Evaluating User Experience Using the UX Graph and Experience Recollection Methods

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Agenda

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Part 2: Satisfaction Is a Measure for UX
   2. UX
   3. Quality Characteristics and UX

Part 3: Evaluation of UX
   5. ESM (Type R)
   6. TFD (Type R)
   7. UX Curve (Type M)
   8. UX Graph (Type M)
   9. ERM (Type M)
Part 1: When EX Evaluation Should Be Done?

1. BUSINESS PROCESS AND DESIGN PROCESS
Human-Centered Design Process
(ISO 9241-210:2010)
Desgin Thinking Process

d-school, Stanford University

http://www.blendmylearning.com/2014/05/28/using-design-thinking-to-develop-personalized-learning-pilots/
PDCA (Shewhart), PDSA (Deming)

https://en.wikipedia.org/wiki/PDCA
Experience Process: UX Over Time
Business Process and Design Process

Plan
- Understand
  - Specify Requirement
  - Ideate
  - Create Solution
  - Evaluate
- Design
  - Produce
  - Sell
- User Research
  - User Evaluation
  - Information
  - UX Evaluation
  - Expect
    - Buy
      - Use
        - waste
  - Consumer
    - User
Part 2: Satisfaction Is a Measure for UX

2. UX
Origin of UX

• Norman, D.A. (1993)
  – became the User Experience Architect of Apple Computer

• Norman, D.A. (1998)
  • “I invented the term because *I thought human interface and usability were too narrow. I wanted to cover all aspects of the person’s experience* with the system including industrial design, graphics, the interface, the physical interaction, and the manual. Since then the term has spread widely, so much so that it is starting to lose it’s meaning”

• Norman, D.A. and Merholz, P. (2007)
  • “User experience, human centered design, usability, even affordances just sort of entered the vocabulary and no longer have any special meaning. *People use them often without having any idea why, what the word means, its origin, history, or what it’s about.*”
Concept of UX

• 2010 ISO9241-210
  – Person's perceptions and responses resulting from the use and/or anticipated use of a product, system or service

• 2011 UX White Paper

• Unlike the usability, the concept of UX was considered as leading to the sales promotion
  – Has become a buzzword
Part 2: Satisfaction Is a Measure for UX

3. QUALITY CHARACTERISTICS AND UX
Shackel and Richardson (1991)
Nielsen, J. (1993)
SQuaRE (ISO25010 2011)
• Quality in Design and Quality in Use

Quality in Design

Usability

Quality in Use

Satisfaction
Objective/Subjective Quality Characteristics

Objective Quality Characteristics

- Usability

Subjective Quality Characteristics

- Satisfaction
Four Quality Characteristics

Area

- **Usability**
  - Objective Quality in Design
- **Objective Quality in Use**
- **Subjective Quality in Design**
- **Subjective Quality in Use**
- **Satisfaction**
Quality in Design (Externally Measured)

- Usability (Ease of Use)
  - Recognizability
  - Memorability
  - Learnability
  - Discoverability
  - Operability
  - User Error Protection
  - Accessibility
- Functionality
- Performance
- Reliability
- Safety
- Compatibility
- Cost
- Maintainability

Subjective Quality in Design (Internally Measured)

- Attractiveness
  - Appeal for Kansei
  - Appeal for Needs

Quality in Use (Internally Measured)

- Effectiveness
  - Efficiency
  - Productivity
- Match to User Characteristics
- Match to Context of Use
- Freedom from Risk

Subjective Quality in Use (Internally Measured)

- Satisfaction (Significance)
  - Sense of Accomplishment
  - Relief
  - Joyfulness
  - Delight
  - Pleasure
  - Beauty
  - Cuteness
  - Likeability
  - Desire for Iterative Use

User Characteristics

Context of Use
Part 3: Evaluation of UX

4. EVALUATION OF UX
Prerequisite for Evaluation

- Evaluation of UX shall be conducted
  - By real users
  - In the real situation

- Usability Test
  - Is not conducted using real uses
    - Test participants
  - Is not conducted in the real situation
    - Usability laboratory
Evaluation Method - Type R

• Real time Method
  – ESM (Experience Sampling Method)
    • Larson & Csikszentmihalyi (1983)
• Quasi Real time Methods
  – DRM (Day Reconstruction Method)
    • Karapanos et al. (2009)
  – TFD (Time Frame Diary) など
    • Kurosu & Hashizume (2008)
• Can obtain the live information on experience
• Difficult to conduct for a long period
Evaluation Method - Type M

• Memory-based Methods: Retrospective Methods
  – CORPUS
    • von Wiliamowitz-Moellendorff et al. (2006)
  – Joint Production of the Usage Time Table
    • Masaya Ando (2007)
  – iScale
    • Karapanos et al. (2009)
  – UX Curve
    • Kujala et al. (2011)
  – UX Graph
    • Kurosu (2014)
  – ERM (Experience Recollection Method)
    • Kurosu (2016)

