Usability

Acceptability

Accessibility

User experiences

Acceptability, Usability, User experience, Accessibility

Kristina Lapin

Lecture 4

Product acceptance by Nielsen
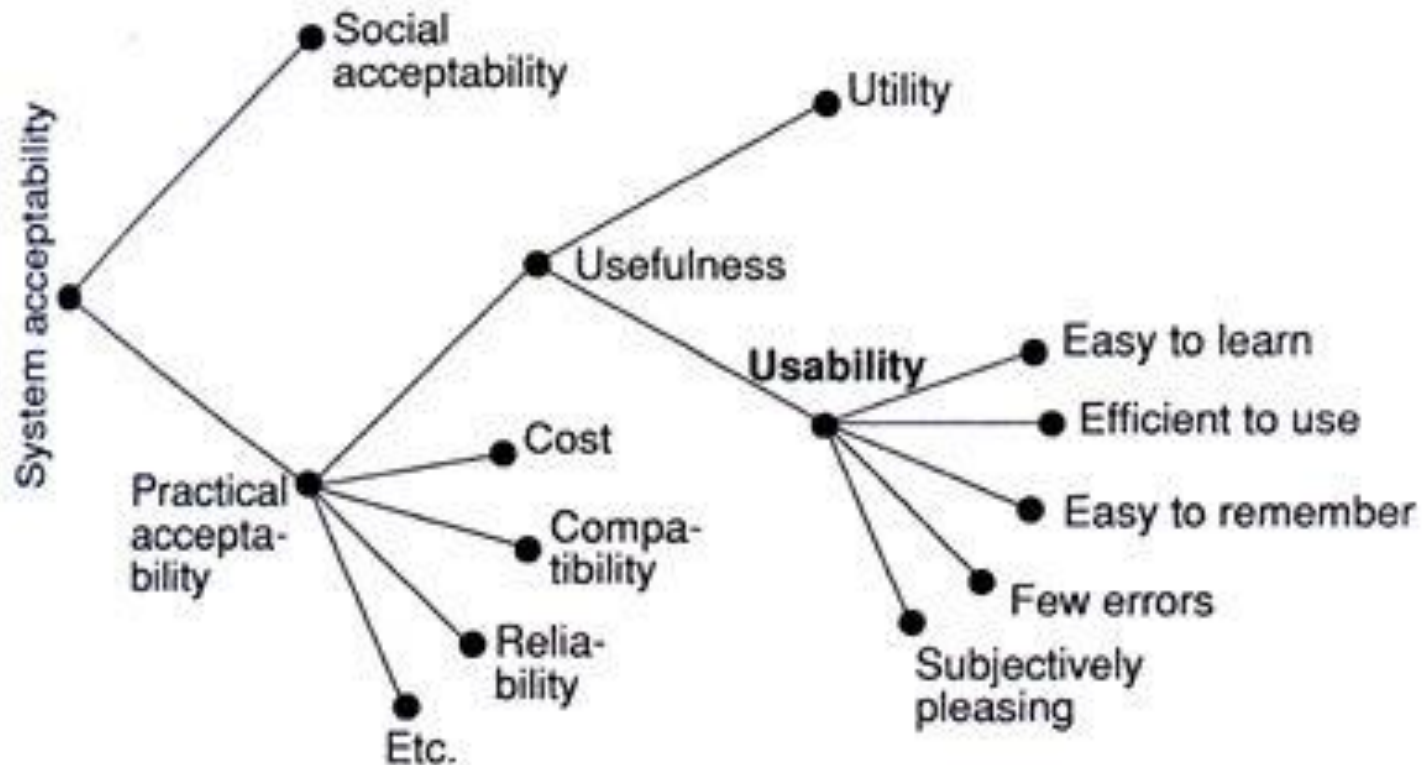
Figure 1 *A model of the attributes of system acceptability.*

