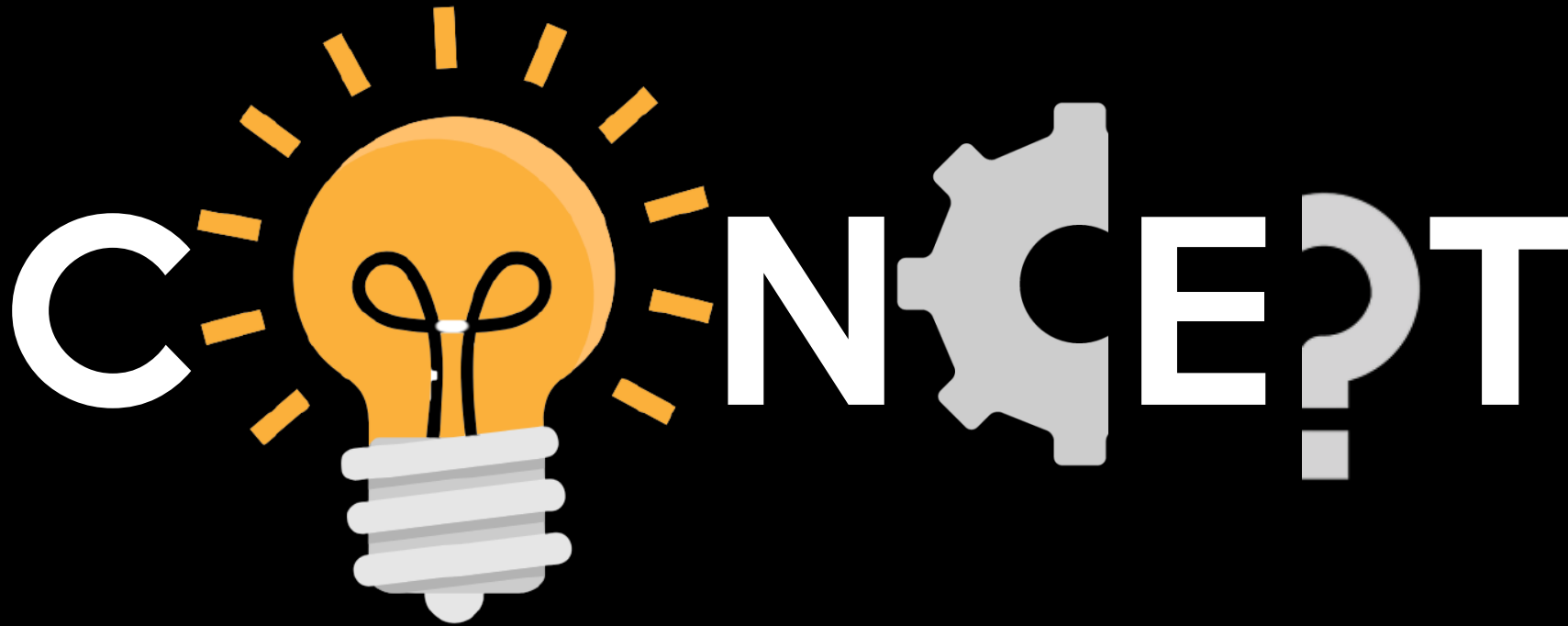


W3: ■ UNDERSTANDING & ■ CONCEPTUALIZING INTERACTION



RECAPITULATE

**HCI has moved beyond designing interfaces for desktop machines
About extending and supporting all manner of human activities in
all manner of places**

Facilitating user experiences through designing interactions

- Make work effective, efficient and safer
- Improve and enhance learning and training
- Provide enjoyable and exciting entertainment
- Enhance communication and understanding
- Support new forms of creativity and expression

PROBLEM

ASSUMPTION

CLAIM

UNDERSTANDING THE PROBLEM

- What do you want to create?
- What are your assumptions?
- Will it achieve what you hope it will?



WHAT IS AN ASSUMPTION?

- An assumption is something that you assume to be the case, even without proof.
- Taking something for granted when it needs further investigation.

For example, people might make the assumption that you're a nerd if you wear glasses, even though that's not true.



<https://www.vocabulary.com › dictionary › assumption>

WHAT IS A CLAIM?

