User Profiles

A step in Usability Engineering Lifecycle

Background

- User Interface
  - The languages through which the user and the product communicate
- Usability
  - A measurable characteristic of a product user interface that is present to a greater or lesser degree
  - *Easy-to-learn* (novice and casual users) and *easy-to-use* (for frequent and proficient users)
- Usability Engineering
  - A discipline that provides structured methods for achieving usability in user interface design during product development

Usability

The ISO defines usability as

"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."

ISO [1998]. Ergonomic Requirements for Office Work with Visual Display Terminals (VDTs) – Part 11: Guidance on Usability

(ISO 9241-11:1998)

Usability

To be usable, a product or service must consider, at a minimum, these five basic dimensions.

- Learnability
- Efficiency of use
- Memorability
- Error tolerance and prevention
- Satisfaction

Usability

- Learnability: Learnability is in some sense the most fundamental usability attribute, because most systems need to be easy to learn and because the first experience most people have with a new system is that of learning to use it. Certainly, there are some systems for which one can afford to train users extensively to overcome a hard-to-learn interface, but in most cases, systems need to be easy to learn.
- The most common way to express the specified level of proficiency is simply to state that the users have to be able to complete a certain task successfully. Alternatively, one can specify that users need to be able to complete a set of tasks in a certain, minimum time before one will consider them as having “learned

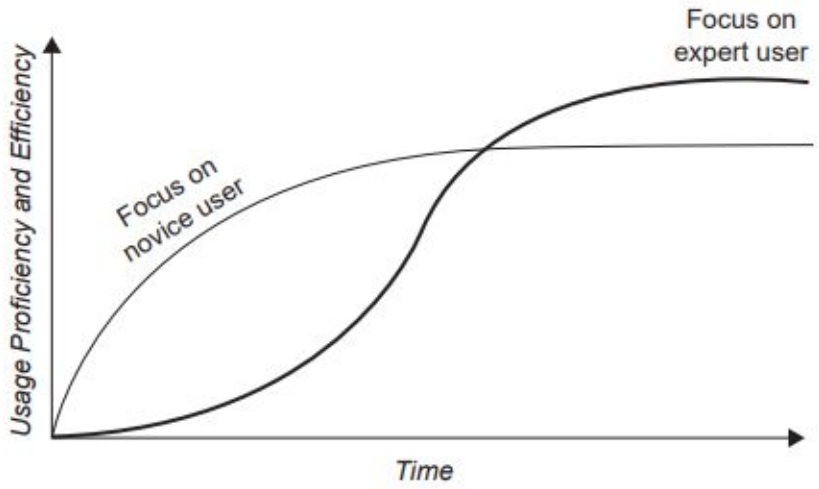


FIGURE 1.2
Learning curves for a hypothetical system that focuses on the novice user, being easy to learn but less efficient to use, as well as one that is hard to learn but highly efficient for expert users.

Usability

- Efficiency of use refers to the expert user's steady-state level of performance at the time when the learning curve flattens out
- To measure efficiency of use for experienced users, one obviously needs access to experienced users. For systems that have been in use for some time, "experience" is often defined somewhat informally, and users are considered experienced either if they say so themselves or if they have been users for more than a certain amount of time, such as a year.
- Experience can also be defined more formally in terms of number of hours spent using the system, and that definition is often used in experiments with new systems without an established user base: test users are brought in and asked to use the system for a certain number of hours, after which their efficiency is measured. Finally, it is possible to define test users as experienced in terms of the learning curve itself: a user's performance is continuously measured (e.g., in terms of number of seconds to do a specific task), and when the performance has not increased for some time, the user is assumed to have reached the steady-state level of performance for that user
- Time to perform test task.

Usability

- Memorability- Casual users are the third major category of users besides novice and expert users. Casual users are people who are using a system intermittently rather than having the fairly frequent use assumed for expert users.
- Having an interface that is easy to remember is also important for users who return after having been on vacation or who for some other reason have temporarily stopped using a program.
- improvements in learnability often also make an interface easy to remember.
- Two main ways of measuring memorability.
  - One is to perform a standard user test with casual users who have been away from the system for a specified amount of time and measure the time they need to perform some typical test tasks.
  - conduct a memory test with users after they fi nish a test session with the system and ask them to explain the effect of various commands or to name the command (or draw the icon) that does a certain thing. The interface's score for memorability is then the number of correct answers given by the us

Link to visibility?