Usability of Interactive systems

Acceptability

- Social acceptability
  - Do product goals correspond to values of various groups of stakeholders?
    - Social networking have great promise bring people together but also pose new issues?
      - Complaints about work conditions or bad managers in Twitter
        » might be considered socially acceptable by originator,
        » but person's manager might view this as detrimental to the company
    - Engaging computer games
      - Liked by children but staying for hours can impact the health

Acceptability

- Practical acceptability
  - **Cost**: Does price meet performance quality?
  - **Reliability**: Is the level of privacy and security appropriate to user needs?
  - **Compatibility**: is an application compatible with required hardware and platforms?
  - **Usefulness**: can system be used achieving desired goal?
  - **Utility**: does system provide appropriate for desired goals set of features?
  - **Usability**: how the tasks are performed?

USABILITY

# Definition of usability

- ISO 9241-11
- The extent to which a product can be used
  - by **specified users**
  - to achieve **specified goals**
  - with **effectiveness**, **efficiency** and **satisfaction**
  - in **a specified context of use**.

Usability for desktop applications

ISO 9241 outlines 3 measurable attributes

- Effectiveness:
  - Accuracy and completeness with which users achieve specified goals;

- Efficiency:
  - Resources expended in relation to the accuracy and completeness with which users achieve goals;

- Satisfaction:
  - Freedom from discomfort, and positive attitudes towards the use of the product.

Usability attributes

Usability

Easy to learn Easy to remember Efficient to use Few errors Subjectively pleasing
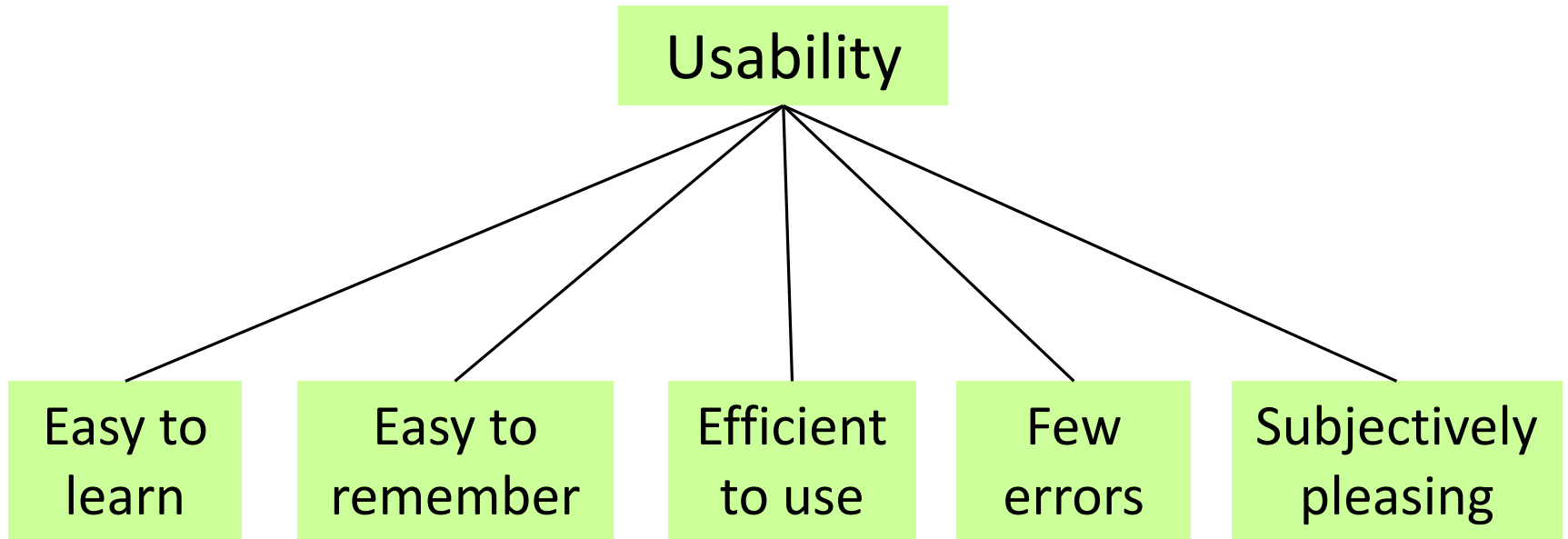
(Nielsen, 2010)

Usability measures

- Learnability
  - How many users are able to complete certain task
    - successfully?
    - In a certain, minimal amount of time?
- Efficiency
  - How much time an experienced user spend performing task?

