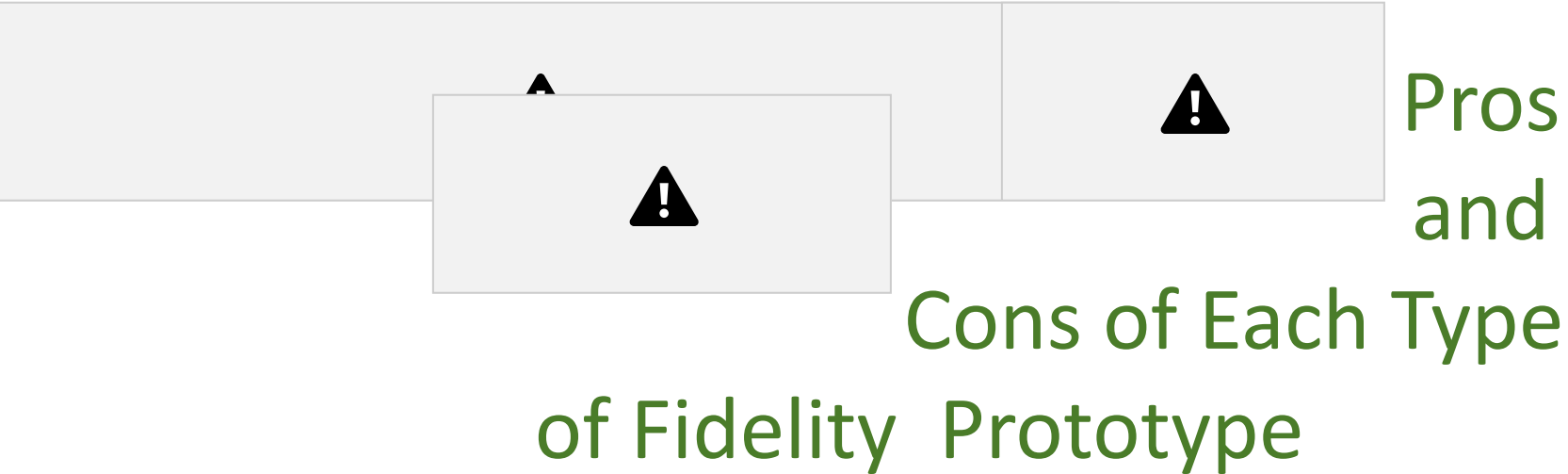- They provide users with more context in the prototype.

(McElroy, 2017)

High-Fidelity Prototypes

- High-fidelity prototypes are similar in look and feel, if not necessarily in functionality, to the anticipated final product.
- High-fidelity prototypes have the following features:
  - It is useful for detailed evaluation of the main design elements

(content, visuals, interactivity, functionality and media).

- It often constitutes a crucialstage in client acceptance.

- It is generally developed fairly well into the project when ideas are beginning to firm up.

(Benyon, 2014)

Pros and Cons of Each Type of Fidelity Prototype

	LOW-FIDELITY	MID-FIDELITY	HIGH-FIDELITY
Pros	Fast, low-skill, cheap, made with materials available around you	More interactive, easier to test, good balance of time and quality	Complete design, including visuals, content, and interactions; can test very detailed interactions
Cons	Limited interactions, harder to test details and full flows, little context for users	More time-intensive, but not fully functional	Very time-intensive, requires skills with software or coding, hard to test large concepts
Use	Exploring and testing high-level concepts like user flows and information architecture; best for making lots of different versions and testing them against each other	Use testing specific interactions and guided flows; also better for stakeholder presentations, as these prototypes have more context	Use testing very specific interactions and details, final testing of user flows, and presenting final design work to stakeholders

⚠️

The Five Dimensions of Fidelity Prototypes

- We can make a mixed-fidelity prototype by prioritizing the five dimensions of fidelity:
  - Visual refinement
  - Breadth of functionality
  - Depth of functionality
 - Interactivity

- Data model

(McElroy, 2017)

Visual Refinement

- The visual refinement is what's typically thought of as fidelity, because it is the easiest way to make a prototype look like a finished product.