- State or declare that something is the case, typically without providing evidence or proof.
- Stating something to be true when it is still open to question

For example, multimodal style of interaction for controlling GPS — one that involves speaking while driving — is safe



<https://literarydevices.net/claim/>

CONCEPT

“Concepts are described in the mind, in expression, or in thought, as abstract concepts or general notions. The fundamental building blocks of theories and values are considered to be these. In all aspects of cognition, they play a significant part.”



FROM PROBLEM SPACE TO DESIGN SPACE

- **Having a good understanding of the problem space can help inform the design space**
 - e.g. what kind of interface, behaviour, functionality to provide
- **But before deciding upon these it is important to develop a conceptual model**

CONCEPTUAL MODEL

Conceptual models are abstract, psychological a representation of a system, made of the composition of concepts which are used to help people know, understand, or simulate a subject the model represents.

A conceptual model is:

“...a high-level description of how a system is organized and operates”

-Johnson and Henderson, 2002

Enables

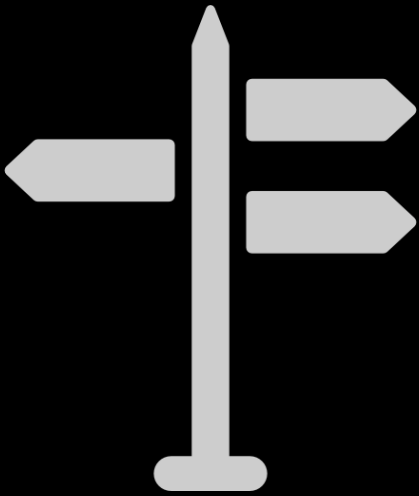
“...designers to straighten out their thinking before they start laying out their widgets”

-Johnson and Henderson, 2002

FIRST STEPS IN FORMULATING A CONCEPTUAL MODEL

- What will the users be doing when carrying out their tasks?
- How will the system support these?
- What kind of interface metaphor, if any, will be appropriate?
- What kinds of interaction modes and styles to use?
- always keep in mind when making design decisions how the user will understand the underlying conceptual model

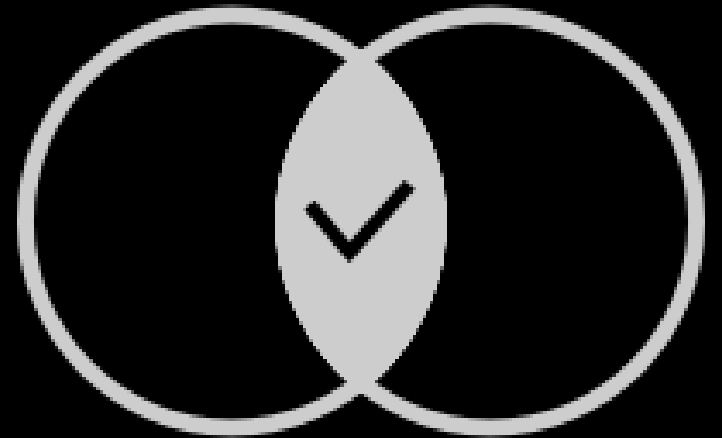
BENEFITS OF CONCEPTUALISING



Enables design teams to ask specific questions about how the conceptual model will be understood



Prevents design teams from becoming narrowly focused early on



Allows design teams to establish a set of commonly agreed terms

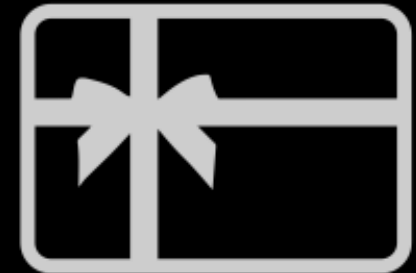
ORIENTATION · OPEN-MINDED · COMMON GROUND

INTERFACE METAPHORS

- An interface metaphor in user interface design is a collection of graphics, behavior and processes of the user interface that leverage basic information that users already have of other domains.
- **Interface designed to be similar to a physical entity but also has own properties**
- Can be based on activity, object or a combination of both

BENEFITS

- 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 users



SHOPPING CART AS PURCHASE · GIFT-WRAPPED AS VOUCHER · CASH AS WALLET

The background of the image is a light gray, semi-transparent overlay on a photograph. The photograph shows a crumpled white paper ball in the upper right and a spiral-bound notebook with a grid pattern in the lower left. A white pen lies horizontally across the notebook. The text is presented in white, bold, sans-serif capital letters on black rectangular backgrounds.

