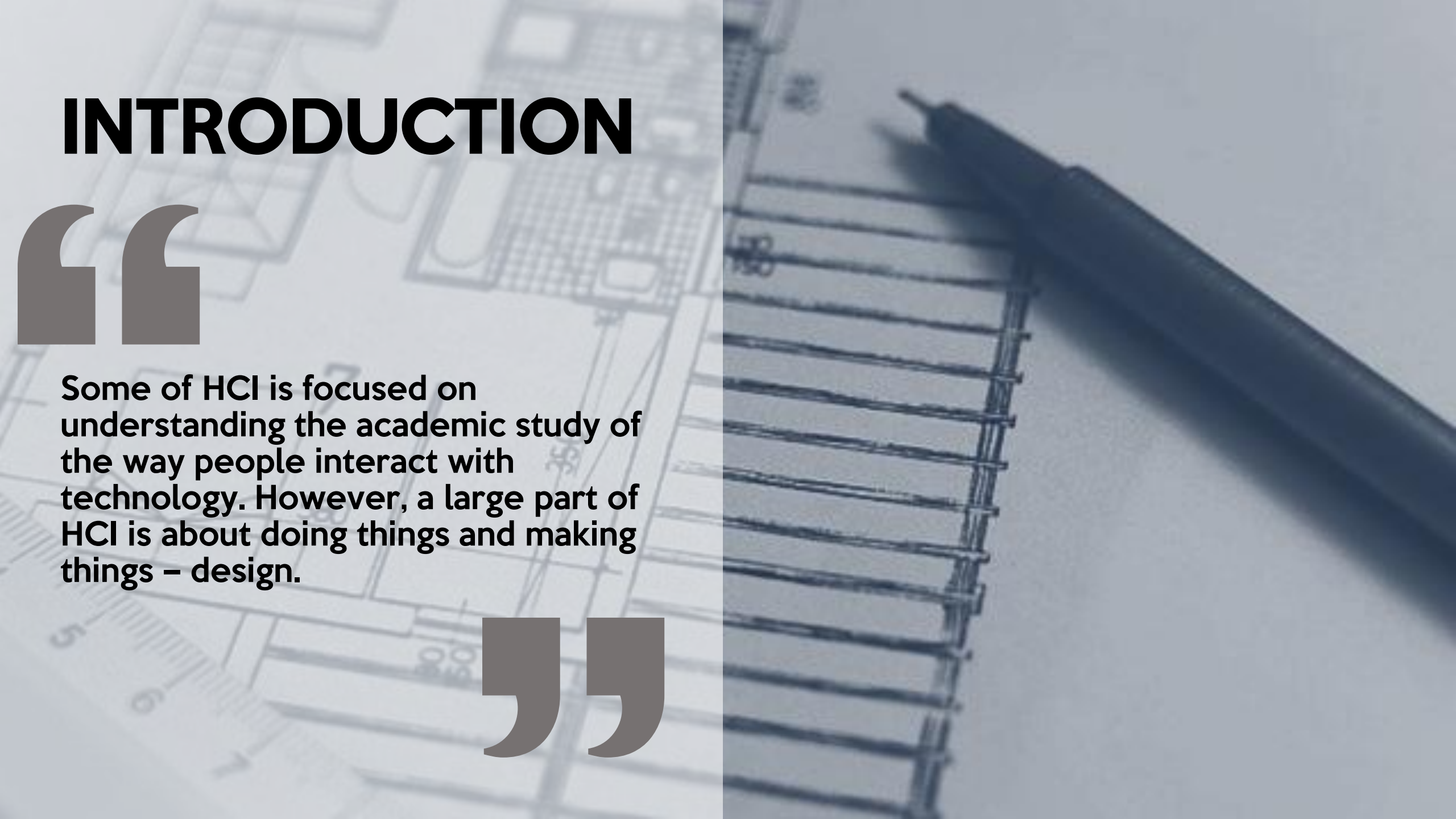
W2: THE DESIGN & INTERACTION

INTRODUCTION



Some of HCI is focused on understanding the academic study of the way people interact with technology. However, a large part of HCI is about doing things and making things – design.