Usability measures

- Memorability
  - How many casual that are away from the system are able to complete certain task in a certain time

- Few and non-catastrophic errors
  - Number of errors

- Subjective satisfaction
  - Asking users for subjective preferences
    - by filling a short questionnaire
  - In a few cases can be psychophysiological measures
    - heart rate, skin conductivity, blood pressure …

Nielsen's principles vs. ISO 9241
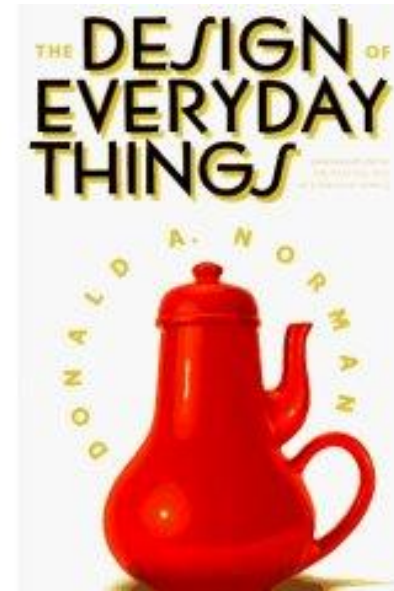
Nielsens principles

1. Learnability
2. Efficiency of use
3. Memorability
4. Few and noncatastrophic errors
5. Satisfaction

ISO 9241

A. Effectiveness
B. Efficiency
C. Subjective satisfaction

Norman's usability principles

- Visibility
- Constraints
- Mapping
- Consistency
- Feedback
- Affordance

Norman, Donald A. (2002). *The Design of Everyday Things*. New York: Basic Books.

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!
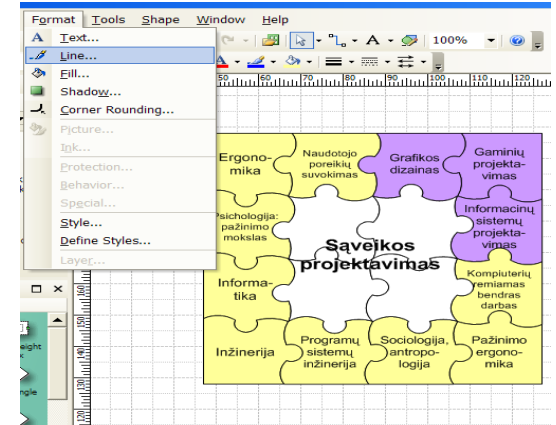
From:
www.baddesigns.com

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

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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

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 ⟶ "ccclichhk"

