Usability

What does it mean that something is usable?

- Satisfactory
- Learnable
- Simple
- Easy to learn
- Forgiving
- Nice
- Inexpensive
- Efficient
- Inspiring
- Useful
- Error preventing
- Self explanatory
- Doesn’t require a manual
- Neat design
- Anyone can use it
- Intuitive
- Effective
- A total experience
- Immediate
- Grandma can use it!
Which road may I not choose?
User Centered Systems Design, spring 2010

User centered systems design. Part 1: Introduction and Usability

Confusion over Palm Beach County ballot

Although the Democrats are listed second in the column on the left, they are the third hole on the ballot.

(PARTY)  (NAME)  (STATE)  (VOTE)

REPUBLICAN

GEORGE W. BUSH  PREIDENT
DICK CHENEY  VICE PRESIDENT

DEMOCRATIC

AL GORE  PRESIDENT
JOHN EDWARDS  VICE PRESIDENT

LIBERTARIAN

HARRY BROWN  PRESIDENT
ART BAVIER  VICE PRESIDENT

GREEN

Ralph NaDER  PRESIDENT
WINONA LaJIOKE  VICE PRESIDENT

SOCIALIST WORKERS

JAMES HARRIS  PRESIDENT
MARGARET TROCHE  VICE PRESIDENT

NATIONAL LAW

JOHN HAGEN  PRESIDENT
JAY GOLDHAIDER  VICE PRESIDENT

SOCIALIST

DAVID MERZEL  PRESIDENT
MARY CAI HOLLIS  VICE PRESIDENT

CONSTITUTION

HOWARD PHILLIPS  PRESIDENT
J. CUNES TRADER  VICE PRESIDENT

WORKERS WORLD

MONICA MAURICE  PRESIDENT
GLORIA LE RIVA  VICE PRESIDENT

WRITE IN CANDIDATE

To vote for a write-in candidate, follow the instructions on the long stub of your ballot card.

Punching the second hole costs a vote for the Reform Party.

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User centered systems design. Part 1: Introduction and Usability

Kopiera till "Eudora Pro Folder"

Objekt kvar att kopiera: 1

Stopp

Återstående tid: Cirka 1155 timmar

Några objekt på den här platsen har samma namn som objektet du flyttar. Vill du ersätta dem?

Ändra OK

Ein papper har fastnat i skrivaren. Klicka på fortsatt när du tagit bort det.

$0:60

IT-frågan: Brukar du svara på enkäter på nätet?

Ja

Iblend

Nej

Ja, alltid

Se resultat

UCSD 5 ECTS credits January 20, 2010 © Jan Gulliksen, 2010
Usability

- People tend to believe that usability is something that can be added on. That is not true!
- The usability of a system is defined 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 9241-11 Guidance on usability
Usability according to ISO 9241-11

- **Usability** – “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.”
- **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 to the use of the product.”
- **Context of use** – “users, tasks, equipment (hardware, software and materials), and the physical and social environments in which a product is used”

Attributes of system acceptability

- Social acceptability
  - Usefulness
  - Utility
- Practical acceptability
  - Usability
  - Easy to learn
  - Efficient to use
  - Easy to remember
  - Few errors
  - Subjectively pleasing
- Cost
- Compatibility
- Reliability
- Etc.

From Nielsen (1993) Usability Engineering
Usability according to Jacob Nielsen (1993)

- **Easy to learn**: In order for the user to quickly get on with his/her work.
- **Efficient to use**: Once the user has learned to use the system it must be efficient to work with.
- **Easy to remember**: It should be possible to return to the system after a period of absence and still remember how it works.
- **Few errors**: The user should do as few errors as possible. If errors are made it must be possible to easily recover and get back to the situation where the user was before the error occurred.
- **Subjectively pleasing**: The user should feel good about using the system, like to work with it.

Metrics

- Usability can be measured.

  ...but usability is much more than metrics!

- Effectiveness, efficiency and satisfaction can ultimately be measured according to ISO 9241-11.
- Task and goal **support** is much harder to measure.
- Usability metrics are not easy to “translate” into design solutions. It is one thing to establish the goals and measure them, another thing to design accordingly.
Measuring usability

- When specifying or measuring usability, the following information is needed (ISO 9241-11):
  - A description of the intended goals;
  - A description of the components of the context of use including users, tasks, equipment and environments;
  - Target or actual values of effectiveness, efficiency and satisfaction for the intended contexts.

