Resilience Scaling Technologies - Usability

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Contributors

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- Review panel
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- Propose a usability-centered reading of D13 (from resilience building to resilience scaling technologies: directions)
Definition

Neilsen’s definition [Nielsen, 1993] of usability is a quality attribute that assesses how easy it is to use an interface and learn how to use it. The word "usability" also refers to the ease with which a product can be used during the design process. It is the degree to which the target users are able to accomplish their goals with effectiveness, efficiency, and satisfaction. (Nielsen, 1993) 

- Learnability (how easy is it to learn the design?)
- Transferability (how well can users apply previously learned the design, how quickly can users perform actions in the system?)
- Efficiency (how fast can users complete a task in the system?)
- Error rate (how many errors will users make, how severe are the errors? can users recover from the errors?)
- Memorability (will the users remember how to use the design? future)
Resilience Scaling Technologies

- Diversity
- Assessability
- Evolvability

**Usability**: At the core of a research domain

- ACM SIGCHI largest SIG (Special Interest Group) at ACM
- 8.87% of downloaded papers in the ACM DL (first of all SIGs)
- UPA (Usability Professional Association)
- World Usability Day every year

Diversity of input/output/interaction to increase communication bandwidth (multimodal interfaces, interaction design, …)

**Usability - Diversity**

Systems complexity
- Number of functions
- Number of users

Human Capabilities
- Motor
- Information processing
- Human-Computer interaction

Time
Usability - Diversity

- Diversity on Input/output devices and interaction techniques
- Diversity of users
  - Web applications (e-gov, …)
  - Gaming (want to know more about that?)
  - Command and control systems (responsibility, …)
  - Peace keeping operations (OTW) (language, training, …)
- Diversity of contexts of use

Usability - Assessability

- COST action 294 MAUSE on MAturing USability Evaluation Methods
  - Methods
  - Tools
  - Formative - Summative evaluation
- Usability laboratories
- Usability heuristics
- What do to with the measures … Prodi-Berlusconi debate “you use statistics like a drunk man on the street uses a pavement lamp; not for seeing better but for standing still”
Designing for Evolvability

Why Software Projects Fail (source Boehm 2006) - Average overrun: 89.9% on cost, 121% on schedule, with 61% of content

352 companies - 8,000 software projects. Source: The Standish Group, 1995

Usability – Evolvability

- Users evolve too
  - Practice
  - Training
  - Aging
- Evolution by means of barriers
  - Barrier = systems that prevent or stop anything
  - Ammunition loading problem in tanks
    - Recurrent problem
    - No recorded problem on operation
    - Solution to re-design and deploy new load
    - Usage study on operation (3 days)
- Same philosophy in software (patches) - what about the resilience of such systems?
- Problem with web applications
Overview of the Talk

- Introduction to Usability principles
  - Definition
  - The specificity of Usability with respect to the other resilience scaling technologies
- Categorisation of the identified research gaps
- Detailed presentation of the research gaps descriptions
- Conclusions
Usability Research
Gaps Descriptions

Usability
Assessability –
Diversity –
Evolvability

Usability Research
Gaps Descriptions
& Explicit Gaps –
All the Research Gaps Descriptions Dealing with Usability and related to Development Processes
All the Research Gaps Descriptions Dealing with Usability influenced by Context

LEGEND

Usability gap
Highly related: made explicit in the gap
Refined but not made explicit in the gap

17

All the Research Gaps Descriptions Dealing with Usability and raising new issues (not addressed by standard Usability)

LEGEND

Usability gap
Highly related: made explicit in the gap
Refined but not made explicit in the gap

18
0) Context
1) Contextual Usability

- Plasticity of user interfaces
  - Diversity of contexts
  - Dynamic evolvability of the presentation
  - Assessability of the usability of context aware systems (Usability Metrics GU1)
    - Of each presentation
    - Of the evolvability (context confusion GU3)
- Roles migration - function allocation – authority sharing
  - Modes
  - Keeping the user in the loop
- User Errors (context)
  - Reducing the likelihood
  - Reducing the impact
  - Increasing the recovery