Previous ⟶ Previous
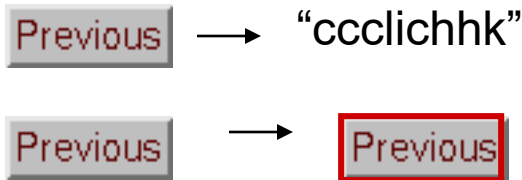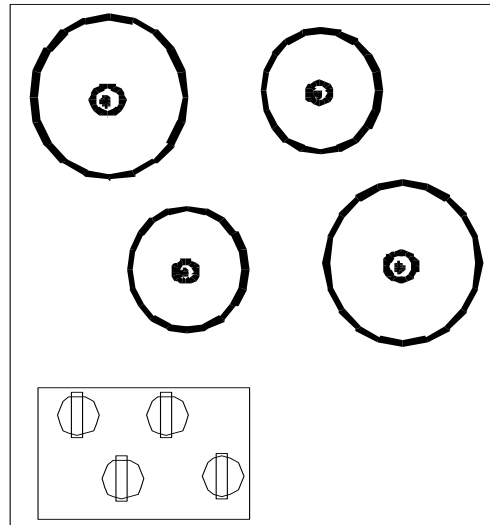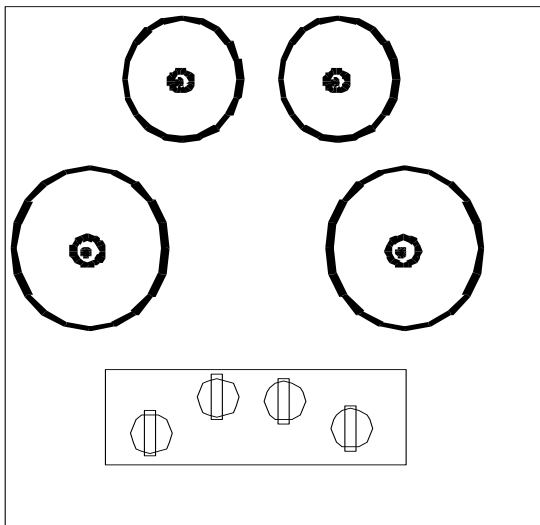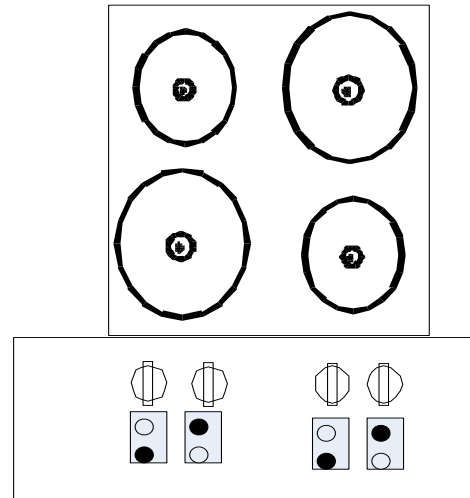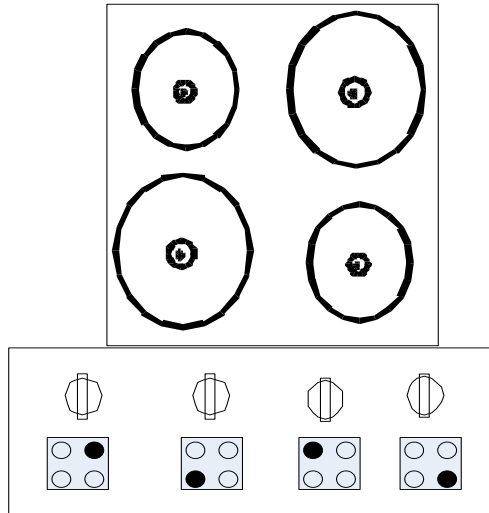
Mapping

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?

From: www.baddesigns.com

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

From: www.baddesigns.com

Consistency

- Design interfaces to have similar operations and use similar elements for similar tasks

- For example:
  - always use `ctrl key + 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

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

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Affordance and interaction design

- 'Perceived' affordances
  - Learned conventions of arbitrary mappings between action and effect at the interface
  - Some mappings are better than others

Examples

– Physical affordances:

How do the following physical objects afford? Are they obvious?
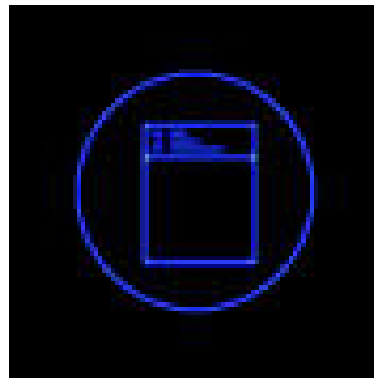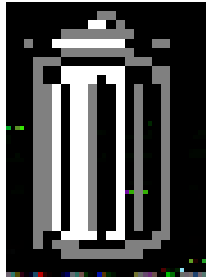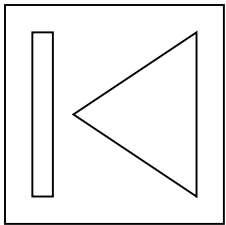
Virtual affordances

How do the following screen objects afford?