Measures of usability in ISO 9241-11

<table>
<thead>
<tr>
<th>Usability objective</th>
<th>Effectiveness</th>
<th>Efficiency</th>
<th>Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall usability</td>
<td>Percentage of goals achieved.</td>
<td>Time to complete a task.</td>
<td>Rating scale for satisfaction.</td>
</tr>
<tr>
<td></td>
<td>Percentage of users successfully completing task.</td>
<td>Tasks completed per unit time.</td>
<td>Frequency of discretionary use.</td>
</tr>
<tr>
<td></td>
<td>Average accuracy of completed tasks.</td>
<td>Monetary cost of performing the task.</td>
<td>Frequency of complaints.</td>
</tr>
</tbody>
</table>
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User centered systems design. Part 1: Introduction and Usability

Metrics described in ISO 9241-11

<table>
<thead>
<tr>
<th>Usability objective</th>
<th>Effectiveness</th>
<th>Efficiency</th>
<th>Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meets needs of trained users</td>
<td>Number of power tasks performed. Percentage of relevant functions used.</td>
<td>Relative efficiency compared with an expert user.</td>
<td>Rating scale for satisfaction with power features.</td>
</tr>
<tr>
<td>Meets needs to walk up and use</td>
<td>Percentage of tasks completed successfully on first attempt.</td>
<td>Time taken on first attempt. Relative efficiency on first attempt.</td>
<td>Rate of voluntary use.</td>
</tr>
<tr>
<td>Meets needs for infrequent or intermittent use</td>
<td>Percentage of tasks completed successfully after a specified period of non-use.</td>
<td>Time spent on re-learning functions. Number of persistent errors.</td>
<td>Frequency of reuse.</td>
</tr>
<tr>
<td>Minimization of support requirements.</td>
<td>Number of references to documentation. Number of calls to support. Number of accesses to help.</td>
<td>Productive time. Time to learn to criterion.</td>
<td>Rating scale for satisfaction with support facilities.</td>
</tr>
<tr>
<td>Learnability</td>
<td>Number of functions learned. Percentage of users who manage to learn criterion.</td>
<td>Time to learn to criterion. Time to re-learn to criterion.</td>
<td>Rating scale for ease of learning.</td>
</tr>
<tr>
<td>Error tolerance</td>
<td>Percentage of errors corrected or reported by the system. Number of user errors tolerated.</td>
<td>Time spent on correcting errors.</td>
<td>Rating scale for error handling.</td>
</tr>
<tr>
<td>Legibility</td>
<td>Percentage of words read correctly at normal viewing distance. Time to correctly read a specified number of characters.</td>
<td></td>
<td>Rating scale for visual discomfort.</td>
</tr>
</tbody>
</table>

1. In these examples the resources should be measured in relation to a specified level of effectiveness.

Going beyond metrics and usability goals

- The most well known and used usability goal is the one saying that: “a certain task must not take longer than 2 minutes to complete”.
- Meeting such a requirement does not have any influence on the overall usability of the system.
- Nevertheless, usability metrics are important until you reach a mature UCSD process.
- A UCSD process focuses more on usability as a quality.
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Good (?) Usability requirements

- “The system must be easy to learn.”
- “The system must be efficient.”
- “The system must follow ISO 9241-10”
- “The system must be user friendly”

Requirements or goals?

Levels of usability goals

- Current level. Measured either in the manual process or with the current or competitive product and used as a benchmark to set minimum acceptable levels for the planned product.
- Minimum acceptable level. Used during iterative evaluation and re-design to determine when to stop iterating.
- Target level. Used to drive and focus the design effort, actual expected level.
- Optimal level. Used as a target for the long term. What should be possible if time, money, etc. were not considered?

Whiteside, Bennett & Holzblatt, 1988
Assignment: Design of a parking meter

- Requirement specification for a parking meter
  - The parking meter must be burglar safe.
  - It must be possible to pay both with credit cards and with coins.
  - It should be possible to pay per hour, day or month.
  - It must be possible to undo.

- Assignment: Add usability requirements to the requirements mentioned above.

Assignment

Usability requirements for a parking meter.

- Are the requirements measurable?
- How will they be measured?
- Do the requirements fully cover all the usability aspects of the system?
- Do the usability requirements involve the functional requirements?
- Have all aspects of usability been taken into consideration?
- Which requirement is the most important one?