Usability

- Error tolerance & prevention- Users should make as few errors as possible when using a computer system.
- Typically, an error is defined as any action that does not accomplish the desired goal, and the system's error rate is measured by counting the number of such actions made by users while performing some specified task.
- Catastrophic errors

Usability

- Satisfaction- refers to how pleasant it is to use the system.
- Home computing, games, interactive fiction, or creative painting - their entertainment value is more important than the speed with which things get done, because one might want to spend a long time having fun (Carroll & Thomas, 1988)
- Subjective satisfaction may be measured by simply asking the users for their subjective opinion. From the perspective of any single user, the replies to such a question are subjective, but when replies from multiple users are averaged together, the result is an objective measure of the system's pleasantness. can be done through questionaries, rating scale etc.

Usability Requirements

- Usability requirements capture the usability goals and associated measures for a particular product.

Scenario: A system for use in a university's self-service cafeteria that allows users to pay for their food using a credit system

Usability Requirements: The system needs to be simple so that new users can use the system in less then 2 minutes. System should be memorable for more frequent users . Users won't want to wait around for the system to finish processing, so it needs to be efficient and to be able to deal easily with user errors..

Scenario: A system to support distributed design teams, e.g., for car design.

Usability Requirement: Keeping transmission error rate lower then 5% is likely to be of high priority

User Requirements

- User requirements capture the characteristics of the intended user group.

Scenario: A system for use in a university's self-service cafeteria that allows users to pay for their food using a credit system

User Requirement: The majority of users are likely to be under 25 and comfortable dealing with technology.

Scenario: A system to support distributed design teams, e.g., for car design.

User Requirement: Professional designers, who may be worried about technology but who are likely to be prepared to spend time learning a system that will help them perform their jobs better. The design team is likely to be multi-lingual.

Factors to Consider, to Achieve Usability

- Cognitive, perceptual, and motor capabilities and constraints of people in general
- Special and unique characteristics of the intended user population in particular
- Unique characteristics of the users' physical and social work environment
- Unique characteristics and requirements of the users' tasks, which are being supported by the product
- Unique capabilities and constraints of the chosen software and/or hardware and platform for the product

Benefits of user-friendly products to business users

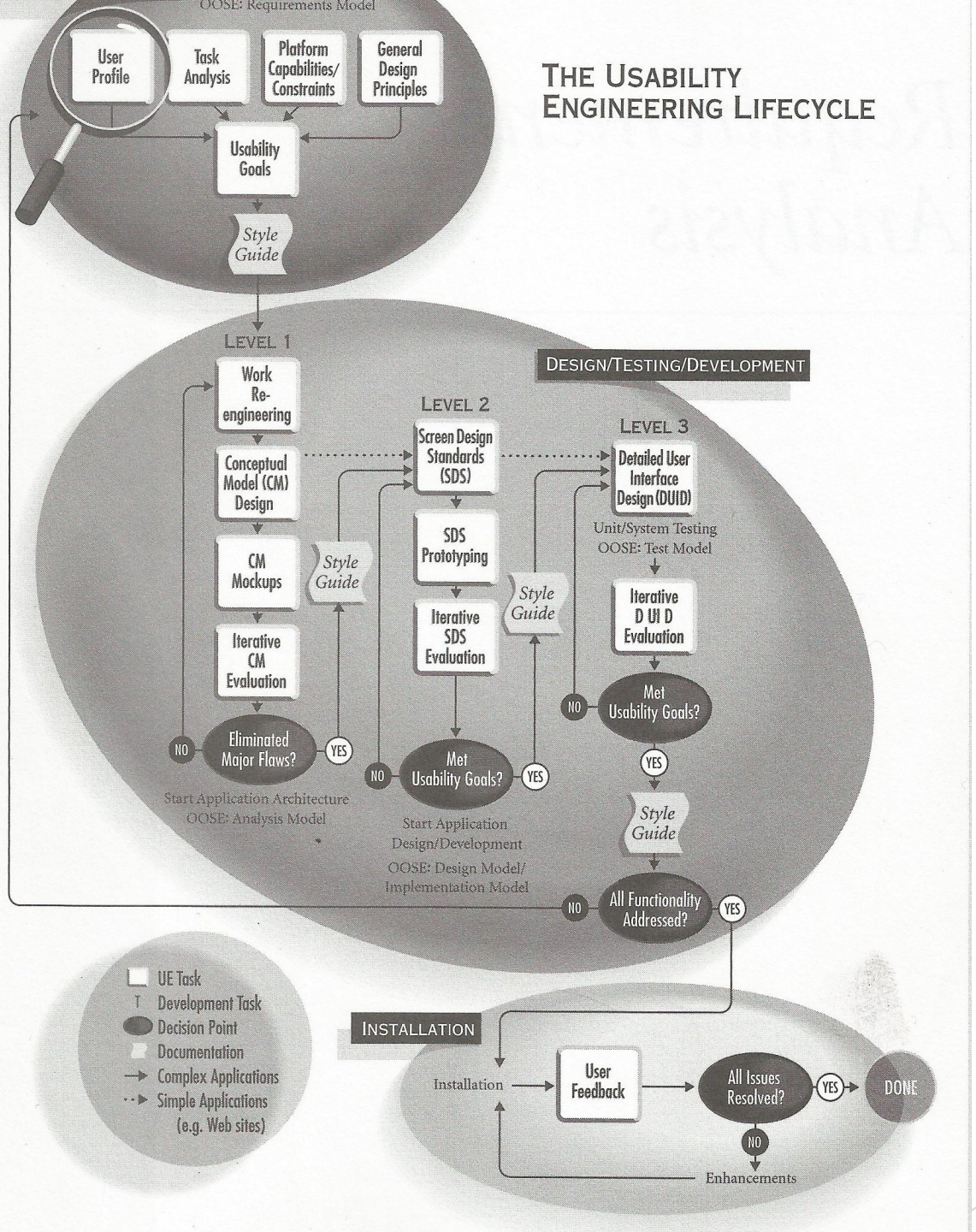
- Increased productivity
- Decreased user training time and cost
- Decreased user errors
- Increased accuracy of data input and data interpretation
- Decreased need for ongoing technical support

