Chapter 3

Managing Design Processes

Outline

- Introduction (usability engineering)
- Four pillars of design
- Development methodologies
- Ethnographic observation
- Participatory design
- Scenario development

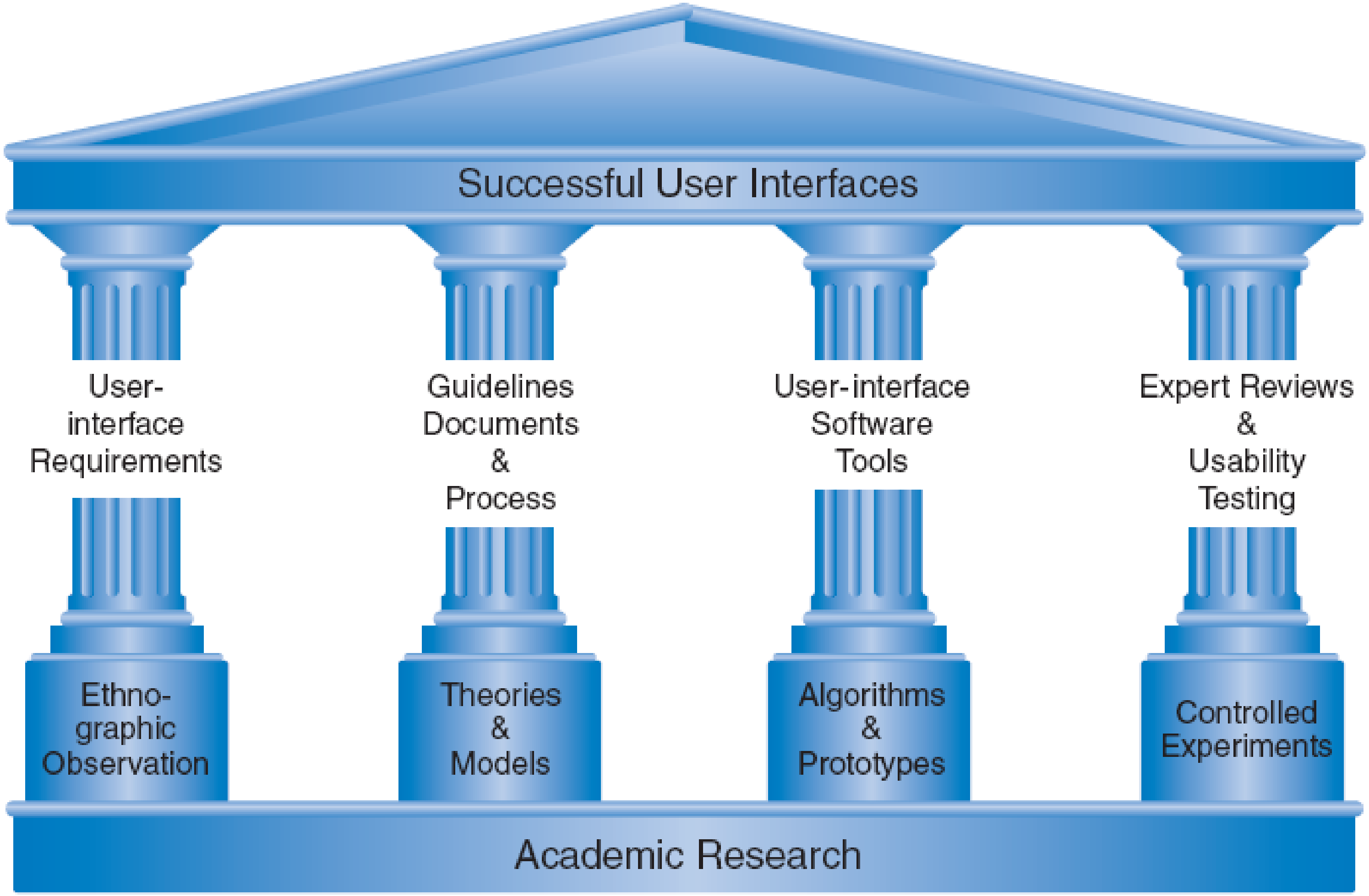
Usability Engineering

- Around the world, usability engineering is becoming a recognised discipline with maturing practices and a growing set of standards.
- Usability engineering is a systematic approach to making software easier to use for the individuals who actually use it to get their work done.
- Like software engineering, it is an evolving science that determines best practices and continually tests and refines its techniques.

Organizational Design and Support Usability

- Organisations are becoming more aware of the importance of usability.
- When competitive products provide similar functionality, usability engineering is vital for product acceptance.
- Many organisations have created usability laboratories.
- Organisations awareness can be stimulated by “usability day” presentations, internal seminars, newsletters and awards.
- Resistance to new techniques and a changing role for software engineers can cause problems in organisations.