- Using lower-fidelity visuals will focus user feedback on the larger concepts of the user flow

- High-fidelity visuals allow us to test the touch and feel and accessibility of our designs

(McElroy, 2017)

Breadth of Functionality
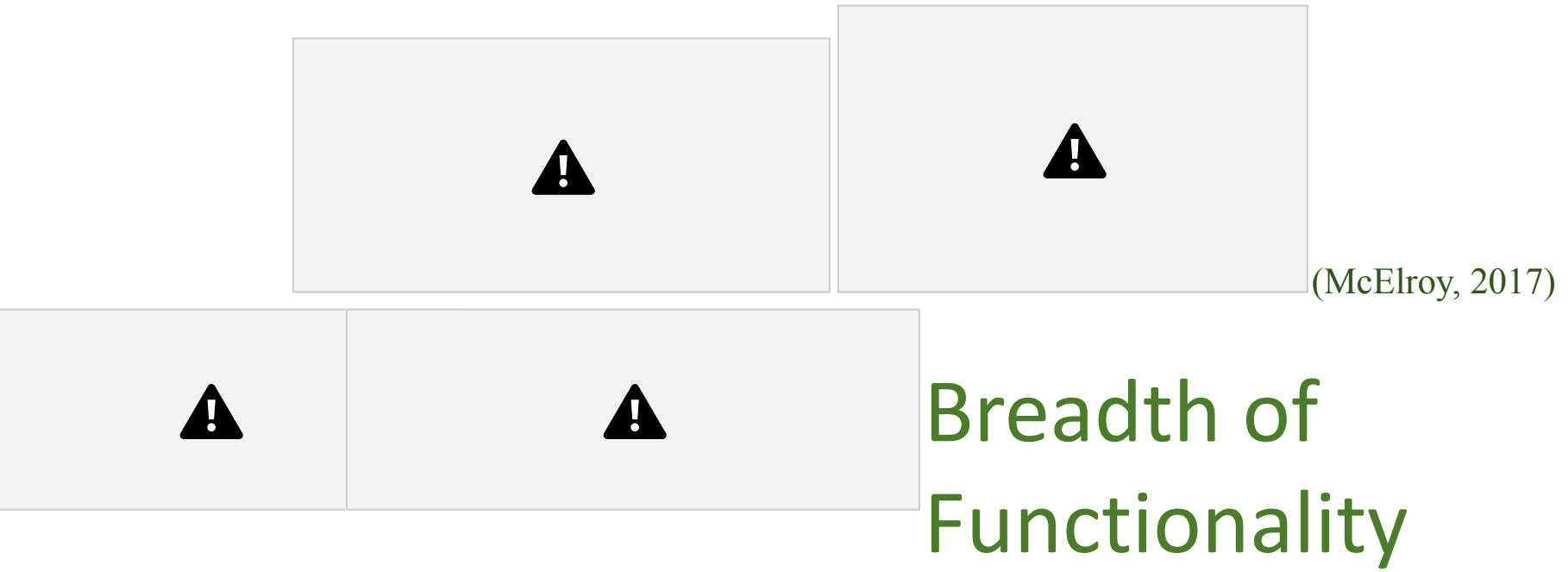
- The breadth of the prototype indicates how much of the broad functionality
  is represented in the prototype.
  - A high-fidelity breadth will allow the user to interact with all of the clickable features of an app

easier to design and test that specific feature
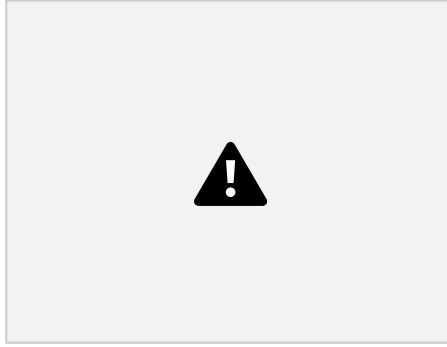
(McElroy, 2017)

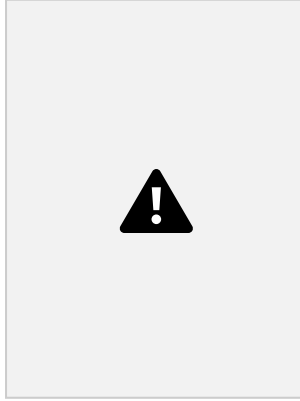- A low-fidelity breadth focuses on one small piece of the functionality of a product, to make it

Depth of Functionality

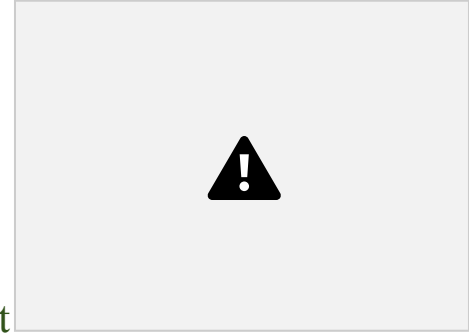- The depth of the prototype indicates how detailed an individual feature

of the prototype is built out to be.

