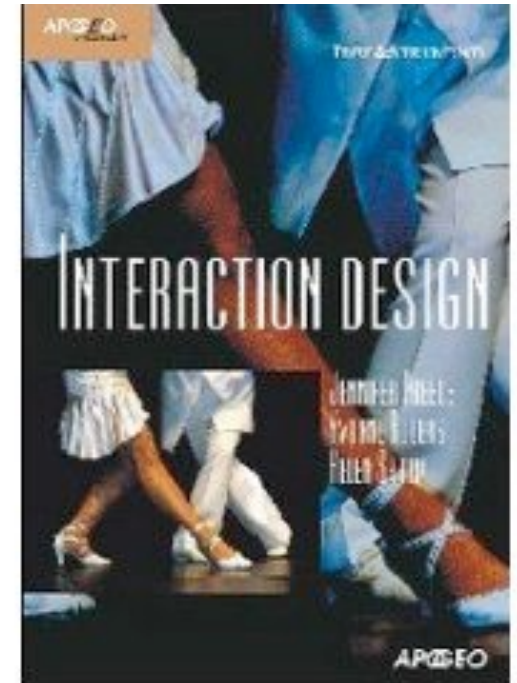# What is interaction design?

Interaction Design: Beyond Human-Computer Interaction 6th Edition

Preece Jenny; Rogers Yvonne; Sharp Helen

In Italia edito da Apogeo

Interaction design: origins

- The interaction design label remained relatively marginal until the mid-1990s; the design community largely considered the **behaviors** of the virtual world to be a specialty within industrial design.

- During this period, academia as well as ICT industries were mainly occupied with **usability** and **human factors engineering**, focusing on ways to operationalize psychology and ergonomics into methods for creating efficient and error-free interactions to support work tasks.

Interaction design: origins

In his 2007 book *Designing Interactions*, industrial designer and IDEO founder Bill Moggridge

- I felt that there was an opportunity to create a **new design discipline**, dedicated to creating imaginative and attractive solutions in a virtual world, where one could design behaviors, animations, and sounds as well as shapes.

- This would be the equivalent of **industrial design** but in software rather than three-dimensional objects.

- Like industrial design, the discipline would start from the **needs** and **desires** of the **people** who **use a product or service**, and strive to create designs that would give **aesthetic pleasure** as well as lasting satisfaction and enjoyment.

What is interaction design?

- Interaction design is about shaping and creating **digital things** for **people's use**.

    - Jonas Löwgren, IxD Foundation

- Designing interactive products to support the way people **communicate** and **interact** in their everyday and working lives

    - Sharp, Rogers and Preece (2007)

- The design of spaces for human **communication** and **interaction**

    - Winograd (1997)

Goals of interaction design

- Bring usability principle into the design process

- Develop usable products
  - Usability means easy to learn, effective (**to learn and)** to use and provide an **enjoyable** experience

- Involve **users** in the design process

Example of bad and good design

– Elevator controls and labels on the bottom row all look the same, so it is easy to push a label by mistake instead of a control button

– People do not make same mistake for the labels and buttons on the top row. Why not?

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
   - Such that they 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

Which kind of design?

- Number of other terms used emphasizing what is being designed, e.g.,
  - user interface design, software design, user-centered design, product design, web design, experience design (UX)
- Interaction design is the **umbrella** term covering all of these aspects
  - fundamental to all disciplines, fields, and approaches concerned with researching and designing computer-based systems for people

HCI and interaction design
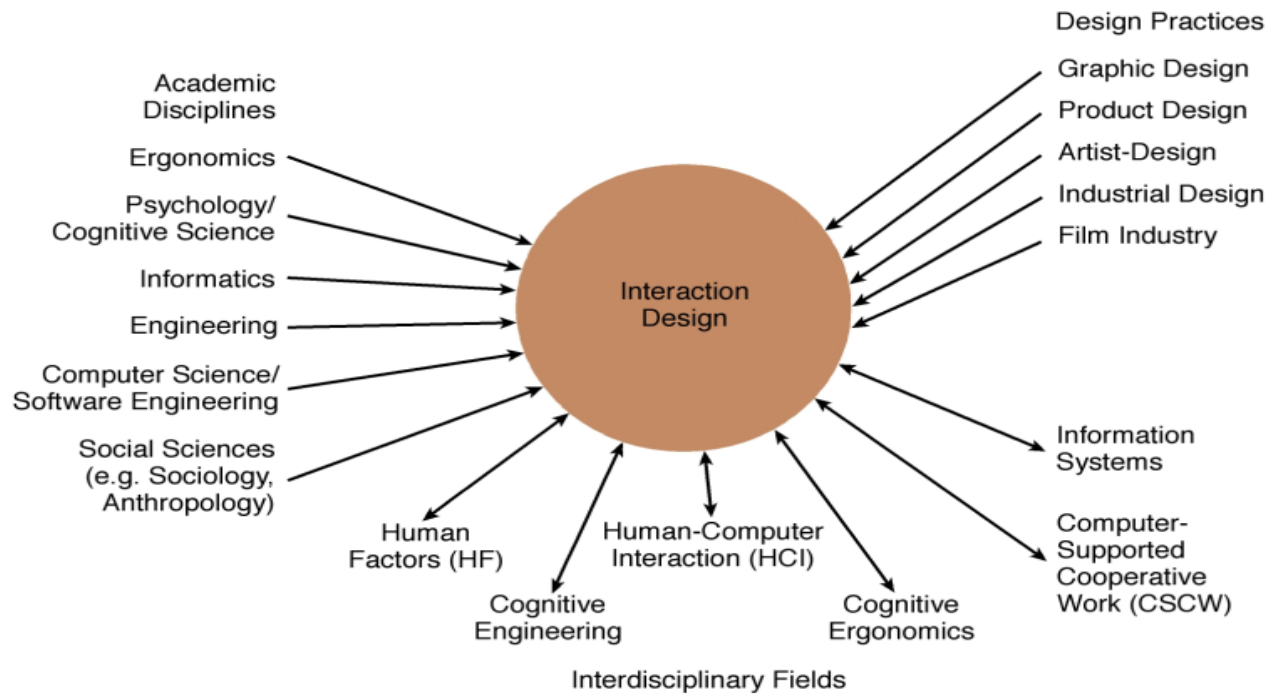
What do professionals do in the ID business?