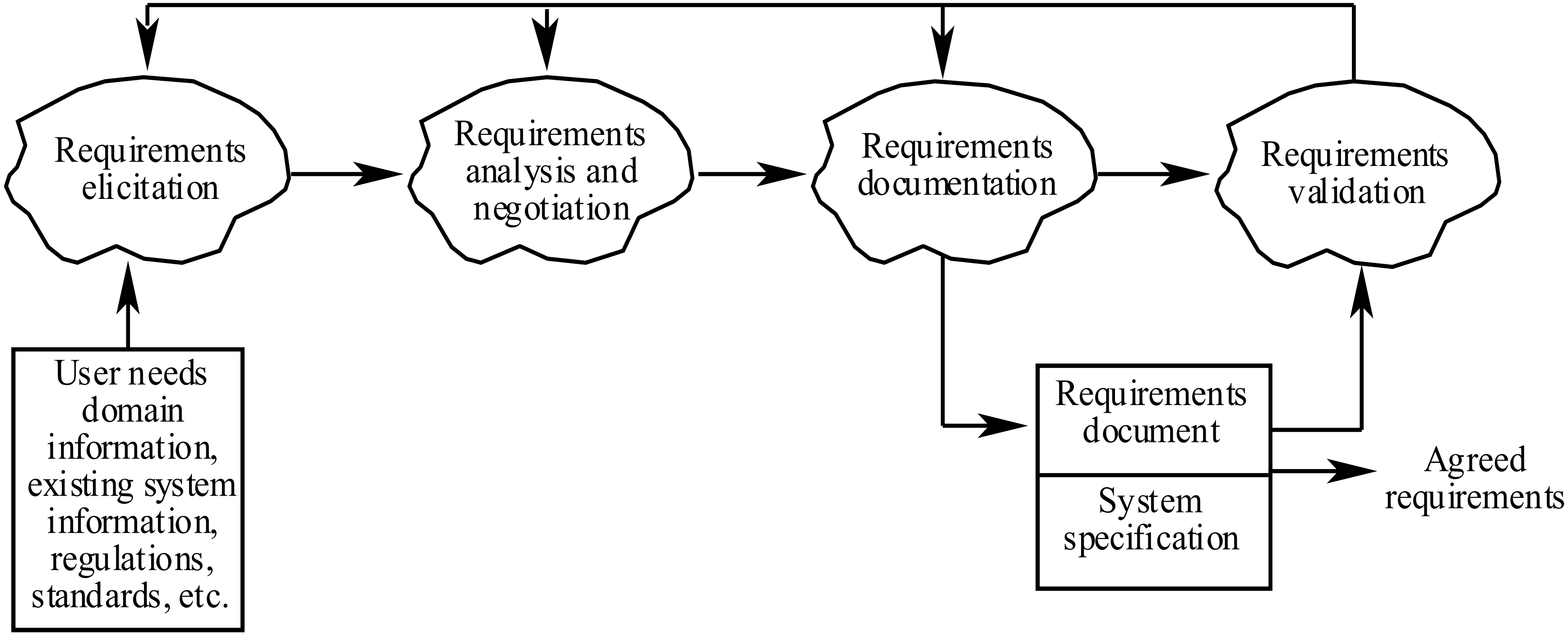
The Four Pillars of Design


Successful User Interfaces
User-interface Requirements
Guidelines Documents & Process
User-interface Software Tools
Expert Reviews & Usability Testing
Ethno-graphic Observation
Theories & Models
Algorithms & Prototypes
Controlled Experiments
Academic Research

User Interface Requirements

- **User Interface Requirements**
  - Soliciting and clearly specifying user requirements is a major key to success in any development activity
  - Laying out the user-interface requirements is part of the overall requirements development and management process
  - User interface requirements describe system behavior
- **Ethnographic Observation**
  - Identifying and observing the user community in action
  - Discussed later

User Interface Requirements


Requirements elicitation
Requirements analysis and negotiation
Requirements documentation
Requirements validation
User needs domain information, existing system information, regulations, standards, etc.
Requirements document
System specification
Agreed requirements

User Interface Requirements

- Requirements elicitation
  - Requirements discovered through consultation with stakeholders
- Requirements analysis and negotiation
  - Requirements are analysed and conflicts resolved through negotiation
- Requirements documentation
  - A requirements document is produced
- Requirements validation
  - The requirements document is checked for consistency and completeness

Requirements Discovery – Laddering

- Used to unpack the respondents’ concepts systematically
- Deals with hierarchically arranged knowledge