WHAT IS DESIGN

Generally speaking, it is the process of envisioning and planning the creation of objects, interactive systems, buildings, vehicles, etc.

It is user-centered, users are at the heart of the design thinking approach.

https://www.strate.education › gallery › news › design-...

WHAT TO DESIGN

NEED TO TAKE INTO ACCOUNT:

- Who the users are
- What activities are being carried out
- Where the interaction is taking place

NEED TO OPTIMISE THE INTERACTIONS USERS HAVE WITH A PRODUCT

- Match the users activities and needs

UNDERSTANDING USERS' NEEDS

- ✓ Need to take into account what people are good and bad at
- ✓ Consider what might help people in the way they currently do things
- ✓ Listen to what people want and get them involved
- ✓ Use tried and tested user-based methods

GOOD OR BAD DESIGN

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One problem with these elevator controls is that the labels on the bottom row look like pushbuttons.

So when you want to open the elevator door, you accidently push the "DOOR OPEN" label instead of the pushbutton next to it.

The top row of pushbuttons doesn't seem to have this problem.

ONE SOLUTION TO THIS PROBLEM WOULD BE TO PUT THE LABELS ON THE PUSHBUTTONS, RATHER THAN BESIDE THE PUSHBUTTONS.

THE DESIGN

WHICH IS THE BEST WAY TO INTERACT WITH A SMART TV?

APPLE REMOTE · MINUUM KEYBOARD · STANDARD REMOTE

WHAT IS INTERACTION DESIGN

Designing interactive products to support people in their everyday and working lives

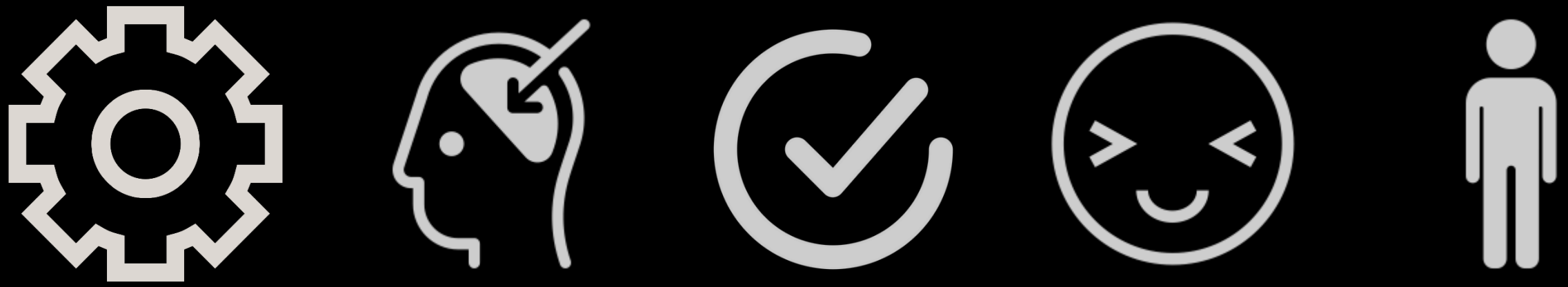
SHARP, ROGERS AND PREECE (2002)

The design of spaces for human communication and interaction

WINOGRAD (1997)

Interaction design is about creating interventions in often complex situations using technology of many kinds including PC software, the web and physical devices.

GOALS OF INTERACTION DESIGN



USABLE · EASY TO LEARN · EFFECTIVE · ENJOYABLE EXPERIENCE · INVOLVED USER

EVOLUTION OF HCI 'INTERFACES'

50

Interface at the hardware level for engineers - switch panels

60 70

interface at the programming level - COBOL, FORTRAN

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Interface at the interaction dialogue level - GUIs, multimedia

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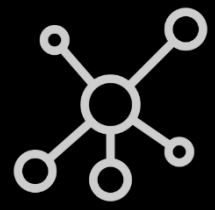
Interface at the work setting - networked systems, groupware