- A high-fidelity depth contains all aspects
  of a specific function of the product

product

- A low-fidelity depth contains a shallow
 representation of the functions of a

(McElroy, 2017)

Interactivity

- The interactivity of the prototype indicates how the interactive parts of the app or product are displayed to the user.

    - Low-fidelity interactivity requires manual movement and does not include any motion or transitions

- High-fidelity interactivity includes clickable elements for inputs, animations and transitions, and outputs
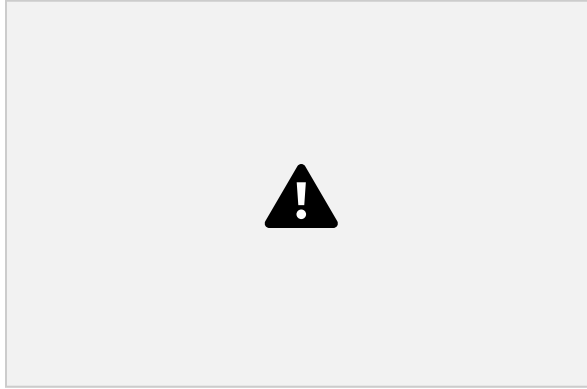
(McElroy, 2017)

Data model

- The data model encompasses the content that a user interacts with in the interface and the data utilized in both the frontend and backend of a product.

- Lower-fidelity content doesn't provide much context to the user and might lead the user and the visual design astray by not providing a proper understanding of the content

- When you use mid- to high-fidelity data, you'll improve your usability testing because the user will be able to reference real content

(McElroy, 2017)

⚠ Prototyping tools

- Axure
- InVision

- Figma
- Justinmind
- Proto.io

⚠️

Testing Prototypes with

Users

- Planning the Research
- Conducting the Research
- Synthesizing the Research

(McElroy, 2017)

⚠️ Planning the

Research

- Creating a research plan that includes exactly what assumptions you want to test, the goal of the research, a few basic questions to establish who the test subject is, and the questions you need to ask or the tasks the user needs to accomplish to test the assumptions.

- Questions: There are two types of questions you should ask your user: Establishing questions - allow you to get to know this specific user, to understand their work background, and to find any hidden biases that may affect your testing

  - Feedback questions- are used to get your user to interact with your prototype and to test your research goal are being met

(McElroy, 2017)

Planning the Research

⚠️

- Open session:
  - More exploratory
  - Allowsthe user to interact and meander through the product
  - Great for overall feedback on the experience of the product
- Closed session:
  - Amore guided approach
  - Users are being prompted with specific tasksthroughout the session

(McElroy, 2017)

Conducting the Research

⚠️

- Finding users – your friends and family, a meetup of a specific interest groups, an open co working space and entice potential users with treats to enlist their help, online user testing sites such as usertesting.Com…

- Running the session

  - Preparing the necessary materials before you start the session: a consent form, the prototypes, a way to record, a second person to take notes

  - Set up time slotsfor each participant

- Neutrally observe the user's interactions and withhold any judgement or problem solving until the synthesis of the findings

- At least 4 to 8 user tests per prototype, or more for a very diverse audience or multiple personas

(McElroy, 2017)

⚠️

Synthesizing the Research

- Organizing your notes and writing anything that is potential feedback onto individual post-it notes or in a list

- Grouping similar ideasinto categories

  - Writing out an insight for each of the categories as indication for the

problem area, orsuccess area, withoutsuggesting a solution yet

- Thinking of lots of different solutions for those problems like alternative user flows or navigation patterns

(McElroy, 2017)

⚠

Synthesizing the Research

- Documenting your design decisions, with supporting user quotes and anecdotesfor each insight, and the prioritized recommendations

- Presenting your findingsto your full team and the stakeholders ■ Creating a recommendation on the direction you think the product and interactionsshould improve

- Prioritising which insights and recommendations should be
  implemented into the next round of prototyping

(McElroy, 2017)

⚠️

Summary

- We discussed about what a prototype and why prototypes
  are important.

- We discussed about different fidelity levels of prototypes, such as low-fidelity prototypes, mid-fidelity prototypes and high-fidelity prototypes.

- We analysed the processes of testing prototypes with users, including planning, conducting and synthesizing the research.

⚠ Additionalresources

⚠️

- Prototyping for Designers: Developing the Best Digital and Physical Products (Kathryn McElroy, 2017)

- Designing Interactive Systems: A comprehensive guide to HCI, UX and interaction design, 3rd Edition (David Benyon, 2014)

- Interaction Design: Beyond Human-Computer Interaction, 4th Edition (Jennifer Preece, Helen Sharp, Yvonne Rogers, 2015)