INSTRUCTING

CONVERSING

MANIPULATING

EXPLORING

INTERACTION

TYPES

INTERACTION TYPES

INSTRUCTING

ISSUING COMMANDS AND SELECTING OPTIONS

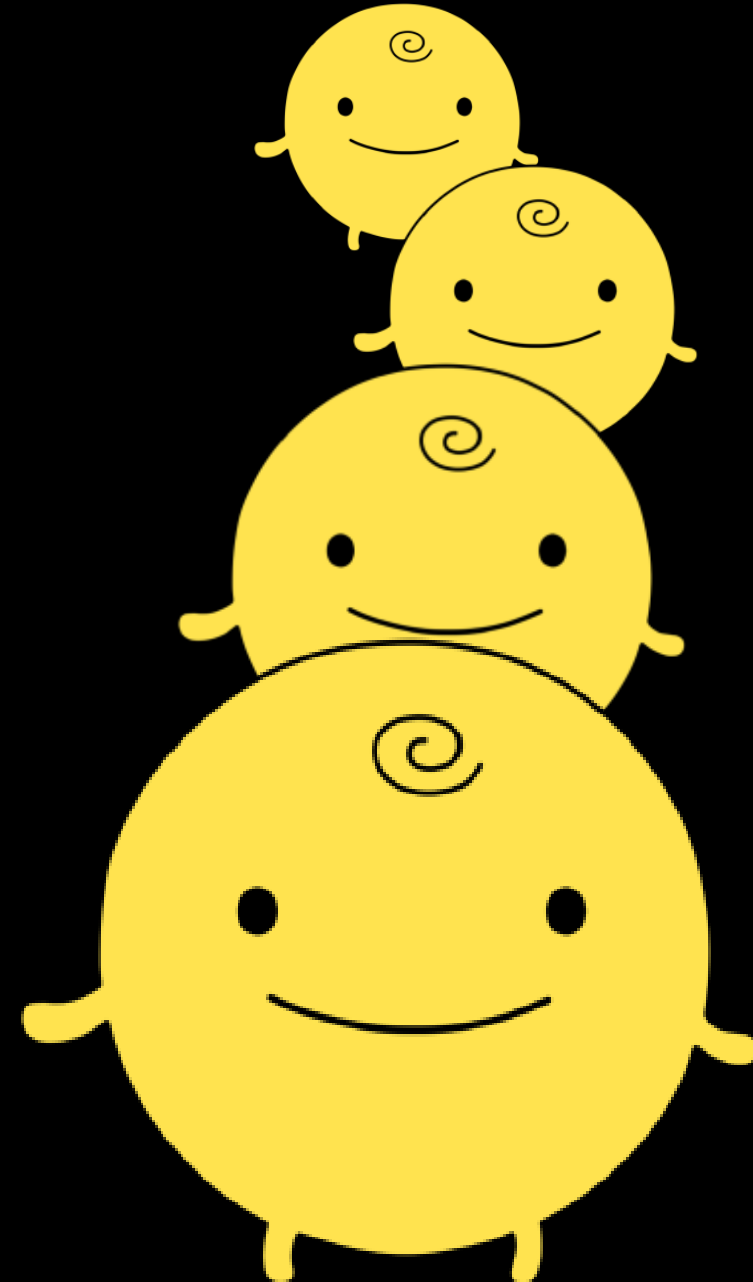
- **Where users instruct a system and tell it what to do**
 - e.g. tell the time, print a file, save a file
- **Very common conceptual model, underlying a diversity of devices and systems**
 - e.g. word processors, VCRs, vending machines
- **Main benefit is that instructing supports quick and efficient interaction**
 - good for repetitive kinds of actions performed on multiple objects



