Overview

Theories
- Emotional design
- Mental models and conceptual models
- Visibility and Affordance
- Knowledge in the head and in the world
- Object – Action
- Three pillars of design

Theories
- Theory should be more central to research and practice.
  “A good theory should guide researchers in understanding relationships between concepts and generalising results. Should also guide practitioners when making design trade-offs for products.”
- Theory should lead rather lag behind practice.
  “A robust theory should predict or at least guide practitioners in designing new products. Effective theories should suggest novel products and help refine existing ones.” (Shneiderman 85)
Levels of theory

Shneiderman (pg 86) suggests there are different levels of theories:
- Conceptual level
- Semantic level
- Syntactic level
- Lexical level.

Designers are expected to move from the conceptual level, that is how a user perceives an action to a lexical level, that is how this will be achieved.

Emotional design (Norman 2004)

- Three components to emotional design
  - “Visceral design is about the initial impact of the product, about its appearance, touch, and feel” (37)
  - behavioural design which is about use
  - reflective design one’s feelings, message, culture, emotions the product evokes

Mental models

“The models people have of themselves, others, the environment and the things with which they interact. People form mental models through experience, training, and instruction. The mental models of a device is formed largely by interpreting its perceived actions and its visible structure.” (Norman, 1990 17)
Mental models (Norman, 1990)

- Norman describes three different mental images of any object:
  - The image in the head of the designer who created the object
  - The image in the head of the person using device and how it works
  - What the device itself conveys about the product.

Three elements

- **Design model**
  - what the designer had in mind
- **User model**
  - how user explains system operations.
- **System image**
  - all the user can see

User and designer communicate only through system itself, its physical appearance, operation and responses.

Conceptual models

"The most important thing to design is the user’s conceptual model. Everything else should be subordinated to making the model clear, obvious, and substantial. That is almost exactly the opposite of how most software is designed."

(Preece 2002, 39)

- A conceptual model describes a proposed system in terms of ideas and concepts about what it should do and what it should look like and is something that should be understandable by the user.
Conceptual models

- Two fundamental principles of designing for people
  - Make things visible
  - Provide a good conceptual model
- Good conceptual models allow us to predict affects of our actions.
- To design a good conceptual model must identify what the users will be doing when they carry out tasks.
  "If the system image does not make the design model clear and consistent then the user will end up with the wrong mental model" (Norman, 1990, 16)

Visibility and affordance

Visibility:
"the user needs help. Just the right things have to be visible: to indicate what parts operate and how, to indicate how the user is to interact with the device. Visibility indicates the mapping between intended actions and actual operations." (Norman, 8)

Affordance:
"Refers to the perceived and actual properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used. .. Affordances provide strong clues to the operation of things." (Norman, 9)

Knowledge in the head and in the world

- Knowledge is distributed:
  - in our head (what we remember), we act based on memory and what is around us, what we know
  - in the world (what we can see, hear, feel), great precision in terms of knowledge not required
  - constraints of the world (what we are prevented from doing) physical features, physical properties of objects constrain operation (Norman 55)
Precise behaviour emerges from imprecise knowledge

- Information in the world: most of what we need to complete a task is information in the world.
- Great precision not required: perfect behaviour will result if knowledge describes information or behaviour sufficiently for us to determine the correct choice.
- Natural constraints: behaviour is restricted by other properties of objects.
- Cultural constraints: conventions govern social behaviour. (Norman 55)

Memory is knowledge in the head

- Can’t remember everything about an application.
- You want to into a meeting in your diary PDA and want to make sure that the alarm rings to tell you that the meeting is in 30 minutes time.

Cognitive aids

- Are: “external representations that are intended to gain our attention at a time relevant to the task that needs to be performed.” (Preece et al 105)
- Using computer systems in a work setting users are constantly interrupted. Need to continually switch between tasks – workers multitask continually.
- Systems must be designed to provide information about the status of the activity. Cognitive aids – external representations intended to gain our attention at a time relevant to task.
Natural mappings:

- Refers to the relationship between controls and their effects in the world
- Reduce the need for information in memory. Refers to how objects, devices, screens are laid out to better represent their function.

Norman (78) suggests

“If the design depends upon labels, it may be faulty. The labels are important and often necessary, but the appropriate use of natural mappings can minimise the need for them. Wherever labels seem necessary, consider another design.”

- Well designed products are easy to use.

Implications for business

Summary:
- The importance of theory to practice relates to understanding how people think and work. Norman’s work contributes significantly to this understanding and helps us think more carefully about users.
- Mental and conceptual models come into the systems development process. Designers must seek user feedback.
- Understanding the importance of visibility and affordance, knowledge in the world and knowledge in the head relates very much too how functions are mapped in a system.
- The object / action approach describes one way of mapping user tasks to desktop functionality.
Reading for practice critique week 3.


Practice critique next week

- Read paper and bring to class next week.
- Review paper and last 2 lectures.
- You will be given questions to be answered in the tute
- Marked during the lecture and answers provided.
- This exercise is worth 5%.

References