• Can be influenced by the forgetting and distortion of memory
  – Forgetting and distortion can be interpreted as the description of experiences at present time

• UX can be evaluated for a long time (months, years)
Part 3: Evaluation of UX

5. ESM (TYPE R)
ESM (Experience Sampling Method)

- Using pagers to programmable watches
- Study experience in the naturally occurring contexts of everyday life.
  - Experience = any of the contents of consciousness: thoughts, feelings, sensations

- But is a disturbance to the life
- Max of around 2 weeks
Part 3: Evaluation of UX

6. TFD (TYPE R)
TFD (Time Frame Diary)

• One of diary methods
  – Divide a day (24 hours) into 96 time frames (each for 15 minutes)

• Informants carry the printed form and fill in the form for every 2-3 hours
  – Each time frame should be filled with the place and the behavior (incl. feeling)
  – Repeat for 7 days (Most of the people repeat similar behavior on every week)

• Then conduct the interview
<table>
<thead>
<tr>
<th>Time</th>
<th>Place</th>
<th>What You Did</th>
<th>Time</th>
<th>Place</th>
<th>What You Did</th>
</tr>
</thead>
<tbody>
<tr>
<td>0:00</td>
<td>home</td>
<td>drinking</td>
<td>12:00</td>
<td>University classroom</td>
<td>take lesson (English)</td>
</tr>
<tr>
<td>0:15</td>
<td>my room</td>
<td>PC (paper work)</td>
<td>12:15</td>
<td>road</td>
<td>walk (go home)</td>
</tr>
<tr>
<td>0:30</td>
<td>living room</td>
<td></td>
<td>12:30</td>
<td>road</td>
<td>use cell-phone (call)</td>
</tr>
<tr>
<td>0:45</td>
<td>my room</td>
<td>PC (mail)</td>
<td>13:00</td>
<td>living room</td>
<td>use cell-phone (mail)</td>
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<td>1:00</td>
<td></td>
<td></td>
<td>13:15</td>
<td></td>
<td>have lunch, watch TV</td>
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<tr>
<td>1:30</td>
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<td></td>
<td>13:30</td>
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<td>1:45</td>
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<td></td>
<td>13:45</td>
<td>my room</td>
<td>PC (paper work)</td>
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<td>bedroom</td>
<td>Sleep</td>
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<td>2:15</td>
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<td>14:15</td>
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<td>walk (go to hair-salon)</td>
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<td>2:30</td>
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<td>14:30</td>
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<td>go to hair-salon</td>
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</tbody>
</table>
Part 3: Evaluation of UX

7. UX CURVE (TYPE M)
UX Curve

• Abscissa is time from the time when participants started using the artifact until “today”
• Ordinate is (a) attractiveness, (b) ease of use, (c) utility, (d) degree of usage
• Participants are asked to freely describe their general relationship and user experience by means of the product with the general UX Curve template
UX Curve Template
Example of UX Curve

http://uxonline.pl/2012/01/
Pros and Cons of UX Curve

• UX curve reflects the real experience by the real user in the real situation

• Emphasis is rather on the curve than on episodes

• Fatigue by drawing similar curve for 3 (4) times
Part 3: Evaluation of UX

8. UX GRAPH (TYPE M)
UX Graph

• Only one graph on the satisfaction (as the intensive measure of UX)
• First, episodes and ratings are written
• Then, the graph will be drawn
• Developed a software for supporting the use of this method
Example of UX Graph

<table>
<thead>
<tr>
<th>UX graph recording sheet</th>
<th>Target item</th>
<th>Smartphone (Android)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Name</td>
<td>Date Year</td>
<td>Month Apr Date</td>
</tr>
<tr>
<td></td>
<td>Age M/F</td>
<td>M_Age_43</td>
</tr>
</tbody>
</table>

1) Describe the event, your feeling and the level of satisfaction (from +10 to -10)

① **Expectation**: Interested in so much. But a bit anxious if I can fully use it.  
**Rating**: 4

② **Started to Use (Year 2012)**: People around me changed to smartphone and I decided.  
**Rating**: -1

③ **(Year 2012)**: Amazed to see pictures taken beautifully. Twitter is interesting.  
**Rating**: 3

④ **(Year 2013)**: My pal taught me how to use LINE. Fascinating!  
**Rating**: 6

⑤ **(Year 2013)**: He also taught me how to describe the bookmark and use the Internet.  
**Rating**: 9

⑥ **(Year 2014)**: Unpleasant that Facebook and other SNS link together without permission.  
**Rating**: -1

⑦ **(Year 2015)**: Charger connection became bad and can’t charge adequately.  
**Rating**: -6

⑧ **(Year 2015)**: Applications update automatically and device doesn’t work naturally.  
**Rating**: -8

⑨ **(Year )**  
**Rating**: 

⑩ **(Year )**  
**Rating**: 

⑪ **(Year )**  
**Rating**: 

⑫ **Present Time**: Want to buy a new device because of malfunctioning. But expensive.  
**Rating**: -9

⑬ **Anticipation in Near Future**: Will buy a new one in 6 months. Perhaps iPhone.  
**Rating**: 1

2) Write down the circled numbers at the adequate height of level of satisfaction rating.