- **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 (UX)** - people who do all the above but who may also carry out field studies to inform the design of products

The User Experience

- How a product **behaves** and is **used** by people in the real world
    - the way people feel about it and their pleasure and satisfaction when using it, looking at it, holding it, and opening or closing it
    - "every product that is used by someone has a user experience: newspapers, ketchup bottles, reclining armchairs, cardigan sweaters." (Garrett, 2003)

- Cannot design a user experience, only design *for* a user experience

- User experience in the literature is mostly an **individual construct**.

What is involved in the process of interaction design

- Identifying needs and establishing requirements for the user experience

- Developing alternative designs to meet these

- Building interactive prototypes that can be communicated and assessed

- Evaluating what is being built throughout the process and the user experience it offers

Core characteristics of interaction design

- Users should be involved through the development of the project

- Specific <u>usability</u> and <u>user experience goals</u> need to be identified, clearly documented and agreed at the beginning of the project

- Iteration is needed through the core activities

Design principles

- Generalizable abstractions for thinking about different aspects 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

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?

It is not visible as to what to do!

Visibility

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

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:

  Previous $\longrightarrow$ "ccclichhk"

  Previous $\longrightarrow$ Previous

Constraints

- Restricting the possible actions that can be performed
- Helps prevent user from selecting incorrect options
- Physical objects can be designed to constrain things
- e.g. only one way you can insert a key into a lock

- Three main types (Norman, 1999)

  - Physical

  - logical

  - cultural

Logical constraints

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

- An example is they logical relationship between physical layout of a device and the way it works as the next slide illustrates

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?

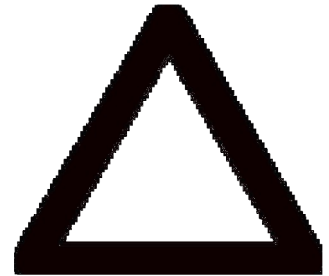# How to design them more logically

(i) A provides direct adjacent mapping between icon and connector

(ii) B provides color coding to associate the connectors with the labels

Cultural constraints

- Learned arbitrary conventions
  like red triangles for warning

- Can be universal or culturally specific

Mapping

- Relationship between controls and their movements and the results in the world

Activity on mappings

– Which controls go with which rings (burners)?

Why is this a better design?

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 is consistent interfaces are easier to learn and use

When consistency breaks down

- What happens if there is more than one command starting with the same letter?

  - e.g. save, spelling, select, style

- Have to find other initials or combinations of keys, thereby breaking the consistency rule

  - E.g. ctrl+S, ctrl+Sp, ctrl+shift+L

- Increases learning burden on user, making them more prone to errors

Internal and external 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)
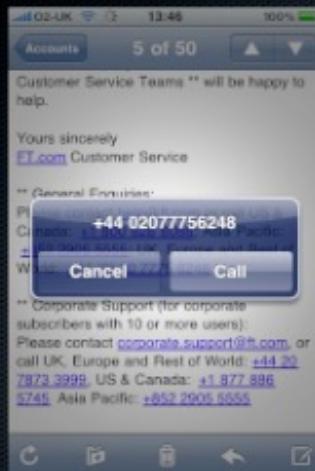
Reduce short-term memory load
iPhone mail data detectors
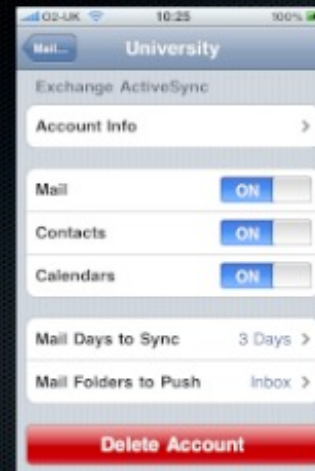
Strive for Consistency
iPhone email account deletion

Keypad numbers layout

- A case of external inconsistency

(a) phones, remote controls

1	2	3
4	5	6
7	8	9
	0	

(b) calculators, computer keypads

7	8	9
4	5	6
1	2	3
0		

Affordances: to give a clue

- 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 popularised in interaction design to discuss how to design interface objects
  - e.g. scrollbars to afford moving up and down, icons to afford clicking on

What does 'affordance' have to offer interaction design?

- Interfaces are virtual and do not have affordances like physical objects

- Norman argues it does not make sense to talk about interfaces in terms of 'real' affordances

- Instead interfaces are better conceptualized as 'perceived' affordances
    - Learned conventions of arbitrary mappings between action and effect at the interface
    - Some mappings are better than others

Activity

– Physical affordances:

How do the following physical objects aff
   Are they obvious?

Activity

- – Virtual affordances

  How do the following screen objects afford?

  What if you were a novice user?

  Would you know what to do with them?