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Interface becomes widespread (RF tags, Bluetooth technology, mobile devices, consumer electronics, interactive screens, embedded technology)

FROM HCI TO INTERACTION DESIGN

HUMAN-COMPUTER INTERACTION (HCI) IS

"concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them"

(ACM SIGCHI, 1992, p.6)

INTERACTION DESIGN (ID) IS

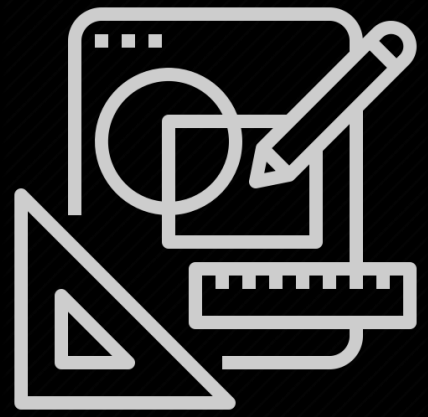
"the design of spaces for human communication and interaction" Winograd (1997)

Increasingly, more application areas, more technologies and more issues to consider when designing 'interfaces

RELATIONSHIP BETWEEN ID, HCI AND OTHER FIELDS

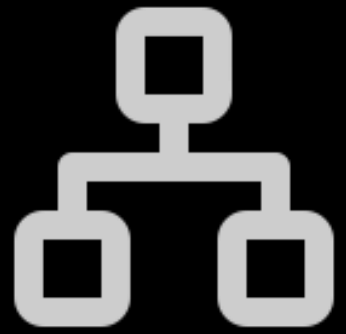
- Psychology
- Engineering
- Ergonomics
- Informatics
- Social Sciences
- Computing Sciences

ACADEMIC DISCIPLINES CONTRIBUTING TO ID



- Graphic design
- Product design
- Artist-design
- Industrial design
- Film industry

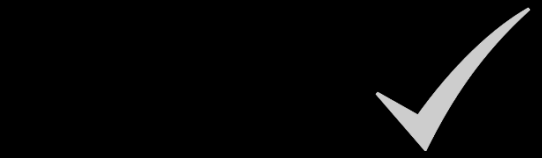
DESIGN PRACTICES CONTRIBUTING TO ID



- HCI
- Human Factors
- Cognitive Engineering
- Cognitive Ergonomics
- Computer Supported
- Co-operative Work
- Information Systems

FIELDS THAT ‘DO’ INTERACTION DESIGN

HOW EASY IT IS TO WORK IN MULTIDISCIPLINARY TEAMS ?



More people involved in doing interaction design the more ideas and designs generated...but...

The more difficult it can be to communicate and progress forwards the designs being created

INTERACTION DESIGN IN BUSINESS

NIELSEN NORMAN GROUP

The Nielsen Norman Group is an American computer user interface and user experience consulting firm, founded in 1998 by Jakob Nielsen and Don Norman. “help companies enter the age of the consumer, designing human-centered products and services”.

SWIM INTERACTIONS

Swim is a San Francisco-based design consultancy. Founded by Gitta Salomon in 1996, : “provides a wide range of design services, in each case targeted to address the product development needs at hand”.

IDEO-DESIGN COMPANY

IDEO is a design and consulting firm with offices in the U.S., England, Germany, Japan, and China. It was founded in Palo Alto, California, in 1991. The company uses the design thinking approach to design products, services, environments, and digital experiences.

INTERACTION DESIGNERS

People involved in the design of all the interactive aspects of a product

USABILITY ENGINEERS

People who focus on evaluating products, using usability methods and principles

WEB DESIGNERS

People who develop and create the visual design of websites, such as layouts

INFORMATION ARCHITECTS

people who come up with ideas of how to plan and structure interactive products

USER EXPERIENCE DESIGNERS

people who do all the above but who may also carry out field studies to inform the design of products

WHAT DO PROFESSIONALS DO IN THE ID BUSINESS ?

