Introduction to Human Computer Interaction (IHCI)

Dr. Kalpana Shankhwar, PhD from NTU Taiwan

Assistant Professor

Department of Human Centered Design, IIIT Delhi

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Accessibility and inclusiveness

Accessibility: the extent to which an interactive product is accessible by as many people as possible
- Focus is on people with disabilities; for instance, those using android OS or apple voiceover

Inclusiveness: making products and services that accommodate the widest possible number of people
- For example, smartphones designed for all and made available to everyone regardless of their disability, education, age, or income

Accessibility is an outcome.
Inclusive design is a process.

https://blog.prototypr.io/inclusive-design-and-accessibility-50718a3ac768
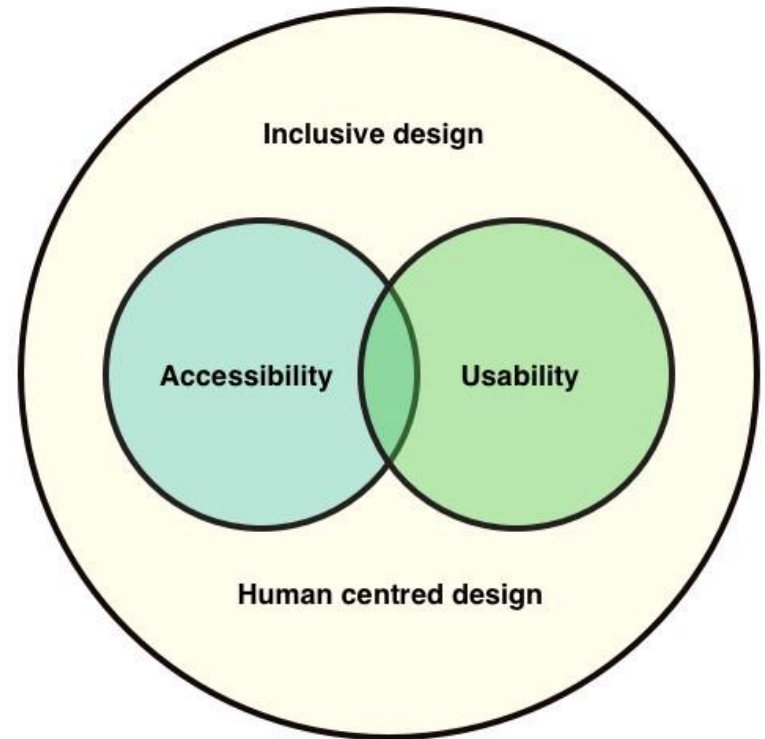
Microsoft's definition of the two are:

Inclusive design: *a design methodology that enables and draws on the full range of human diversity.*

Accessibility: *the qualities that make an experience open to all.*

Disabilities

- Whether someone is disabled changes over time with age, or recovery from an accident

- The severity and impact of an impairment can vary over the course of a day or in different environmental conditions

- Disabilities can result because technologies are designed to necessitate a certain type of interaction that is impossible for someone with an impairment

Understanding disability

Disabilities can be classified as:
- Sensory impairment (such as loss of vision or hearing)
- Physical impairment (having loss of functions to one or more parts of the body after a stroke or spinal cord injury)
- Cognitive (including learning impairment or loss of memory/cognitive function due to old age)

Each type can be further defined in terms of capability:
- For example, someone might have only peripheral vision, be color blind, or have no light perception

Impairment can be categorized:
- Permanent (for instance, long-term wheelchair user)
- Temporary (that is, after an accident or illness)
- Situational (for example, a noisy environment means that a person can't hear)

Designing for users on the autistic spectrum

Do...	Don't...
use simple colours	use bright contrasting colours
write in plain English — **Do this.**	use figures of speech and idioms
use simple sentences and bullets	create a wall of text
make buttons descriptive — *Attach files*	make buttons vague and unpredictable — *Click here!*
build simple and consistent layouts	build complex and cluttered layouts

Designing for users of screen readers

Do...	Don't...
describe images and provide transcripts for video — `<alt>`	only show information in an image or video
follow a linear, logical layout	spread content all over a page
structure content using HTML5 — `<h1>` `<nav>` `<label>`	rely on text size and placement for structure — 36pt, bold **Header**
build for keyboard use only	force mouse or screen use
write descriptive links and headings — *Contact us*	write uninformative links and headings — *Click here*

Designing for users with low vision

Do...	Don't...
use good colour contrasts and a readable font size — **Aa**	use low colour contrasts and small font size — Aa
publish all information on web pages	bury information in downloads
use a combination of colour, shapes and text — *Start >*	only use colour to convey meaning
follow a linear, logical layout — 200% magnification	spread content all over a page — 200% magnification
put buttons and notifications in context	separate actions from their context