3) After the satisfaction graph, draw the curve of frequency of use in the upper half.
UX Graph Tool

– Web-based tool
• Available free of charge (on https://ux-graph.com/)

UX Graph Tool beta Ver. 0.4
(for PC Win/Mac latest modern browser)

Age and Sex of informant
Age  Sex

Targeted Usage (example: Relationship with the smartphone)
UX Graph Tool

• Can be used by anybody
  – on the PC/ tablet/ smartphone with an internet environment with modern browsers (such as Firefox and google Chrome)
How to Use the Tool?

1: input demographic information and targeted usage
   - age
   - sex
   - targeted artifact
How to Use the Tool?

• 2: input prior and initial experience
How to Use the Tool?

• 3: input more experience up to now
How to Use the Tool?

- 4: input current feelings and future expectations
How to Use the Tool?

- 5: arrange and download the graph
Evaluation of UX Graph

• Improvements compared to UX Curve
  – Simpler
  – Episodes are written more in detail

• Curve (Graph) is attractive, but the satisfaction rating is more useful
  – Curve may not be necessary

• Time unit on the abscissa is not uniform because of the ambiguity of memory
Part 3: Evaluation of UX

9. ERM (TYPE M)
ERM (Experience Recollection Method)

- No curve (graph)
- Time is not a ratio scale but an ordinal block
  - Before the usage
  - At the start of usage
  - A while after starting the use
  - During the usage
  - Recently
  - Now
  - In the near future (prediction)
- Satisfaction rating is from +10 to -10
**Recording Sheet for ERM: Experience Recollection Method**

<table>
<thead>
<tr>
<th>Target Item</th>
<th>Male/Female</th>
<th>Age</th>
</tr>
</thead>
</table>

1. Write what you experienced at each phase and fill in the evaluation by +10 to -10 rating.

<table>
<thead>
<tr>
<th>Phase</th>
<th>What you experienced</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expectation before the purchase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluation at the time of start of usage</td>
<td>Year</td>
<td></td>
</tr>
<tr>
<td>Evaluation at early days from the start of usage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluation during the use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recent evaluation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present evaluation</td>
<td>Year</td>
<td></td>
</tr>
<tr>
<td>Estimation in the near future</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. Draw a curve of frequency of usage

<table>
<thead>
<tr>
<th></th>
<th>Before the use</th>
<th>Start to use</th>
<th>Recently</th>
<th>Present</th>
<th>Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almost everyday</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quite frequently</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Rather frequently</td>
<td></td>
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<tr>
<td>To a certain degree</td>
<td></td>
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<tr>
<td>Not so much</td>
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<tr>
<td>Almost no use</td>
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<tr>
<td>No use at all</td>
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</tbody>
</table>
1. Write what you experienced at each phase and fill in the evaluation by +10 to -10 rating.

<table>
<thead>
<tr>
<th>Phase</th>
<th>What you experienced</th>
<th>Evaluation (+10 ~ -10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expectation before purchase</td>
<td>I expected to get the latest model of iPhone on the day of sale.</td>
<td>8</td>
</tr>
<tr>
<td>Evaluation at the time of starting to use</td>
<td>I was bewildered for the larger screen compared to my previous model (iPhone5).</td>
<td>5</td>
</tr>
<tr>
<td>Evaluation at early days from starting to use</td>
<td>I got used to the large screen soon. And I felt the advantage of large screen for enjoying the game.</td>
<td>10</td>
</tr>
<tr>
<td>Evaluation during the use</td>
<td>The body was bent, but was straighten back by pushing it harder.</td>
<td>5</td>
</tr>
<tr>
<td>Recent evaluation</td>
<td>The power loss of battery is unexpectedly fast.</td>
<td>-5</td>
</tr>
<tr>
<td>Present evaluation</td>
<td>It’s now a must to carry the backup battery.</td>
<td>-5</td>
</tr>
<tr>
<td>Evaluation in the near future</td>
<td>I will use this until the next model will appear.</td>
<td>-2</td>
</tr>
</tbody>
</table>
THANKS
Abstract

- Evaluation of User Experiences continues to be a challenge; especially, challenging is finding generalizable methods of systematic and rigorous evaluation. The approaches of UX Graph and the Experience Recollection Method (ERM) were developed specifically to help users to recollect their experiences with services and products, more precisely and in more detail. Using these methods, in the real context of use, helps users recollect their experiences more accurately, helps designers gain better understanding, and as a result produces better designs. The first part of this talk will discuss the challenges of integrating qualitative User Experience evaluations into business and design processes. Next, UX Graph and ERM methods will be introduced. Finally, these methods will be applied to real case studies.