CONVERSING

INTERACTING WITH A SYSTEM AS IF HAVING A CONVERSATION

- **Where users Underlying model of having a conversation with another human**
- **Range from simple voice recognition menu-driven systems to more complex 'natural language' dialogs**
 - Examples include timetables, search engines, advice-giving systems, help systems
- **Also virtual agents, toys and pet robots designed to converse with you**
- **a system and tell it what to do**
 - e.g. tell the time, print a file, save a file



INTERACTION TYPES

MANIPULATING

INTERACTING WITH OBJECTS IN A VIRTUAL OR PHYSICAL SPACE BY MANIPULATING THEM

- Involves dragging, selecting, opening, closing and zooming actions on virtual objects
- Exploits users' knowledge of how they move and manipulate in the physical world
- Can involve actions using physical controllers
 - (e.g. Wii) or air gestures (e.g. Kinect) to control the movements of an on screen avatar
- Tagged physical objects (e.g. balls) that are manipulated in a physical world result in physical/digital events (e.g. animation)



DIRECT MANIPULATION

SHNEIDERMAN-(1983) COINED THE TERM DM, CAME FROM HIS FASCINATION WITH COMPUTER GAMES AT THE TIME

- **Continuous representation of objects and actions of interest**
- **Physical actions and button pressing instead of issuing commands with complex syntax**
- **Rapid reversible actions with immediate feedback on object of interest**

WHY ARE DM INTERFACES SO ENJOYABLE?

- Continuous representation of objects and actions of interest Novices can learn the basic functionality quickly
- Experienced users can work extremely rapidly to carry out a wide range of tasks, even defining new functions
- Intermittent users can retain operational concepts over time
- Error messages rarely needed
- Users can immediately see if their actions are furthering their goals and if not do something else
- Users experience less anxiety
- Users gain confidence and mastery and feel in control
- Physical actions and button pressing instead of issuing commands with complex syntax
- Rapid reversible actions with immediate feedback on object of interest

INTERACTION TYPES

EXPLORING

MOVING THROUGH A VIRTUAL ENVIRONMENT OR A
PHYSICAL SPACE

- Involves users moving through virtual or physical environments
- Physical environments with embedded sensor technologies



WHICH CONCEPTUAL MODEL IS BEST?

- **Direct manipulation is good for 'doing' types of tasks,**
 - e.g. designing, drawing, flying, driving, sizing windows
- **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 specialized applications**
 - (e.g. phone services)
- **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

CONCEPTUAL MODELS:

INTERACTION AND INTERFACE

- **Interaction type: what the user is doing when interacting with a system,**
 - e.g. instructing, talking, browsing or other
- **Interface type: the kind of interface used to support the mode,**
 - e.g. speech, menu-based, gesture

KINDS OF INTERFACE TYPES

- Command
- Speech
- Data-entry
- Form fill-in
- Query
- Graphical
- Web
- Pen
- AR
- Gesture

PARADIGM

In science and philosophy, a paradigm is a distinct set of concepts or thought patterns, including theories, research methods, postulates, and standards for what constitutes legitimate contributions to a field.

- Inspiration for a conceptual model
- General approach adopted by a community for carrying out research shared assumptions, concepts, values, and practices



EXAMPLES OF NEW PARADIGMS

PERVASIVE COMPUTING

also called ubiquitous computing, is the growing trend of embedding computational capability (generally in the form of microprocessors) into everyday objects to make them effectively communicate and perform useful tasks in a way that minimizes the end user's need to interact with computers

internetofthingsagenda.techtarget.com

WEARABLE COMPUTING

Is the study or practice of inventing, designing, building, or using miniature body-borne computational and sensory devices. Wearable computers may be worn under, over, or in clothing, or may also be themselves clothes (i.e. "Smart Clothing" (Mann, 1996a)).

Interaction-design.org

AUGMENTED REALITY

In computer programming, a process of combining or "augmenting" video or photographic displays by overlaying the images with useful computer-generated data. ... Faster computer processors have made it feasible to combine such data displays with real-time video.

britannica.com > technology > augmented-reality

THEORY

“

A theory is an abstract or generalizing form of meditative and logical thought about a phenomenon, or the consequences of such thinking. Contemplative and logical thought processes are also correlated with such techniques as observational study, research, etc.

”