Benefits of user-friendly products to development organizations

- Greater profits due to more competitive products/services
- Decreased overall development and maintenance costs
- Decreased customer support costs
- More follow-on business due to satisfied customers

Usability Lifecycle: Tasks we will cover

- User Profile
- Contextual Task Analysis
- Usability Goals
- Conceptual Model Design
- Screen Design Standards
- Detailed Design


OOSE: Requirements Model
User Profile
Task Analysis
Platform Capabilities/ Constraints
General Design Principles
Usability Goals
Style Guide
THE USABILITY ENGINEERING LIFECYCLE
LEVEL 1
DESIGN/TESTING/DEVELOPMENT
Work Re-engineering
Conceptual Model (CM) Design
CM Mockups
Iterative CM Evaluation
Eliminated Major Flaws?
NO
YES
Start Application Architecture
OOSE: Analysis Model
LEVEL 2
Screen Design Standards (SDS)
SDS Prototyping
Iterative SDS Evaluation
Met Usability Goals?
NO
YES
Start Application Design/Development
OOSE: Design Model/ Implementation Model
LEVEL 3
Detailed User Interface Design (DUID)
Unit/System Testing
OOSE: Test Model
Iterative D UI D Evaluation
Met Usability Goals?
NO
YES
All Functionality Addressed?
NO
YES
UE Task
Development Task
Decision Point
Documentation
Complex Applications
Simple Applications (e.g. Web sites)
INSTALLATION
Installation
User Feedback
All Issues Resolved?
YES
NO
DONE
Enhancements

User Profile: Task Summary

Task	Purpose	Description	Techniques	Work Products	Integration
User Profiles	Establish user characteristics around which the UI design must be tailored.	Develop a description of the intended user population in terms of characteristics relevant to UI design.	Questionnaire distributed to users. Interviews with people knowledgeable about users.	Questionnaire/ interview form Data summary Analysis and conclusions	Drives virtually all other tasks except Platform capabilities/ constraints

User Profile: Purpose

- To establish the general requirements of a category of users in terms of overall interface style and approach

User Profile: How to go about it

- Determine user categories: who will use the planned product
- Determine user characteristics relevant to the UI design
  - By gathering data through interviews and/or a **User Profile questionnaire**
  - In vendor organizations, obtain indirectly from marketing personnel
  - In internal development organizations and contract developers, obtain indirectly from human resource personnel
- Draw high level conclusions regarding UI design requirements and document these in narrative format
- A separate User Profile should be summarized for each significant category of users within a market segment or business unit
- Once done, can be reused for each new product for that user category, hence reduces the development cost across projects

Sample Technique: A step-by-step procedure

- Determine User categories
- Determine relevant user characteristics, including
  - Psychological characteristics (e.g. attitude, motivation)
  - Knowledge and experience (e.g. typing skill, task experience)
  - Job and task characteristics (e.g. frequency of use, task structure)
  - Physical characteristics (e.g. color blindness)
- Develop a draft questionnaire
- Get management's feedback on the draft
- Revise the questionnaire
- Conduct a pilot questionnaire with interviews

Sample Technique: A step-by-step procedure (Cont'd)

- Revise the questionnaire
- Select a user sample
- Distribute the questionnaires
- Design data entry/analysis
- Enter data
- Summarize data
- Interpret data
- Present results

