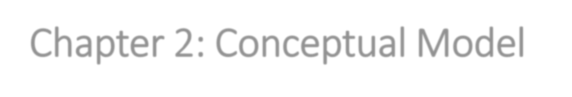
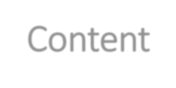
HUMAN - COMPUTER INTERACTION 

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Chapter 2: Conceptual Model Bui Dang Ha Phuong

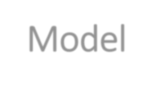
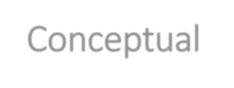
Content

▪ Conceptual Model

▪ Metaphors in Design

▪ Interaction Types

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Conceptual Model 

▪ What is a Conceptual Model

▪ What is a Mental Model

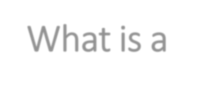
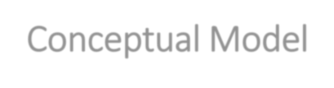
▪ The Core Components of Conceptual Model

▪ Conceptual and Physical Design

▪ Exploring Design Concepts

▪ Exploring the Design Space

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What is a Conceptual Model

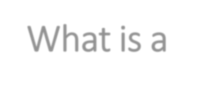
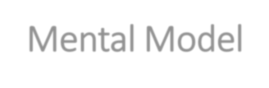
▪ A conceptual model is a high-level description of how a system is organized and operates.

(Johnson and Henderson, 2002)

▪ A conceptual model is the mental model that people carry of how something should be done.

(Interaction Design Association – IxDA)

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What is a Mental Model

▪ The understanding and knowledge that we possess of something is often referred to as a mental model

(Norman, 1998)

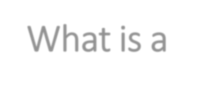
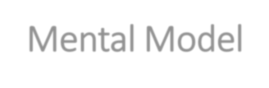
▪ Mental models are used

▪ to reason about a system

▪ to try to fathom out what to do when something unexpected happens with the system or when encountering unfamiliarsystems

(Preece, Sharp and Rogers, 2015)

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What is a Mental Model

▪ The more someone learns about a system and how it functions, the more their mental model develops

(Preece, Sharp and Rogers, 2015)

▪ If people do not have a good mental model of something they can only perform actions by rote => if something goes wrong, they will not know why and will not be able to recover

(Benyon, 2014)

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The Core Components of Conceptual Model ▪ Metaphors

▪ Concepts

▪ The relationships between the different concepts

▪ The mapping between the concepts and the user experience (Preece, Sharp and Rogers, 2015)

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Conceptual and Physical Design 

(Benyon, 2014)

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Exploring Design Concepts

▪ Interaction design is design for human use and focuses on three main things:

▪ ***How do you do?*** is concerned with the ways in which we affect the world.

▪ ***How do you feel?*** concerns how we make sense of the world and the sensory qualitiesthatshape media.

▪ ***How do you know?*** concerns the ways that people learn and plan; how designers want people to think about theirsystem.

(Verplank, 2007)

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Exploring the Design Space

▪ A design space constrains a design in some dimensions whilst allowing exploration of alternatives in others.

(Beaudouin-Lafon and Mackay, 2012)

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Metaphors in Design

▪ What is a Metaphor

▪ Metaphor Examples

▪ Benefits of Metaphors

▪ Problems with Metaphors

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What is a Metaphor

▪ Metaphor is a device for seeing something in terms of something else. It brings out the thisness of a that or the thatness of a this.

(Kenneth Burke, 1945)

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What is a Metaphor

▪ Metaphors are used in three main ways:

▪ As a way of conceptualizing what we are doing (e.g.surfing the web) ▪ As a conceptual model instantiated at the interface (e.g. the card metaphor)

▪ As a way of visualizing an operation (e.g. an icon of a shopping cart into which we place items we wish to purchase on an online shopping site)

(Preece, Sharp and Rogers, 2015)

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Metaphor Examples 

▪ **The desktop metaphor Google Now Card **

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Benefits of Metaphors 

▪ Makes learning new systems easier

▪ Helps users understand the underlying conceptual model

▪ Can be very innovative and enable the realm of computers and their applications to be made more accessible to a greater diversity of use

*Source: https://www.academia.edu/*

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Problems with Metaphors 

▪ Break conventional and cultural rules e.g. recycle bin placed on desktop ▪ Can constrain designersin the way they conceptualise a problem space ▪ Conflict with design principles

▪ Forces usersto only understand the system in terms of the metaphor ▪ Limits designers’imagination in coming up with new conceptual models *Source: https://www.academia.edu/*

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Mental Models and Icons 

▪ We look at icons and our neural nets unconsciously map them to what we know already about the image or components of the image.



*Source: https://www.lifechallenge.top/*

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Icons 

▪ Horton’s icon checklist (Benyon, 2014) for icon design

| Understandable | Does the image spontaneously suggest the intended concept to the viewer? |
| --- | --- |
| Familiar | Are the objects in the icon ones familiar to the user? |
| Unambiguous | Are additional cues (label, other icons, documentation) available to resolve any ambiguity? |
| Memorable | Where possible, does the icon feature concrete objects in action? Are actions shown as operations on concrete objects? |
| Informative | Why is the concept important? |
| Few | Is the number of arbitrary symbols less than 20? |

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Icons 

▪ Horton’s icon checklist (Benyon, 2014) for icon design

| Distinct | Is every icon distinct from all others? |
| --- | --- |
| Attractive | Does the image use smooth edges and lines? |
| Legible | Have you tested all combinations of colour and size in which the icon will be displayed? |
| Compact | Is every object, every line, every pixel in the icon necessary? |
| Coherent | Is it clear where one icon ends and another begins? |
| Extensible | Can I draw the image smaller? Will users still recognise it? |

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Interaction Types

▪ Another way of conceptualizing the design space is in terms of the interaction typesthat will underlie the user experience.

▪ Essentially, these are the ways a person interacts with a product or application.

▪ The four main types of interaction are:

▪ Instructing

▪ Conversing

▪ Manipulating

▪ Exploring

(Preece, Sharp and Rogers, 2015)

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Instructing 

▪ This type of interaction describes how users carry out their tasks by telling the system what to do. 

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Conversing 

▪ This form of interaction is based on the idea of a person having a conversation with a system, where the system acts as a dialog partner. 

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Manipulating 

▪ This form of interaction involves manipulating objects and capitalizes on users’knowledge of how they do so in the physical world.



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Exploring 

▪ This mode of interaction involves users moving through virtual or physical environments. 

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Which type of interaction is best? ▪ Issuing instructions is good for repetitive tasks, e.g. spell-checking, file management

▪ Having a conversation is good for children, computer-phobic, disabled users and specialised applications(e.g. phone services)

▪ Direct manipulation is good for ‘doing’ types of tasks, e.g. designing, drawing, flying, driving,sizing windows

▪ Hybrid conceptual models are often employed, where different ways of carrying out the same actions is supported at the interface - but can take longer to learn

*Source: https://www.academia.edu/*

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Summary

▪ A conceptual model is a high-level description of a product in terms of what users can do with it and the concepts they need in order to understand how to interact with it.

▪ Metaphors are commonly used as part of a conceptual model.

▪ Interaction types provide a way of thinking about how best to support the activities users will be doing when using a product.

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Additionalresources

▪ 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)

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