Informatics 134

Software User Interfaces
Spring 2023

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Agenda

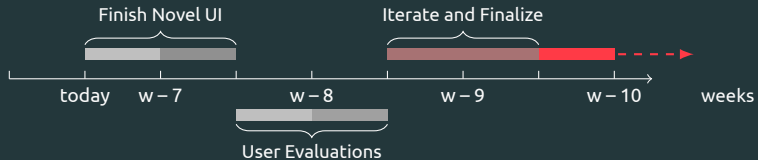**Upcoming**

Upcoming

- Today:
  - Bridging the Gulfs
- Next Week:
  - Evaluation methods
  - Monday: A3 Widget Sketch (due on Slack)
  - Wednesday: Development Check-in 2
- User Evaluations:
  - Due May 24th
  - Testable interface ready by 5/19

Team Project Outlook for Rest of Quarter

Finish Novel UI

Iterate and Finalize

today   w − 7   w − 8   w − 9   w − 10   weeks

User Evaluations

Project Review

Team Quiz

Team Quiz

- Nominate one person from your team to submit answers.
- Login to the quiz page and enter your team's name.
- You will have 1 minute to answer each question. Discuss as a team (quietly) and submit when ready.
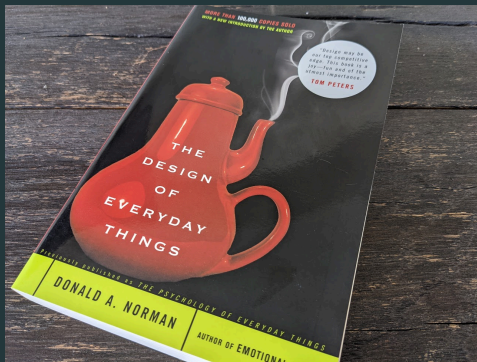
Reducing Gaps through Learnability

On Execution and Evaluation

- Written by Don Norman (UCSD, nngroup.com)
- The hidden frustrations with everyday things
- Principles for design

The Design of Everyday Things [Norman, 1988]

On Execution and Evaluation

> ''The basic idea is simple. To get something done, you have to start with some notion of what is wanted—the goal that is to be achieved. Then, you have to do something to the world, that is, take action to move yourself or manipulate someone or something. Finally, you check to see that your goal was made. So there are four different things to consider: the goal, what is done to the world, the world itself, and the check of the world. The action itself has to major aspects: doing something and checking. Call these *execution* and *evaluation*.''
>
> ——[Norman, 1988], p. 46

Physical System   User Goals
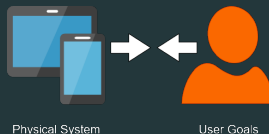
Gulfs of Execution

Represent the *gaps* between user goals and the input or interactions required to complete them.

Gulf of Evaluation

Represent the *gaps* between the output of a user interface and user goals.

Good user interface design starts with identifying and finding ways to reduce the gaps.

On Affordances

"Affordances provide strong clues to the operations of things. Plates are for pushing. Knobs are for turning. Slots are for inserting things into. Balls are for throwing or bouncing. When affordances are taken advantage of, the user knows what to do just by looking: no picture, label, or instruction needed."

——[Norman, 1988]

So...

Affordances provide clues about how a thing operates.

Signifiers help indicate the affordances a thing.

Good signifier or bad signifier examples?

Signifiers are one way we can design user interfaces to "bridge" the gaps. What are some other ways?
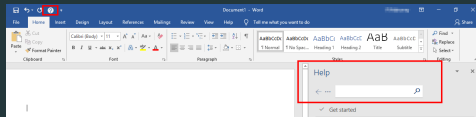
Learnability

Provide awareness of affordances

Help locate affordances

Inform use of affordances

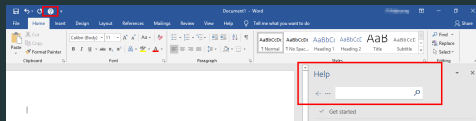**Strategies to improve learnability**

Help or Integrated Search

Strategies to improve learnability

Help or Integrated Search

- Negative perception by users
- Removes user from task at hand
- Vocabulary problem

Reducing the Gaps

Strategies to improve learnability

Vocabulary (e.g., 'select')

People rarely use the same words to describe something

Accuracy requires 'aliases' or 'armchair' terms [Furnas et al., 1987]

A choice between low recall vs. low precision

(though this seems to be changing with recent AI)

Strategies to improve learnability

Teach or train through tutorials

Have you ever read the help docs?

