

HUMAN-CENTERED
DESIGN

Direct Manipulation



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Key to good design:

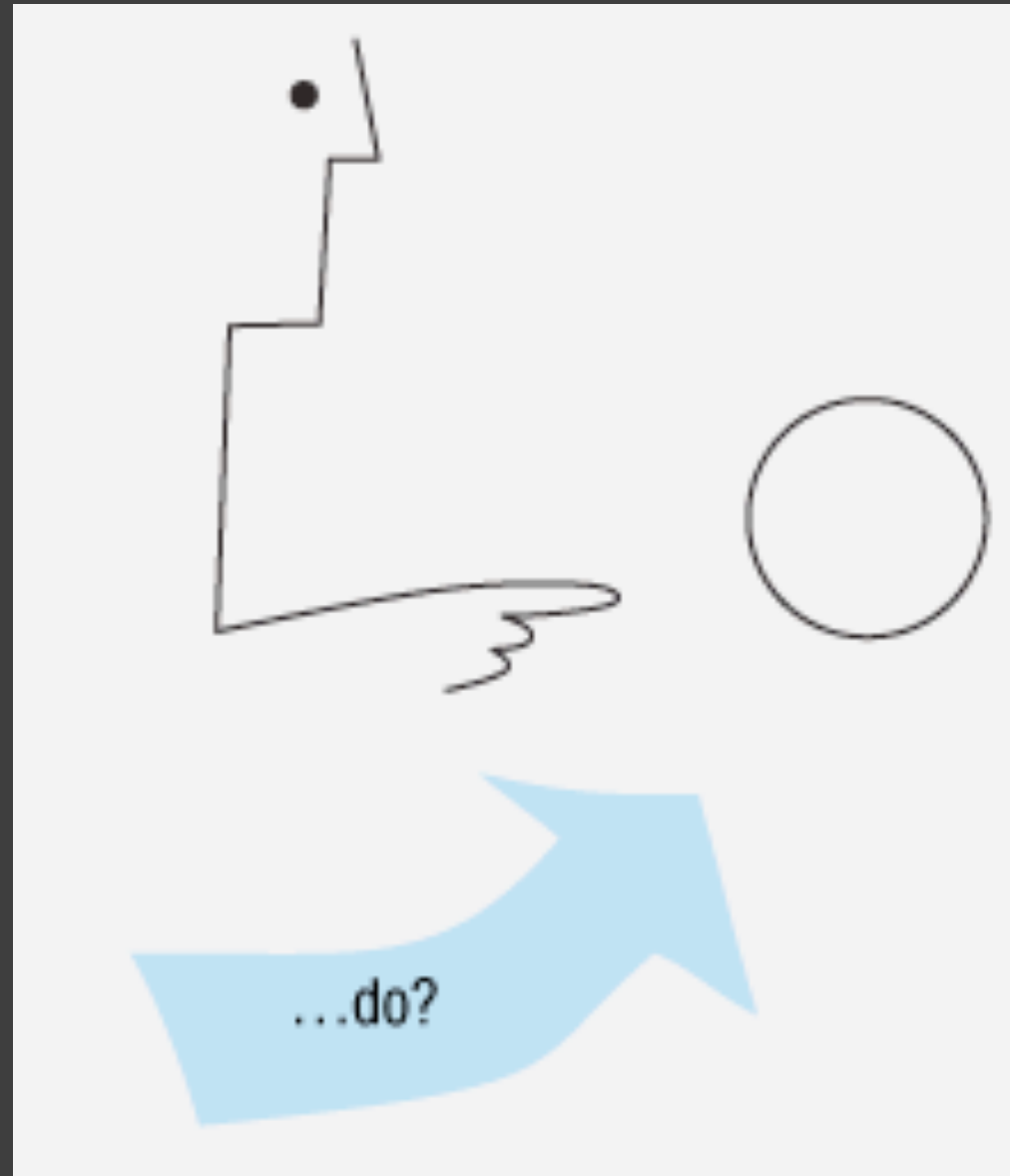
- What makes an interface easy, hard, or “natural”?

How might we improve the measuring cup?

