User Interfaces

EECS 3461 – Sections A & B
Fall 2021

Resource Pack: Humans/Users I
Getting Started, Thinking about Human Behaviour

Intellectual Property Notice

Dependencies

This resource pack assumes that you are already familiar with:

- *no dependencies*

Inquiry

1. What are Goals? What are Activities and Tasks?

2. Are Activities Based on Rational Choice or on Cognitive Heuristics?

3. What is the Bandwagon Effect? How is it an example of a cognitive bias?

1. What are Goals? What are Activities and Tasks?

Chapter 1, pp 14-16, Cooper et al., About Face : the Essentials of Interaction Design . Fourth edition. Indianapolis, IN: John Wiley and Sons, 2014.

Goals vs Activities and Tasks

"Goals are not the same as tasks or activities. A goal is an expectation of an end condition, whereas both activities and tasks are intermediate steps (at different levels of organization) that help someone to reach a goal or set of goals."

…activities are composed of tasks, which in turn are composed of actions, which are themselves composed of operations…

humans adapt to the tools at hand

- a hierarchy is implied:
  - motivations → goals → activities → tasks → operations

Chapter 1, pp 14-16, Cooper et al., About Face : the Essentials of Interaction Design . Fourth edition. Indianapolis, IN: John Wiley and Sons, 2014.

Design Focus

- design that focuses on understanding and supporting the **tasks** that people are performing
- design that focuses on understanding and supporting the **activities** that people are performing

…both of these focus on the 'what' of human behaviours

…neither of these focus on the 'why' of human behaviours

- **Why** is a user performing an activity, task, action, or operation in the first place?

Chapter 1, pp 14-16, Cooper et al., About Face : the Essentials of Interaction Design . Fourth edition. Indianapolis, IN: John Wiley and Sons, 2014.

Goals and Motivation

- Goals motivate people to perform activities
- Understanding goals allows you to understand the expectations and aspirations of actual and prospective users, which in turn can help you decide which activities are truly relevant to a design.
- Task and activity analysis is useful at the detail level, but only after user goals have been analyzed.
- Asking "What are the user's goals?" lets you understand the **meaning** of activities to the users.

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Distinguishing Goals vs Activities and Tasks

- recall the hierarchy:
  - motivations → goals → activities → tasks → operations
- goals are driven by human motivations; activities and tasks undertaken to advance/achieve goals
- goals change very slowly over time; activities and tasks are much more transient
- goals are higher level, activities and tasks depend on whatever technology is at hand

example adapted from
Chapter 1, pp 14-16, Cooper et al., About Face : the Essentials of Interaction Design . Fourth edition. Indianapolis, IN: John Wiley and Sons, 2014.

Example: Goals vs Activities and Tasks

- recall the hierarchy:
  - motivations → goals → activities → tasks → operations
- Goal(s): to travel from Toronto to Ottawa, to travel as quickly, as comfortably, and as safely as possible
- Activities (1850's): make the journey in a covered wagon; for safety, bring along a rifle
- Activities (2020, pre-pandemic): make the journey by flight; for safety, do not bring firearms on the trip
- The goals remain unchanged, but their activities and tasks have changed drastically with the changes in technology

2. Are Activities Based on Rational Choice or on Cognitive Heuristics?

Example: Goals vs Activities and Tasks

- recall the hierarchy:
  - motivations → goals → activities → tasks → operations
- the hierarchy suggests that humans are logical and rational
- the hierarchy suggests that there is a conscious thought process and explicit decision making and deliberation
- the hierarchy suggests that humans are **rational agents**

Peter Abell, "Sociological Theory and Rational Choice Theory," Chapter 8, Foundations of Social Theory (ed Coleman) 1998.