Dissertation is well written

↓

clear;

interesting;

lots of web references;

Lots of web references

↓

Ten to twenty;

Guidelines documents and processes

- Early in the design process, the UI architects should generate a set of working guidelines (Chapter 2)
  - e.g. Microsoft’s Windows guidelines
- Each project has different needs, but guidelines should be considered for:
- Words, icons, and graphics
  - Terminology, abbreviations, and capitalization
  - Character set, fonts, font sizes, and styles
  - Icons, buttons, graphics, and line thickness
  - Use of color, backgrounds, highlighting, and blinking

► Guidelines documents and processes

- Screen-layout issues
  - Menu selection, form fill-in, and dialog-box formats
  - Wording of prompts, feedback, and error messages
  - Justification, white space, and margins
  - Data entry and display formats for items and lists
  - Use and contents of headers and footers
- Input and output devices
  - Keyboard, display, and pointing devices
  - Audible sounds, voice feedback, touch input, …
  - Response time for a variety of tasks
  - Alternatives for users with disabilities

► Guidelines documents and processes

- Action sequences
  - Direct-manipulation clicking, dragging, dropping, and gestures
  - Command syntax, and sequences
  - Shortcuts and programmed function keys
  - Error handling and recovery procedures
- Training
  - Online help and tutorials
  - Training and reference materials

Recommendations for guidelines documents

Guidelines creation should be a social process within an organization to help it gain visibility and build support

- Records decisions for all parties to see
- Promotes consistency and completeness
- Facilitates automation of design
- Allows multiple levels:
  - Rigid standards
  - Accepted practices
  - Flexible guidelines
- Announces policies for (4 Es):
  - Education: users training (how to get it)
  - Enforcement: Who will review the guidelines
  - Exemption: room for creative ideas and new technologies
  - Enhancement: reviewing and improving the guidelines

User-interface software tools

- One difficulty in designing interactive systems is that users may not have a clear idea of what the system will look like.
- It is difficult, costly, and time-consuming to make major changes to systems after implementation
- There is no complete solution to this problem but it can be reduced by developing ***prototypes***.
- Many tools are available for developing prototypes at different levels…

Prototyping

- A prototype is an initial version of a system which may be used for experimentation
- Prototypes are valuable for requirements elicitation because users can experiment with the system and point out its strengths and weaknesses. They have something concrete to criticise

Prototyping

Rapid development of prototypes is essential so that they are available early in the elicitation process

- Throw-away prototyping
- Evolutionary (Executable) prototyping

Expert reviews and usability testing

- As rehearsals are necessary for theaters, different tests are necessary for aircrafts designers, expert reviews and usability tests are necessary for interactive systems
- More detail in Chapter 4

Ethnographic Observation

- What is Ethnography?
  - □ Participant observation: joining work or home environments to listen and observe carefully to understand individual behavior, work, and organizational context. It may involve asking questions and participating in activities
  - □ Traditional ethnographers may continue for weeks and months)
  - □ User-interface designers need to limit this process for days or even hours
- Disadvantages:
  - □ It is easy to misinterpret observations and to overlook important information. Also difficult to use the generated data

Guidelines for Ethnographic observation

- Preparation
  - Understand organization policies and work culture.
  - Familiarize yourself with the system and its history.
  - Set initial goals and prepare questions.
  - Gain access and permission to observe/interview.

- Field Study
  - Establish rapport (understanding) with managers and users.
  - Observe/interview users in their workplace and collect quantitative/qualitative data.
  - Record your visits.

► Guidelines for Ethnographic observation

- Analysis
  - Compile the collected data in numerical, textual, and multimedia databases.
  - Quantify data and compile statistics.
  - Reduce and interpret the data.

- Reporting
  - Prepare a report and present the findings.

Participatory Design

- What is participatory design?
  - Designers and users communicate about proposed designs
  - Shared representations of screens etc.
  - Co-design using simple tools such as paper or video scenarios

Participatory Design: Controversy

- On the positive side, more user involvement brings
  - more accurate information about tasks
  - more opportunity for users to influence design decisions
  - a sense of participation and ownership in users
  - potential for increased user acceptance of final system

► Participatory Design: Controversy

- On negative side, extensive user involvement may
  - □ be more costly
  - □ lengthen the implementation period
  - □ build antagonism with people not involved or whose suggestions are rejected
  - □ force designers to compromise their design to satisfy incompetent participants
  - □ Create personality conflicts between design-team members and users

Scenario Development

- Characterize what happens when users perform typical tasks
- Story like descriptions about the usage of the system
- Represent typical tasks
  - can represent common or emergency situations with both novice and expert users
- Many uses of scenarios:
  - task description
  - basis of evaluation
- Tasks descriptions (more formal than scenarios)
  - use-cases (often used these days)
  - flowcharts