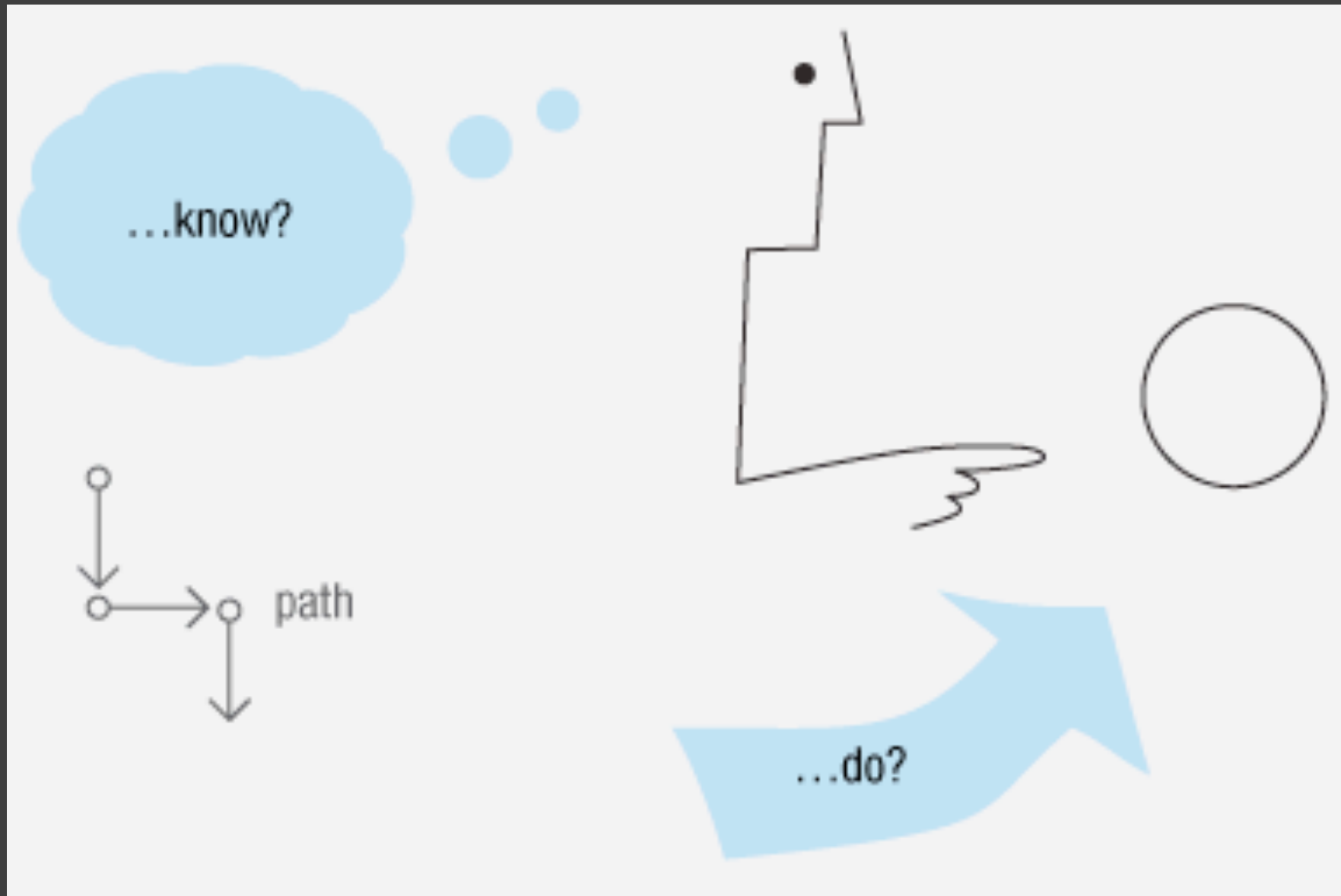
OXO's Alex Lee at Gel 2008: <http://vimeo.com/3200945>

Henry Ford, Innovation, and That "Faster Horse" blogs.hbr.org/cs/2011/08/henry_ford_never_said_the_fast.html

The Gulf of Execution: How do you *do*?



The Gulf of Evaluation: How do you *know*?



The making of gulfs. How easily can someone:

- Determine the function of the device?
- Tell what actions are possible?
- Determine mapping from intention to physical movement?
- Perform the action?
- Tell what state the system is in? / if its in desired state?
- Determine mapping from system state to interpretation

To reduce the gulfs, provide...

- Visibility (perceived affordances or signifiers)
- Feedback
- Consistency (also known as standards)
- Non-destructive operations (hence the importance of undo)
- Discoverability: All operations can be discovered by systematic exploration of menus
- Reliability. Operations should work. Period. And events should not happen randomly.