Rational Choice Theory

- a sociological perspective that focuses on individual behaviour
- rationality is widely used as an assumption of behaviour in individuals
- "understand[ing] individual actors … as acting, or more likely interacting, in a manner such that they can be deemed to be doing the best they can for themselves, given their objectives, resources, and circumstances, as they seem them" (p. 223, Abell 1998)
- aggregate social behaviors results from the behaviors of individual actors, each of whom is making their individual decisions

Evidence for Rational or not?

- sociologists (along with others) argue that humans are social agents and do not continuously calculate according to explicit rational and economic criteria
- our thinking must contend with:
  - huge amounts of information (only some of which needs to be remembered)
  - information that is incomplete or ambiguous
  - time presssues (having to decide quickly)
- to tackle this, humans often use cognitive heuristics

Cognitive Heuristics

- a cognitive heuristic is a mental shortcut; it is a 'rule of thumb' that works well in some scenarios and works not too well in other scenarios
  - when the heuristic works well → evidence of goodness
  - when the heuristic doesn't work well → leads to errors
- a heuristic will, by definition, result in errors in at least some scenarios
  - if the heuristic works optimally in all scenarios, then it is no longer a heuristic!
- a heuristic, by definition, is considered to not be 'rational' because it does not always produce the best outcome, given the current goals, available resources, and circumstance
- a heuristic is a kind of strategy to tackle problem solving and decision-making quickly, without having to continually consider huge amounts of information and to adjudicate among huge numbers of options

Cognitive Bias

- a cognitive heuristic will, by definition, result in errors in at least some scenarios
  - these scenarios tend to follow patterns
  - thus, cognitive heuristics lead to systematic errors
- **cognitive biases** refer to systematic mistakes that derive from limits that are inherent in our capacity to process information [Shiraev et al, 2016]
- cognitive biases derive from cognitive heuristics
- we can't always perceive our own cognitive biases; even when confronted with them, we may even reject their existence (denial)

Cognitive Bias vs Logical Fallacies

- cognitive bias refers to systematic mistakes that derive from the use of cognitive heuristics
- a logical fallacy is an error in a logical argument
- thus, a logical fallacy is not the same thing as a cognitive bias

Types of Cognitive Biases

- there are very many different cognitive biases
  - more than 100, difficult to be definitive since there are different ways of counting
- they can be organized into 4 core categories:
  - needing to act fast
  - needing to act with not enough meaning
  - needing to act in the face of too much information
  - needing to be selective about remembering

3. What is the Bandwagon Effect? How is it an example of a cognitive bias?

The Bandwagon Effect and Social Proof

- The bandwagon effect is the tendency of people, who are wanting to be right or to make the best choice, will do or believe things because many other people do or believe the same
- The bandwagon effect is a kind of conformity bias.
- Conformity bias is just one part of the larger phenomenon of conformity.
- This bias is connected to the psychological and social phenomenon of **social proof**, when people copy the actions of others in their own behaviours
- social proof can easily be exploited in many contexts (e.g., commerce, communications, culture and media)

Examples of the Bandwagon Effect

- Voters are more likely to cast their vote for the candidate they think is winning.
- A streamer with a large number of followers (or other forms of social capital) is perceived as more trustworthy than a similar streamer with a smaller amount of social capital.
- video clip "Elevator psychology – Social Influence"
  - https://vimeo.com/277929528
- some user interfaces attempt to elicit the bandwagon effect in user and to make use of social proof, along with many other types of cognitive biases

Summary

- motivations → goals → activities → tasks → operations
  - motivations contribute to the formation of goals
  - activities are undertaken to achieve goals
  - activities require the completion of one or more tasks
  - the completion of tasks may require one or more operations
- identifying goals helps with understanding the meaning of activities; it lets you understand *why* activities are being undertaken
- humans pursue goals, often using cognitive heuristics
- cognitive heuristics are necessary so that we can act quickly, in the face of incomplete meaning or too much information and so that we can be selective with memory; these upsides also come with the downside of cognitive bias
- the bandwagon effect and social proof have been incorporated into some user interfaces are designed to elicit the bandwagon effect and other types of cognitive biases