(Chapter 7 in Text Book - These slides are by the author - Modified (sometimes) by me)

Focusing on Users

By

Linking

Usecase Diagram
Usecase Description
User Interfaces

User Centred Design

Software development should focus on the needs of users

- Understand your users
- Understand their tasks before designing
- Users in decision making processes
- Design the user interface following guidelines for good **usability**
- Prototypes good for feedback

Why focus on users from the beginning

- Reduced training and support costs
- Reduced time to learn the system
- Greater efficiency of use

- Reduced costs by
  - only developing features that are needed
  - reducing changes to the system later
- Better prioritizing of work for iterative development

Characteristics of Users

Software engineers must develop an understanding of the users

- Goals for using the system - WHY they need it?
- Potential patterns of use
- Demographics
- Knowledge of the domain and of computers
- Physical ability
- Psychological traits and emotional feelings

Basics of User Interface Design

- User interface design should be done in conjunction with other software engineering activities.
- Do use case analysis to help define the tasks that the UI must help the user perform.
- Do *iterative* UI prototyping to address the use cases.
- Results of prototyping will enable you to **finalize the requirements**.

Usability vs. Utility

Does the system provide the *raw capabilities* to allow the user to achieve their goal?

- This is *utility*.

Does the system allow the user to *learn and to use* the raw capabilities *easily*?

- This is *usability*.

Both utility and usability are essential

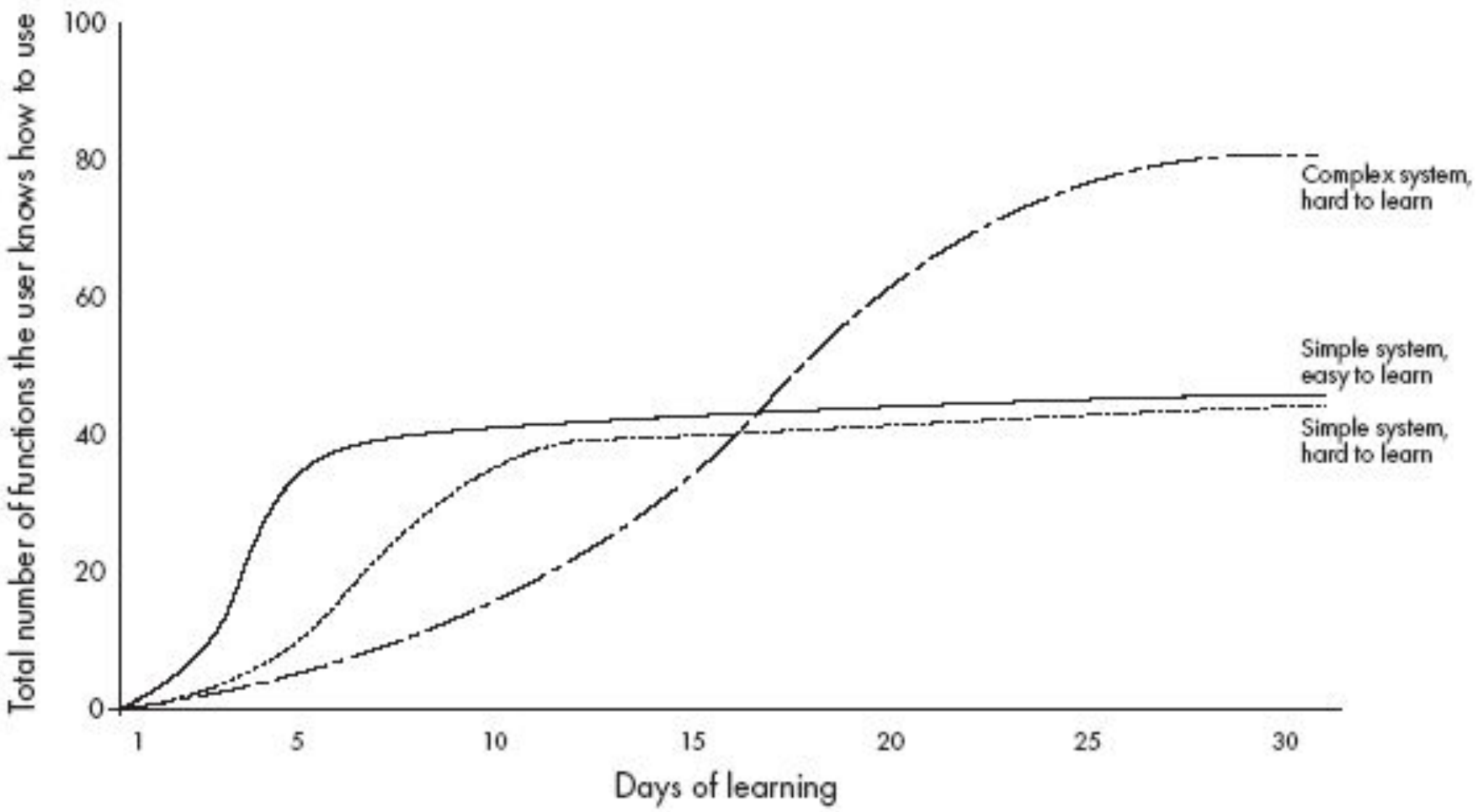
- They must be measured in the context of particular types of users.