What if you were a novice user?

Would you know what to do with them?

Virtual affordances

Affordance on the web page: what can you click on this page?

ACCESSIBILITY

Accessibility: usability for all

- Legislation
  - UK Disability Discrimination Act
  - W3C declarations and guidelines
  - Usability.gov guidelines
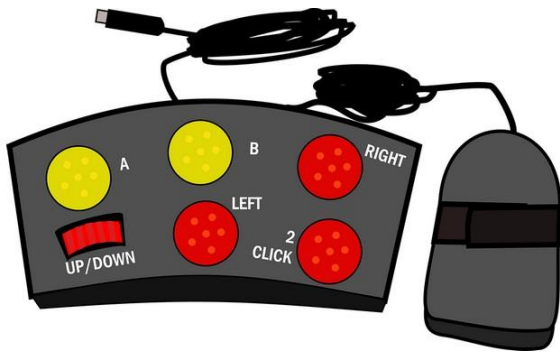
Acessibility

- Concerns removing the barriers that would otherwise exclude some people from using the system at all.

- Excluding reasons:
  - Physically: Inappropriate siting of equipment
  - Conceptually: Cannot understand complicated instructions
  - Economically: Cannot afford essential technology
  - Culturally: Inappropriate metaphors
  - Socially: Equipment is unavailable at an appropriate time and place
    - If people are not members of a particular social group and cannot uinderstand particulat messages

User needs for accessibility

- **Visual:** Long-sightedness, blindness, color blindness, etc.
- **Motor/Mobility:**
  - problems with the use of the *hands* and *arms*
    - which are very likely to cause problems with web accessibility,
  - other muscular or skeletal conditions
- **Auditory:**
  - affect the hearing and come in varying degrees of severity, including total deafness.
- **Epilepsy and other seizures:**
  - light, motion, flickering, etc. on screen, can trigger various attachs, such as photosensitive epilepsy.
- **Learning:**
  - <u>not</u> all disabilities are <u>physical</u>,
  - for example, learning and cognitive disabilities

Web Content Accessibility Principles

Principle 1: Perceivable

Information and user interface components must be presentable to users in ways they can perceive.

Principle 2: Operable

User interface components and navigation must be operable

Principle 3: Understandable

Information and the operation of user interface must be understandable.

Principle 4: Robust –

Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies.

Assistive technologies

Make your computer easier to use

Quick access to common tools
You can use the tools in this section to help you get started.

Windows can read and scan this list automatically. Press the SPACEBAR to select the highlighted tool.

☑ Always read this section aloud   ☐ Always scan this section

Start Magnifier   Start Narrator

Start On-Screen Keyboard   Set up High Contrast

💡 Not sure where to start? Get recommendations to make your computer easier to use

Explore all settings
When you select these settings, they will automatically start each time you log on.

Use the computer without a display
Optimize for blindness

Make the computer easier to see
Optimize visual display

Use the computer without a mouse or keyboard
Set up alternative input devices

Make the mouse easier to use
Adjust settings for the mouse or other pointing devices

Make the keyboard easier to use
Adjust settings for the keyboard

Web Content Accessibility Guidelines [(WCAG) 2.0](#)

- Principle 1: Perceivable
  - Information and user interface components must be presentable to users in ways they can perceive.
  - Guideline example:

  Guideline 1.1 Text Alternatives:
  Provide text alternatives for any non-text content so
  that it can be changed into other forms people need,
  such as large print, braille, speech, symbols or simpler
  language.