WHAT IS INVOLVED IN THE PROCESS OF INTERACTION DESIGN

- Identify needs and establish requirements
- Develop alternative designs
- Build interactive prototypes that can be communicated and assessed
- Evaluate what is being built throughout the process

CORE CHARACTERISTICS OF INTERACTION DESIGN

- Users should be involved through the development of the project
- Specific usability and user experience goals need to be identified, clearly documented and agreed at the beginning of the project
- Iteration is needed through the core activities

USABILITY GOALS

EFFECTIVE TO USE
EFFICIENT TO USE
SAFE TO USE
HAVE GOOD UTILITY
EASY TO LEARN
EASY TO USE

SATISFYING
FUN
ENJOYABLE
ENTERTAINING
HELPFUL
MOTIVATING
AESTHETICALLY PLEASING

USER EXPERIENCE GOALS

DESIGN PRINCIPLES

- Generalizable concepts for thinking about different features of design
- The do's and don'ts of interaction design
- What to provide and what not to provide at the interface
- Derived from a mix of theory-based knowledge, experience and common-sense

IMPORTANT INTERACTION DESIGN PRINCIPLES

- VISIBILITY
- FEEDBACK
- CONSTRAINTS
- AFFORDANCES
- MAPPING
- CONSISTENCY

VISIBILITY

This is a control panel for an elevator.

- How does it work?
- Push a button for the floor you want?
- Nothing happens.
- Push any other button?

Still nothing. What do you need to do?

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VISIBILITY

...you need to insert your room card in the slot by the buttons to get the elevator to work!

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How would you make this action more visible?

- Make the card reader more obvious
- Provide an auditory message, that says what to do (which language?)
- Provide a big label next to the card reader that flashes when someone enters

- MAKE RELEVANT PARTS VISIBLE
- MAKE WHAT HAS TO BE DONE OBVIOUS

FEEDBACK

- Sending information back to the user about what has been done
- Includes sound, highlighting, animation and combinations of these

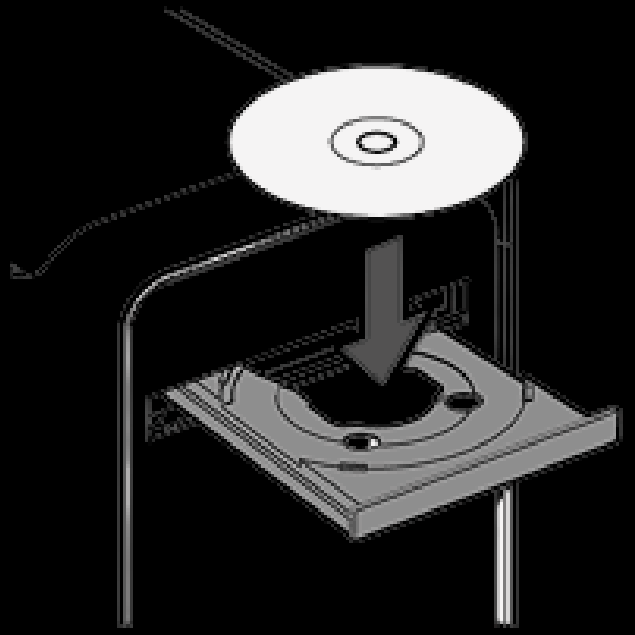
e.g. when screen button clicked on provides sound or red highlight feedback:

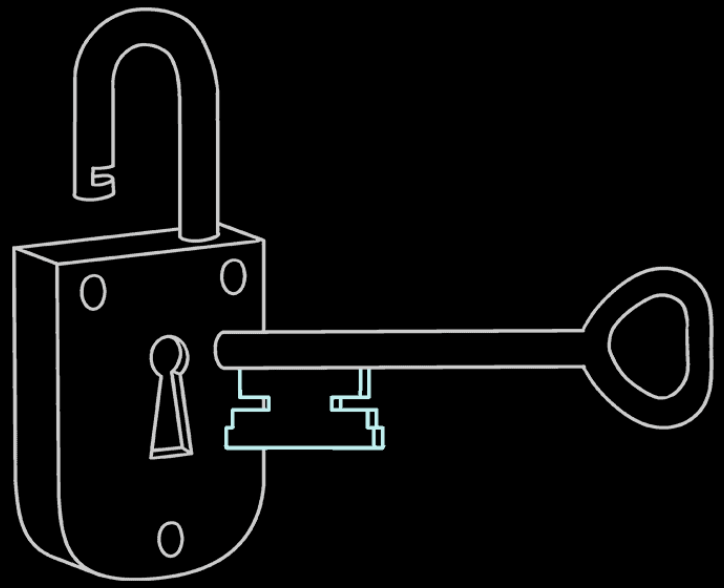
CONSTRAINTS

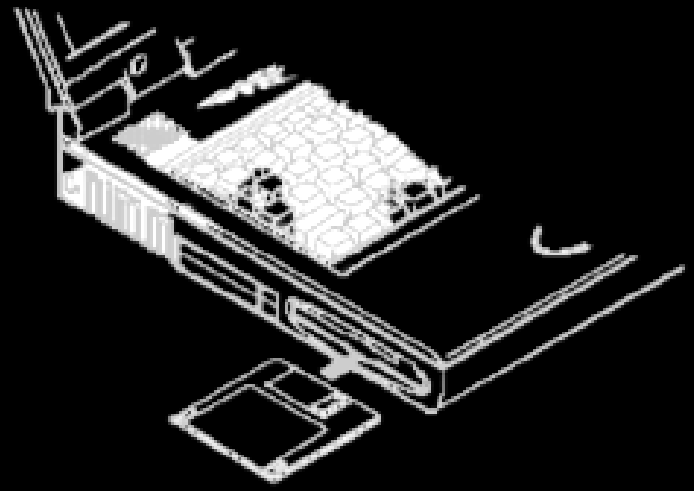
- Restricting the possible actions that can be performed
- Helps prevent user from selecting incorrect options
- Three main types (Norman, 1999)
  - Physical Constraints
  - Cultural Constraints
  - Logical Constraints

PHYSICAL CONSTRAINTS

Refer to the way physical objects restrict the movement of things







LOGICAL CONSTRAINTS

Exploits people's everyday common sense reasoning about the way the world works

Logical or ambiguous design?

- Where do you plug the mouse?
- Where do you plug the keyboard?
- Top or bottom connector?
- Do the color coded icons help?

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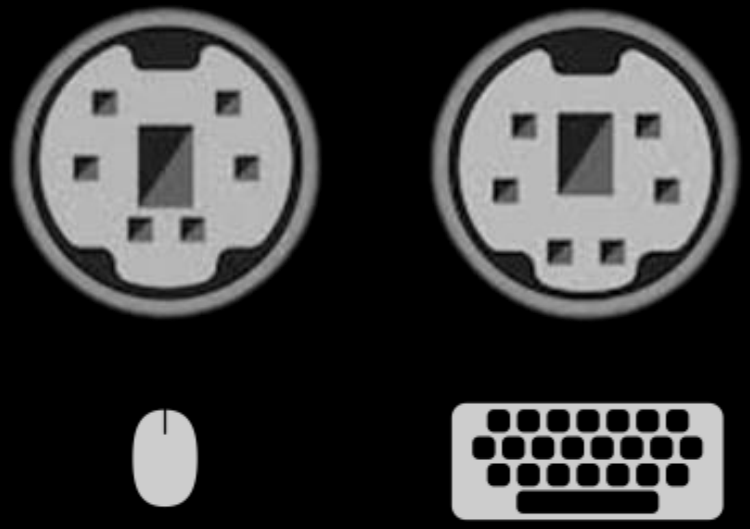
HOW TO DESIGN THEM MORE LOGICALLY

A) Provides direct adjacent mapping between icon and connector



B) Provides color coding to associate the connectors with the labels

CULTURAL CONSTRAINTS

- A mechanism for putting knowledge in the world by adhering to a known convention
- Cultural constraints rely on learned conventions

- Specific Cultural Constraints
  - Precise detail
- Universal Cultural Constraints
  - Once accepted by more than one cultural groups, they become universally accepted conventions.
- They cannot be change easily