Scenario Development - Example Use Cases

Cash withdrawal from an ATM

NORMAL COURSE

A greeting message is waiting

The customer inserts card into machine

If card is acceptable ask for PIN

The customer enters PIN

If PIN is correct display customer accounts and request selection

The customer selects an account

The ATM displays the account limits

The customer enters the withdrawal amount

The bills are dispensed

The card is ejected

The receipt is printed out

Scenario Development - Example Use Cases

Cash withdrawal from an ATM

ALTERNATE COURSE

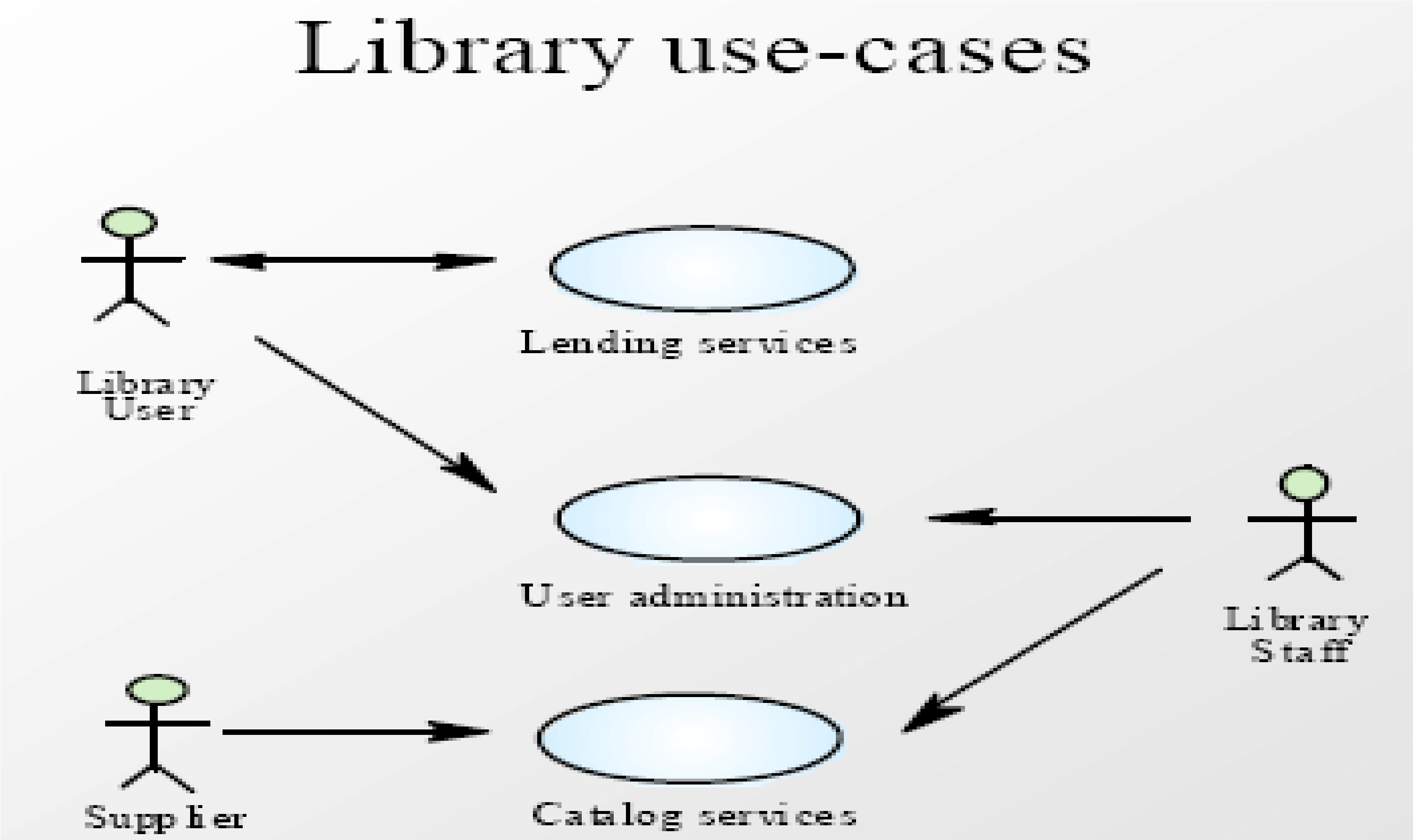
Card is not acceptable

Incorrect PIN code

Withdrawal request too large

Customer cancels

Use Case modeling and documenting



Summary

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