The User Experience

- How a product behaves and is used by people in the real world
  - "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

The iPod Nano Touch

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Usability and user experience goals
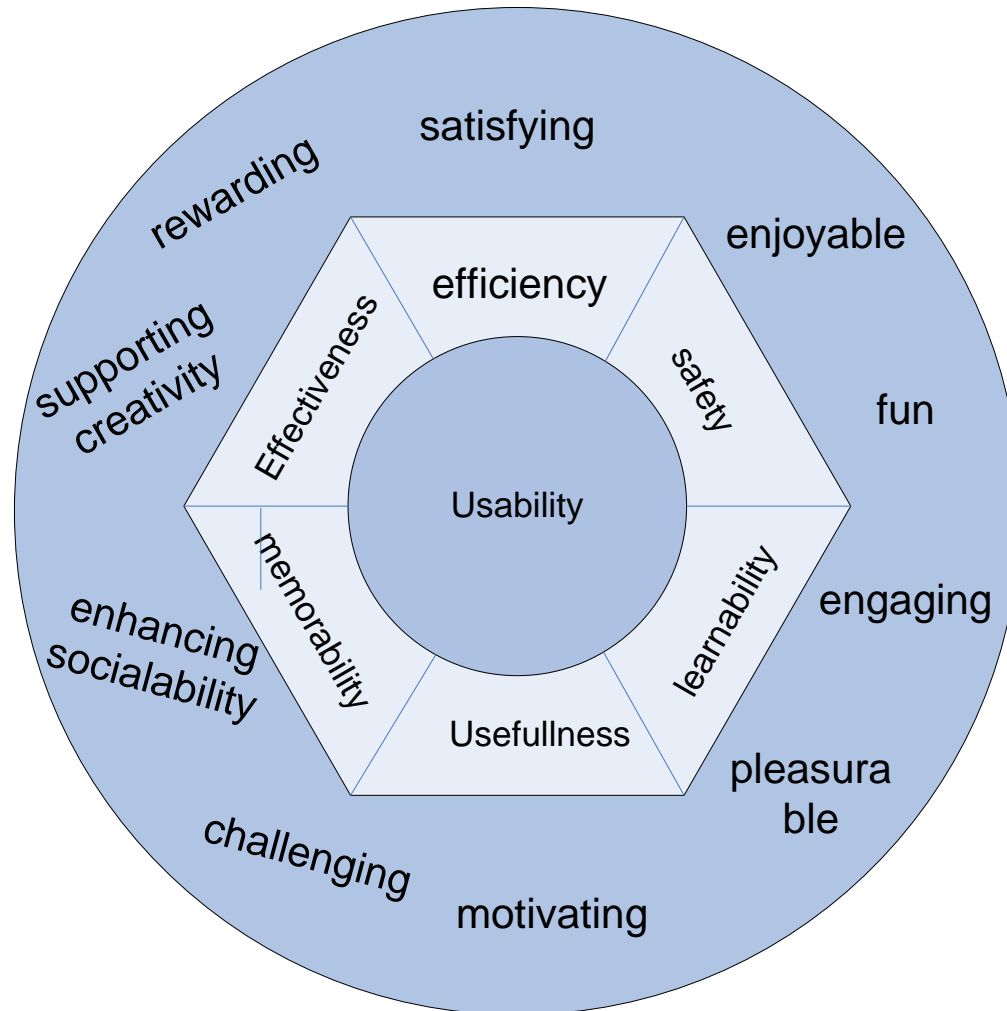
Usability and user experience goals

- Selecting terms to convey a person's feelings, emotions, etc., 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?
  - e.g. 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	

Undesirable aspects

boring	unpleasant
frustrating	patronizing
making one feel guilty	making one feel stupid
annoying	cutesy
childish	gimmicky

USER NEEDS ANALYSIS

User needs analysis

1. Analyse context of use:
   - users, activities and contexts
   - how do they solve their problems now?
2. Identify user goals:
   - What do your users want and need?
3. Define business goals:
   - What do the users need to do for this Web site or application to be a viable investment?