- *Demographic characteristics* – age, gender, location, socio-economic status
- *Occupation experience* – current job title, years at the company, years of experience at that position, responsibilities, previous jobs and job titles
- *Company information* – company size, industry
- *Education* – degree, major, courses taken
- *Computer experience* – computer skills, years of experience
- *Specific product experience* – experience with competitors' products or other domain-specific products, usage trends
- *Tasks* – primary tasks, secondary tasks
- *Domain knowledge* – the users' understanding of the product area
- *Technology available* – computer hardware (monitor size, computing speed, etc.), software, other tools typically used
- *Attitudes and values* – product preferences, fear of technology, etc.
- *Learning style* – visual learner, audio learner, etc.
- *Criticality of errors* – in general, the possible consequences of a user's error.

Figure 2.3: *Sample user profile for a travel agent*

Travel Agent (primary) Characteristic Ranges	
Age:	25–40 years (Average: 32 years)
Gender:	80% female
Job Titles:	Travel agent, Travel specialist, Travel associate
Experience Level:	0–10 years (Typical: 3 years)
Work Hours:	40 hours per week; days and times depend on the company
Education:	High school to Bachelors degree (Typical: some college)
Location:	Anywhere in the U.S. (Predominantly mid-west)
Income:	$25,000–$50,000/year; depends on experience level and location (Average: $35,000/year)
Technology:	Some computer experience; high speed internet connection
Disabilities:	No specific limitations
Family:	Single or married (Predominantly married with 1 child)

User Profile: Questionnaire Guidelines

- Some questions should be kept together
  - User categories Identifiers
  - Those which refer to each other
- Others should be randomly distributed across the questionnaire to reduce response bias.
- A short cover letter should be provided telling the purpose and benefits of User Profiles
- Use bold to highlight key aspects of questions and answers
- Considerable white space is used, especially where respondents are expected to write in answers
- Give users an estimate of the time it will take to finish it

User Profile: Questionnaire Guidelines (Cont'd)

- Use mostly multiple choice questions instead of subjective questions, where respondents may need to make guesses
- Do not ask questions directly about the UI design colors, buttons placing, etc.
- Order choices in an ascending or descending order to poll attitudes or opinions (e.g. "like", "neutral", "dislike")
- For self-assessment questions, order from lowest to highest skill
- Design questions to neutral, as not to lead users and introduce a response bias
- In MCQs, make sure choices are *mutually exclusive*

User Profile: Data Entry and Analysis Guidelines

	Q8	Enjoy learning computers	
Respondents	Yes	Sometimes	No
1	1		
2		1	
3	1		
Sums	2	1	0
Percentage	67	33	0

User Profile: Data Entry and Analysis Guidelines (Cont'd)

	Q9	Interested in computers	
Respondents	Not interested	Only as a means	Am interested
1			1
2		1	
3		1	
Sums	0	2	1
Percentage	0	67	33

User Profile: Data Summary Guidelines

- Each question from the original questionnaire is recorded, using same question numbers and abbreviated answers
- Questions are grouped in related category rather than in the order they appear in the questionnaire
- The percentage of respondents who answered in each MCQ is recorded for each question

User Profile: Sample Data Summary

XYZ Insurance Application—
User Profile Data Summary

Overall Business Organization: Individual Insurance

User Category:

Job title:	Supervisors
Geographic area(s):	All
Total respondents:	43
% of total at geographic area:	33%
Level of automation:	High

Attitude and Motivation:

5. Feel about computers

.13	don't like
.48	neutral
.39	like

6. Affected your job

.16	more difficult
.56	neutral
.28	easier

7. Learning pays off

.24	no
.39	neutral
.37	yes

8. Enjoy learning apps

.74	no
.14	sometimes
.12	yes

9. Interested in computers

.10	not interested
.78	only as a means
.12	interested

Knowledge and Experience:

10. Typing skill

.91	< 15 wpm
.06	15–50 wpm
.03	> 50 wpm

11. Highest degree

.00	no
.05	high school
.00	trade
.76	college
.19	graduate

12. Job experience

.05	< 1 year
.07	1–3 years
.88	> 3 years
.00	other

User Profile Conclusions and Design Implications Guidelines

- Arrange according to the user categories
- Include a general description of the user category
- Summarize the user characteristics
- Infer Usability Requirements from this summary

Usability Requirements Summary

	Ease of learning	Ease of use	Simplicity	Visuals / Icons	Minimal typing	Color Vision Deficit	Other Vision Deficit
Production	XX	X	X	X	XX	X	X
Engineering		X				X	X
Clerical		XX					X
QA	X		X		X	X	X
Supervisor	X		X	X	X	X	X
Manager		X	X		X	X	X