Aspects of usability

Usability can be divided into separate aspects:

- Learnability
  - The speed with which a new user can become proficient with the system.
- Efficiency of use
  - How fast an expert user can do their work.
- Error handling
  - The extent to which it prevents the user from making errors, detects errors, and helps to correct errors.
- Acceptability.
  - The extent to which users *like* the system.

Different learning curves



Some basic terminology of user interface design

- **Dialog**: A specific window with which a user can interact, but which is not the main UI window.
- **Control** or **Widget:** Specific components of a user interface.
- **Affordance**: The set of operations that the user can do at any given point in time.
- **State**: At any stage in the dialog, the system is displaying certain information in certain widgets, and has a certain affordance.
- **Mode**: A situation in which the UI restricts what the user can do.
- **Modal dialog**: A dialog in which the system is in a very restrictive mode.
- **Feedback**: The *response from the system* whenever the user does something, is called feedback.
- **Encoding techniques**. Ways of encoding information so as to communicate it to the user.

Some encoding techniques

- Text and fonts
- Icons
- Photographs
- Diagrams and abstract graphics
- Colours
- Grouping and bordering
- Spoken words
- Music
- Other sounds
- Animations and video
- Flashing

A Simple Task

Design a user interface for ATM

- Language
- Withdraw / Change PIN / Check Balance / Transfer
- Text field for “Amount” - Verify and Click Submit
- Authentication
- Success - Give Money
  - Your Balance is _____ [or should we ask]
- Failure - Give Reason
- [CANCEL]

What are the functionalities expected?

A Simple Task

Design THE user interface for ATM

What do we learn from this exercise?

Usability Principles

1. Do not rely only on usability guidelines – *always test with users*.
   - Usability guidelines have exceptions; you can only be confident that a UI is good if you test it successfully with users.

2: Base UI designs on users' *tasks*.
   - Perform use case analysis to structure the UI.

3: Ensure that the sequences of actions to achieve a task are as *simple* as possible.
   - Reduce the amount of reading and manipulation the user has to do.
   - Ensure the user does not have to navigate anywhere to do subsequent steps of a task.

Usability Principles

4: Ensure that the user always knows what he or she can and should do next.

- Ensure that the user can see *what commands are available* and are not available.
- Make the *most important commands stand out*.

5: Provide good feedback including effective error messages.

- Inform users of the *progress* of operations and of their *location* as they navigate.
- When something goes wrong explain the situation in adequate detail and *help the user to resolve the problem*.

Usability Principles

6: Ensure that the user can always get out, go back or undo an action.

- Ensure that all operations can be *undone*.
- Ensure it is easy to *navigate back* to where the user came from.

7: Ensure that response time is adequate.

- Users are very sensitive to slow response time
  - They compare your system to others.
- Keep response time less than a second for most operations.
- Warn users of longer delays and inform them of progress.