Designing for users with physical or motor disabilities

Do...	Don't...
make large clickable actions — *Yes*	demand precision — *No*
give form fields space	bunch interactions together
design for keyboard or speech only use — *Tab*	make dynamic content that requires a lot of mouse movement
design with mobile and touchscreen in mind	have short time out windows — *Your session has timed out*
provide shortcuts — *Postcode / Find address*	tire users with lots of typing and scrolling — *Address*

Designing for users who are Deaf or hard of hearing

Do...	Don't...
write in plain English — **Do this.**	use complicated words or figures of speech
use subtitles or provide transcripts for videos — *CC*	put content in audio or video only
use a linear, logical layout	make complex layouts and menus
break up content with sub-headings, images and videos	make users read long blocks of content
let users request an interpreter for appointments	don't make telephone the only means of contact with users

Designing for users with dyslexia

Do...	Don't...
use images and diagrams to support text	use large blocks of heavy text
align text to the left and keep a consistent layout	underline words, use italics or write in capitals — *DON'T DO THIS*
consider producing materials in other formats (for example, audio or video)	force users to remember things from previous pages - give reminders and prompts
keep content short, clear and simple	rely on accurate spelling - use autocorrect or provide suggestions — *dyslexia / dsyle*
let users change the contrast between background and text	put too much information in one place

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Being cool about disability

- Prosthetics can be designed to move beyond being functional (and often ugly) to being desirable and fashionable

- People now refer to "wearing their wheels," rather than "using a wheelchair"

Fashionable leg cover designed by Alleles Design Studio

Being cool about disability

Oscar Pistorius
South African sprinter

Cultural differences

5/21/2015 versus 21/5/2015?

- Which should be used for international services and online forms?

- Why is it that certain products, like smartphones, are universally accepted by people from all parts of the world, whereas people from different cultures react to websites differently?

Usability goals

- How good a product is at doing what it is supposed to do (*Effectiveness*)

- supports users in carrying out their tasks (*Efficiency*)

- Protect users from dangerous conditions and

  undesirable situations (*Safety*)

- Have right kind of functionality (*Utility*)

- Easy to learn (*Learnability*)

- Easy to remember how to use (*Memorability*)

Usability and user experience goals

- Selecting terms to convey a person's feelings, emotions, and so forth can help designers understand the multifaceted nature of the user experience

- How do usability goals differ from user experience goals?

- Are there trade-offs between the two kinds of goals? (for example, can a product be both fun and safe?)

- How easy is it to measure usability versus user experience goals?

User experience goals

Desirable aspects

Satisfying	Helpful	Fun
Enjoyable	Motivating	Provocative
Engaging	Challenging	Surprising
Pleasurable	Enhancing sociability	Rewarding
Exciting	Supporting creativity	Emotionally fulfilling
Entertaining	Cognitively stimulating	Experiencing flow

Undesirable aspects

Boring	Unpleasant
Frustrating	Patronizing
Making one feel guilty	Making one feel stupid
Annoying	Cutesy
Childish	Gimmicky

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

Design principles

- *Visibility (findability)*
- *Feedback*
- *Constraints (navigability)*
- *Consistency*
- *Affordance*

Applying Design Principles in Practice

Design principles are used by interaction designers to aid their thinking when designing for the user experience.

Visibility - poor interface

www.baddesigns.com

- 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 - Improving on a poor interface

www.baddesigns.com

…with this elevator, 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

What do I do if I am wearing black?