COMMAND LINE v. GUI

Direct manipulation

- Immediate feedback on actions
- Continuous representations of objects
- Leverage metaphor

Principle

**Command
Line**

GUI

Visibility

Feedback

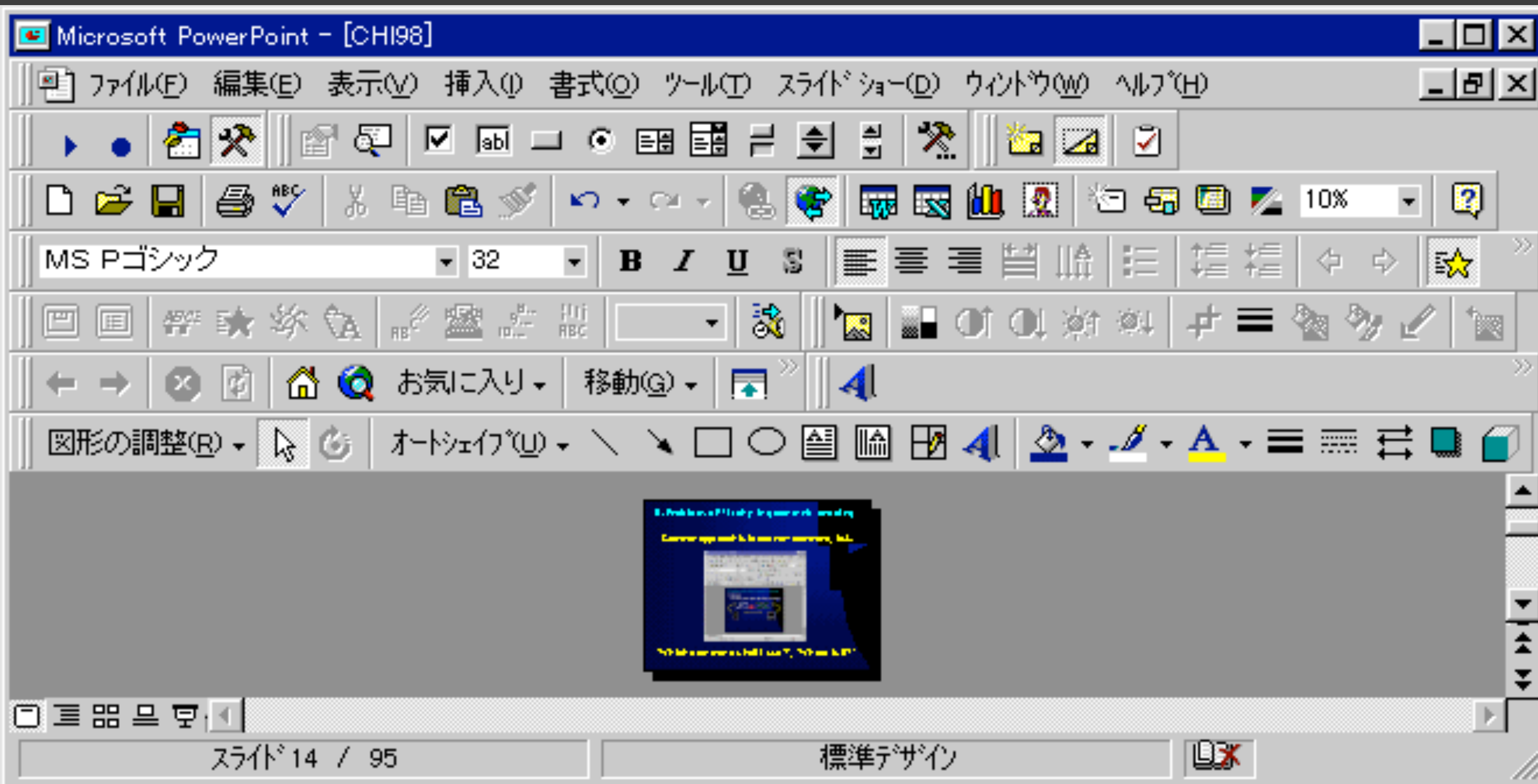
Consistency

Non-destructive

Discoverability

Reliability

Successful Indirection?



Eye to the Future: Gestures

- The solution to menu creep?
- Even more direct?

To learn more...

- Don Norman, *The Design of Everyday Things*
- Hutchins, Hollan, Norman, *Direct manipulation interfaces*, 1985