A

B

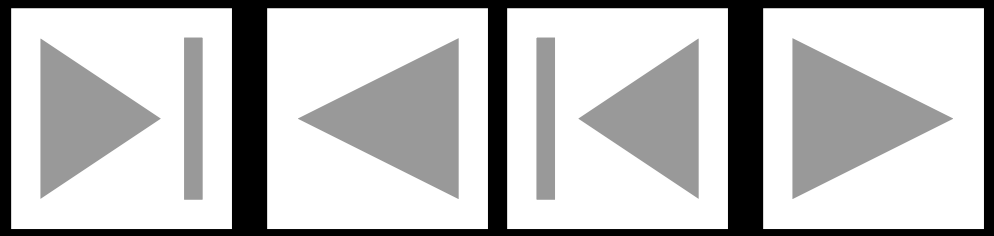
C

AFFORDANCES

- Refers to an attribute of an object that allows people to know how to use it
  - e.g. a mouse button invites pushing, a door handle affords pulling
- Norman (1988) used the term to discuss the design of everyday objects
- Since has been much popularized in interaction design to discuss how to design interface objects
  - e.g. scrollbars to afford moving up and down, icons to afford clicking on

MAPPING

- Relationship between controls and their movements and the results in the world
- Which is a poor mapping of control buttons?



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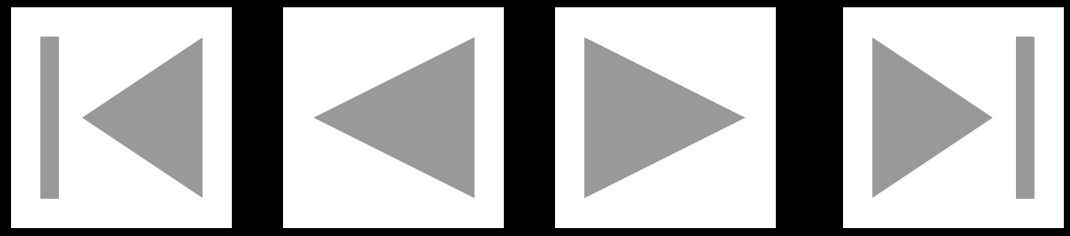

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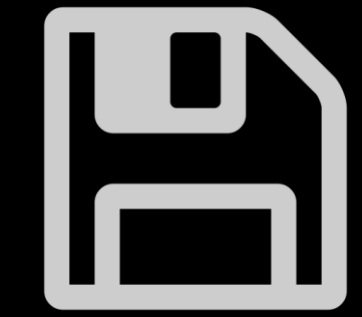
CONSISTENCY

- Design interfaces to have similar operations and use similar elements for similar tasks
- For example:
  - always use ctrl key plus first initial of the command for an operation – ctrl+C, ctrl+S, ctrl+O
- Main benefit of consistent interfaces are easier to learn and use



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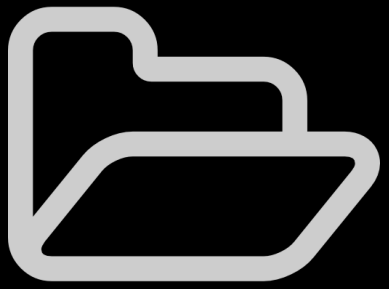