2) Usability Metrics - Assessment

- UEMs conducted by experts
  - Usability Inspection Methods, Guideline Reviews, ...
  - Any type of interactive systems
- UEMs involving the user (User Centred Design GU2)
  - Empirical evaluation, observations, ...
  - Any type of interactive systems (from low-fi prototypes to deployed applications)
- Computer supported UEMs
  - Automatic testing based on guidelines, ...
  - Task or system models-based evaluations (modelling aspects of HCI GU4), metrics-based evaluation, ...
  - Applications with standardized interaction techniques (Web, WIMP)
3) Development process

- There is a need for (GU4 Modelling aspects of HCI)
  - Methods
  - Processes
  - Notations
  - Tools
- to deal with the user interface design, construction and evaluation (GU1 Usability Metrics)
- to address the new challenges raised by ubiquitous systems and to support
  - Diversity of users and contexts of use (GU3 context confusion)
  - Evolvability of needs and uses situations (GU3 context confusion)
  - Assessability of the usability (GU1 usability metrics)
- Designing for usability makes things more complicated
4) Beyond Standard Usability

Two-dimensional affective space defined by valence and arousal: The circumplex model of affect (Russell, 1980).

UX versus Usability

<table>
<thead>
<tr>
<th>Holistic</th>
<th>UX focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do-good</td>
<td>Be competent, be happy)</td>
</tr>
<tr>
<td>Instrument</td>
<td>Be balanced toward pragmatic and pragmatic</td>
</tr>
<tr>
<td>Efficient</td>
<td>Personal subjective (chair is not at all but I’ll buy it)</td>
</tr>
<tr>
<td>Perform</td>
<td>Personal subjective (ask/interpret how the results)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subjective</th>
<th>UX focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Object</td>
<td>Task/interpret how the results</td>
</tr>
<tr>
<td>Positive</td>
<td>UX focus</td>
</tr>
</tbody>
</table>

Avoid Hygiene
Prevent errors
Conclusion

- 6 research gap descriptions have been provided and presented (central to usability)
- They define a set of important research challenges for addressing resilience of interactive systems (paving the way for the next 18 months of ReSIST)
- They do not cover all the issues … by far
  - Management
  - Training
  - Work procedures
  - Cooperative activities
  - …

In Usability the key is the key...

- Whatever tool you select you will be able to use them differently
- You may build the machine the rest do as they want
- You may inform, you may define a process but they might follow the simplest and easiest for them
Thank you for your attention

Questions?

Top 10 Games Industry Facts

1. US computer and video game software sales grew six percent in 2006 to $7.4 billion – almost tripling industry software sales since 1996.
2. Sixty-seven percent of American heads of households play computer and video games.
3. The average game player is 33 years old and has been playing games for 12 years.
4. The average age of the most frequent game buyer is 38 years old. In 2007, 92 percent of computer game buyers and 80 percent of console game buyers were over the age of 18.
5. Eighty-five percent of all games sold in 2006 were rated "E" for Everyone, "T" for Teen, or "E10+" for Everyone 10+. For more information on ratings, please see www.esrb.org.
6. Eighty-six percent of game players under the age of 18 report that they get their parents’ permission when renting or buying games, and 91 percent say their parents are present when they buy games.
7. Thirty-six percent of American parents say they play computer and video games. Further, 80 percent of gamer parents say they play video games with their kids. Sixty-six percent feel that playing games has brought their families closer together.
8. Thirty-eight percent of all game players are women. In fact, women over the age of 18 represent a significantly greater portion of the game-playing population (31%) than boys age 17 or younger (20%).
9. In 2007, 24 percent of Americans over the age of 50 played video games, an increase from nine percent in 1999.
10. Forty-nine percent of game players say they play games online one or more hours per week. In addition, 34 percent of heads of households play games on a wireless device, such as a cell phone or PDA, up from 20 percent in 2002.