Usability Principles

8: Use *understandable encoding techniques*.

- Choose encoding techniques with care.
- Use labels to ensure all encoding techniques are fully understood by users.

9: Ensure that the UI's appearance is *uncluttered*.

- Avoid displaying too much information.
- Organize the information effectively.
  - Google Search Bar

Usability Principles

10: Consider the needs of *different groups* of users.

- Accommodate people from different *locales* and people with *disabilities*.
- Ensure that the system is usable by both *beginners* and *experts*.

11: Provide all necessary *help*.

- Organize help well.
- Integrate help with the application.
- Ensure that the help is accurate.

Usability Principles

12. Be *consistent*.

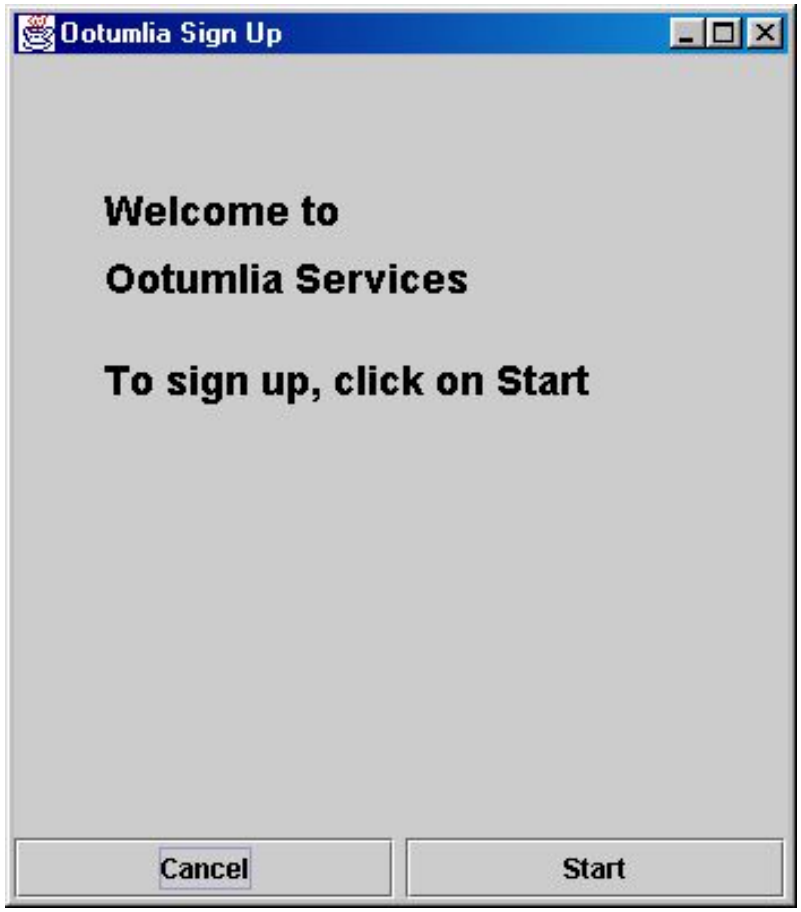
- Use similar layouts and graphic designs throughout your application.
- Follow look-and-feel standards.
- Consider mimicking other applications.