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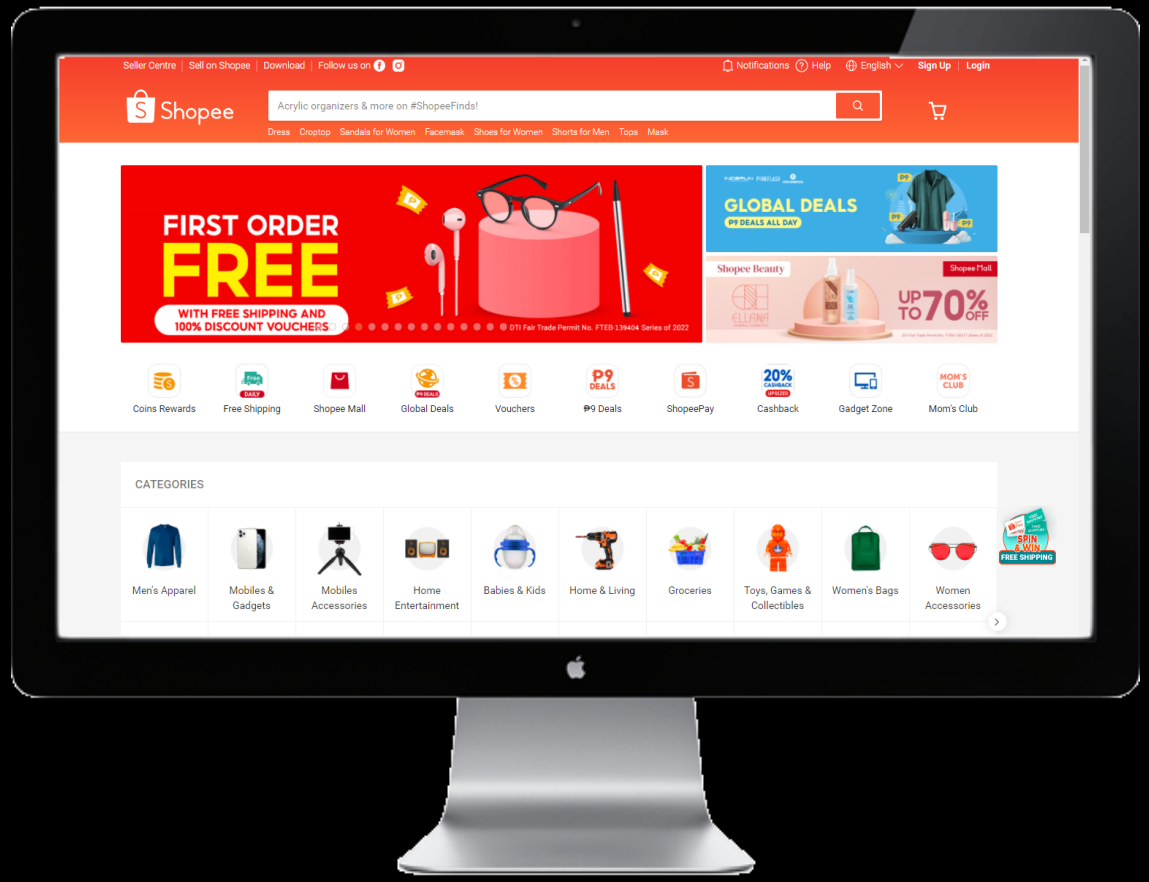
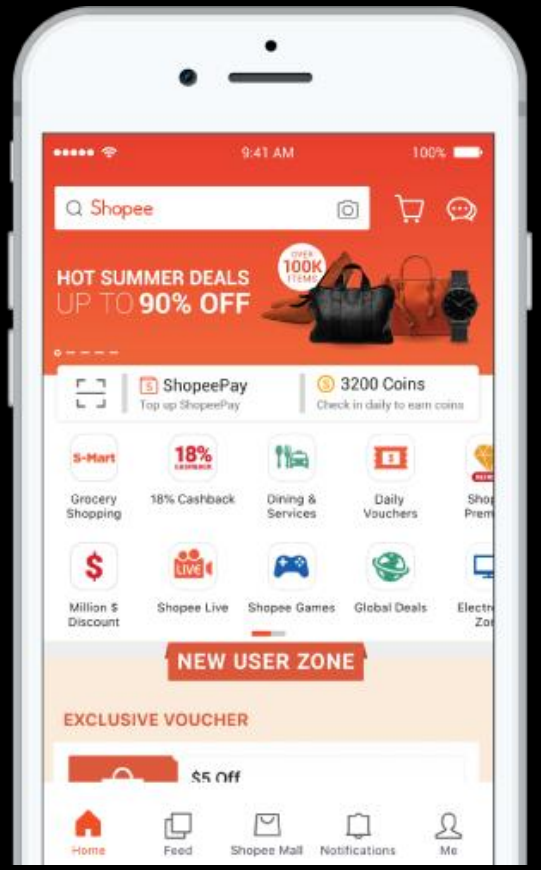
CONSISTENCY