The paradox of the active user [Carroll and Rosson, 1987]

Most users need documentation to learn interfaces

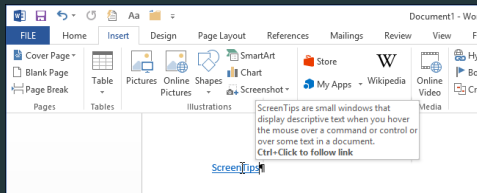Most users find learning a distraction to their immediate goals

Strategies to improve learnability

Tooltips or ScreenTips

- Good for simple tasks
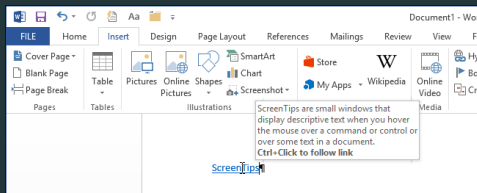- Less helpful for multi-step tasks
- But when do you show?

Strategies to improve learnability

Seek vs. Infer

- Rules based support (e.g., if x then y)
- Assume novice, always display
- Monitor behavior to model when help is needed...

Strategies to improve learnability

Seek vs. Infer

> Rather than rely on the user to know, infer based on user behavior [Horvitz, 1999]
>
> Horvitz's Lumiere system attempted to infer user goals from a history of their actions.
>
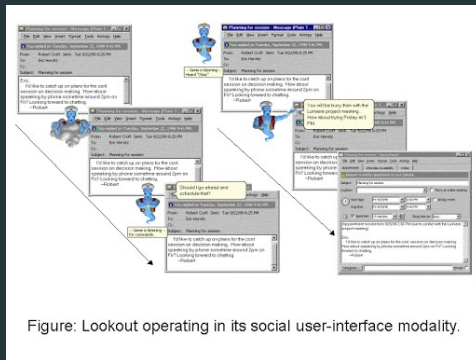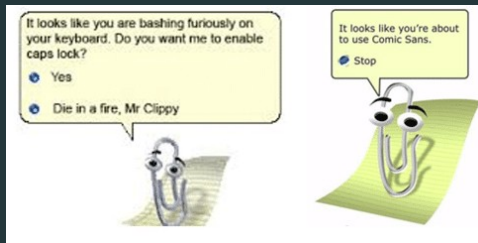> Held promise...but due to a variety of complications led to...

Figure: Lookout operating in its social user-interface modality.

Strategies to improve learnability

Seek vs. Infer

The infamous Mr. Clippy

Ended up adopting a
rules-based approach rather
then action-history modeling.

Strategies to improve learnability

Inference still holds promise...

Make assumptions based on experience (novice vs. expert)

Ask? (e.g., profile setup)

Infer based on behavior

Hurst, et al., implemented a classifier that could identify skill based on accuracy of interaction [Hurst et al., 2007].

Pauses in action

Undo or erase frequency

Disruption to expected flow

Avoidance of feature or lack of use

References

📄 Carroll, J. M. and Rosson, M. B. (1987).
Paradox of the active user.
In *Interfacing thought: Cognitive aspects of human-computer interaction*, pages 80–111.

📄 Furnas, G. W., Landauer, T. K., Gomez, L. M., and Dumais, S. T. (1987).
The vocabulary problem in human-system communication.
Communications of the ACM, 30(11):964–971.

📄 Horvitz, E. (1999).
Principles of mixed-initiative user interfaces.
In *Proceedings of the SIGCHI conference on Human Factors in Computing Systems*, pages 159–166.

Hurst, A., Hudson, S. E., and Mankoff, J. (2007).
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