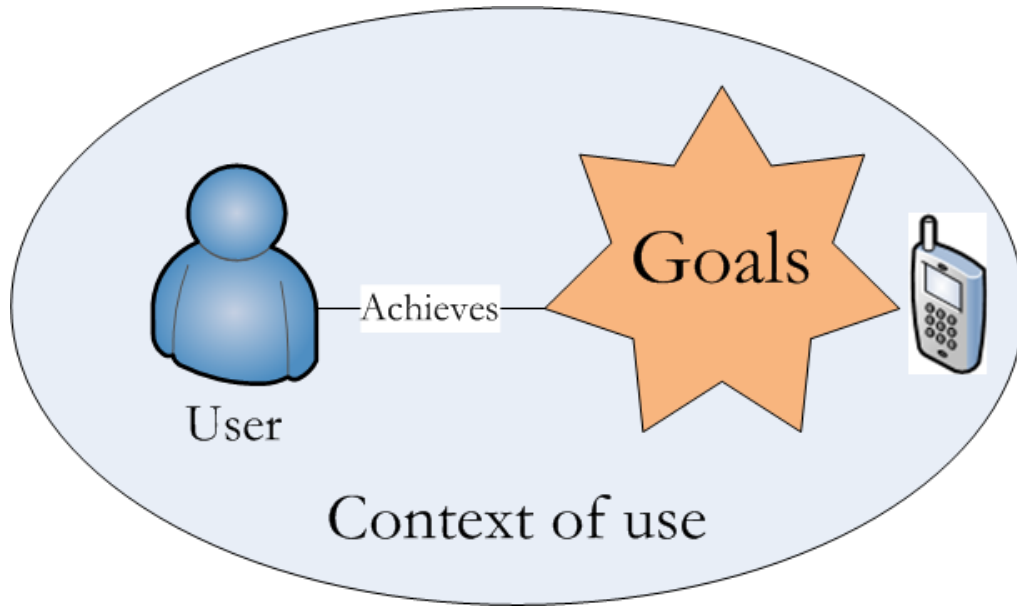# User needs analysis

4. Set the usability objectives:
   – To what extent does the site need to satisfy both the user and the business goals?
   – How do we measure success?
5. Identify the design constraints:
   – Define the budget, the timeline, the project team.
6. Define functional specifications

Usability objectives

Users

Tasks

Usability measures

Mayhew, 1999

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Business goals – usability - UI

Business goal	Usability aspect	User interface solutions
Grow the business by getting more new users to adopt the offered service	Improve the learnability	• Progressive tooltips • Wizards to get people started
Reduce support costs	Reduce and prevent errors	• Formatting information for text fields • Error message enhancements • Diagnostic features
Inspire loyalty among existing users	Reduce navigational requirements	• Shortcuts to frequency used content or features

Tom Brinck, Darren Gergle, and Scott D. Wood. User needs analysis. In *User Experience Re-Mastered*. Morgan Kaufman, 2010, Chapter 2.

Examples of usability objectives

Category	Examples of Specific Objectives
Learning time/ task time	Users will be able to use this site the first time without any training First-time users will be able to find their topic of interest within two minutes of visiting the site; expert users (five or more visits) will be able to find a topic within 30 seconds
Number of errors	Users will not visit more than three incorrect pages (on average) in completing a task Users will make no fatal errors at least 99 percent of the time (such as entering an incorrect credit card or shipping address)
Subjective impressions	On a scale of 1 (really appealing) to 7 (really unappealing), users will rate the site at least a 2.5
Accomplished tasks	At least 75 percent of users who add an item to a shopping cart will complete a purchase At least 95 percent of users who complete their credit card information will complete a purchase
Revisits	At least 50 percent of registered users will return to the site at least once per month

Summary

- Access to interactive systems for all people is an important right.

- Usability is concerned with balancing the PACT elements in a domain.

- Acceptability is concerned with ensuring that designs are appropriate to contexts of use.

- User needs analysis aims at specification of user goals and usability objectives.

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