- Internal consistency refers to designing operations to behave the same within an application
  - Difficult to achieve with complex interfaces
- External consistency refers to designing operations, interfaces, etc., to be the same across applications and devices
  - Very rarely the case, based on different designer's preference

INTERNAL CONSISTENCY

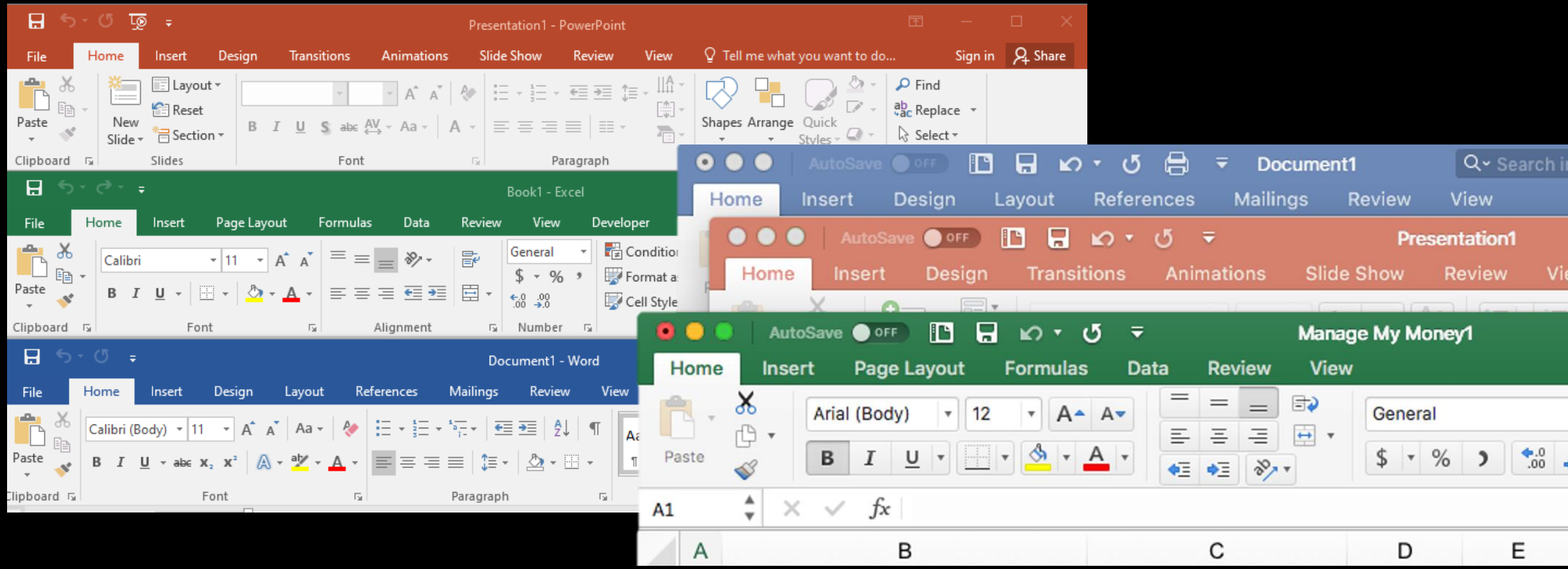
- Internal consistency refers to consistency with other elements in the system—your logo is the same online and in print, signs within a park are consistent with one another.





EXTERNAL CONSISTENCY

- External consistency means having the same aesthetic design or performance across multiple systems.



DESIGN PRINCIPLES REVISITED

- **Visibility** — Placing the controls in a highly visible location
- **Feedback** — Provision of information about the result of an action
- **Constraints** — Restricting the actions to prevent selecting incorrect options
- **Mapping** — Relationship between controls and their effect in the world
- **Affordances** — Properties of an object that indicate how it can be used
- **Consistency**

  Internal consistency refers to designing operations to behave the same within an application
  External consistency refers to designing operations, interfaces, to be the same across applications and devices