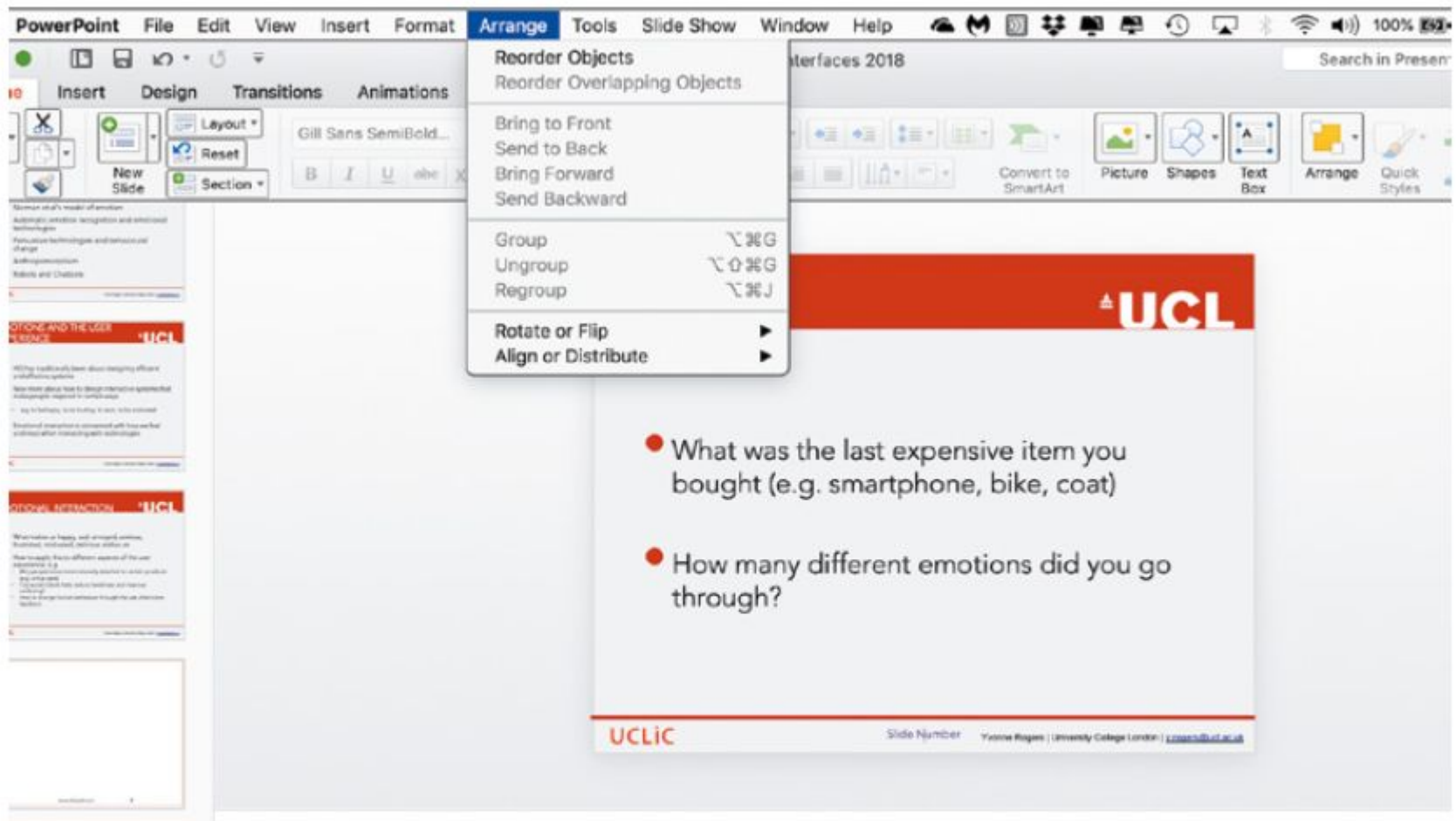Invisible automatic controls can make it more difficult to use

Feedback

- Sending information back to the user about what has been done

- Includes sound, highlighting, animation, and combinations of these

  - For example, when screen button is clicked, it provides sound or red highlight feedback:

 ⟶ "ccclichhk"

 ⟶

Figure 1.12 A menu showing restricted availability of options as an example of logical constraining. Gray text indicates deactivated options.

Source: https://www.ucl.ac.uk

Logical or ambiguous design?

www.baddesigns.com

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

How to design them more logically

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(A) provides direct adjacent mapping between icon and connector

(B) provides color coding that associates the connectors with the labels

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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)

- The main benefit is that 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? (for example, save, spelling, select, style)

- You have to find other initials or combinations of keys, thereby breaking the consistency rule (for example, 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, and so on to be the same across applications and devices

  - Very rarely the case, based on different designer's preference

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. (For example, a mouse button invites pushing, a door handle affords pulling)

- Norman (1988) used the term to discuss the design of everyday objects

- Has since been popularized in interaction design to discuss how to design interface objects (for example, scrollbars to enable moving up and down; icons to click on)

# What does "affordance" have to offer interaction design?

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

- Norman argues that 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

Virtual affordances
- How do these screen objects afford?
- What if you were a novice user?
- Would you know what to do with them?
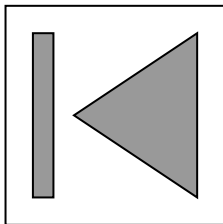
Key points

- Interaction design is concerned with designing interactive products to support how people communicate and interact in their everyday and working lives

- It is concerned with how to create quality user experiences for services, devices, and interactive products

- It is multidisciplinary, involving many inputs from wide-reaching disciplines and fields

- Optimizing the interaction between users and interactive products requires consideration of a number of interdependent factors, including context of use, types of activity, UX goals, accessibility, cultural differences, and user groups.

- Design principles, such as feedback and simplicity, are useful heuristics for informing, analyzing, and evaluating aspects of an interactive product.