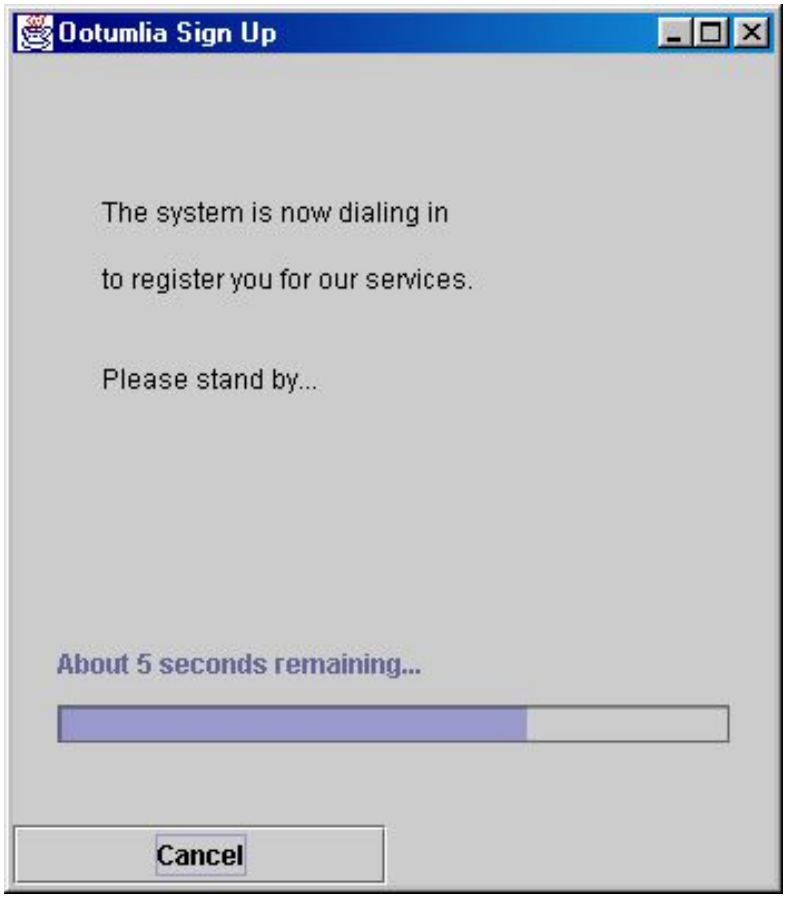
They just need to interact and “get out” successfully.

Example


Ootumlia Sign Up
File
Edit
Help
Personal Info...
Add Addresses...
Add Services...
Welcome to
Ootumlia Services
To sign up, use the Edit menu


Ootumlia Sign Up
Signing you up...
Cancel


Ootumlia Sign Up
Welcome to
Ootumlia Services
To sign up, click on Start
Cancel
Start


Ootumlia Sign Up
The system is now dialing in
to register you for our services.
Please stand by...
About 5 seconds remaining...
Cancel

Evaluating User Interfaces

Heuristic evaluation

1. Pick some use cases to evaluate.

2. For each window, page or dialog that appears during the execution of the use case
   - Study it in detail to look for possible usability defects.

3. When you discover a usability defect write down the following information:
   - A short description of the defect.
   - Your ideas for how the defect might be fixed.

Evaluating User Interfaces

Evaluation by observation of users

- Select users corresponding to each of the actors
- Select the most important use cases
- Write sufficient instructions about each of the scenarios
- Arrange evaluation sessions with users
  - Explain the purpose of the evaluation
  - Preferably videotape each session
  - Converse with the users as they are performing the tasks
  - When the users finish all the tasks, question them
  - Take note of any difficulties experienced by the users
- Formulate recommended changes

Difficulties and Risks in UI Design

Why this is a tough job?

Why it is difficult to get good UI designers?

Difficulties and Risks in UI Design

- **Users differ widely**
  - *Design it for internationalization.*
  - *Satisfy all - Satisfy NONE*
- **User interface implementation technology changes rapidly**
  - *Stick to simpler UI frameworks widely used.*
  - *Avoid fancy stuff - Flexibility is the key.*
  - *Old and Out ?*

Difficulties and Risks in UI Design

- **User interface design and implementation can often take the majority of work in an application**:
  - *Make UI design an integral part of the software engineering process. [Remember Appendix]*
  - *Allocate time for many iterations of prototyping and evaluation.*
  - *No coding, No budge!*
- **Developers often underestimate the weaknesses of a GUI**
  - *Training in UI development*
  - *Study the UIs of good and bad software.*
  - *People will think MY WAY!*

And Finally,

Remember your ATM UI - Needs time and effort.

Do NOT make it the last thing to do.

Good designs ensure usability along with utility.

Always do research and test your assumptions on the field when designing UI

And Finally, UX?

Technology first VS People first

Problem of Tunnel Vision

- Detectives [cannot afford do]
- Doctors [need a lot of time]
- Software Engineers [ego and laziness]

UI

Users