



GAINING METHODOLOGICAL INSIGHTS FROM THE USER EXPERIENCE AND USABILITY STUDY OF AN INTERACTIVE HBBTV APPLICATION

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CONTENTS



Research questions and motivation

The TV-WEB project

- Technical implementation
- User interface
- UX methodology

UX evaluation procedure

Conclusions

RESEARCH QUESTIONS

UX and interaction design is important, but

What about the UX procedure itself?

- Physical, time and cognitive load of the participants of the UX procedure?
- Content and task selection appropriateness?
- Attitude towards the participants?
- Environment?
- Frustration level?

THE TV-WEB PROJECT



EU SEE project: 7 partner states (Slovenia, Hungary, Austria, Croatia, Bosnia and Herzegovina, Montenegro, Serbia) and 16 partners

Use the DTT capacity to deliver selected Internet content

No broadband connection needed -> local interactivity

Tackle the digital divide

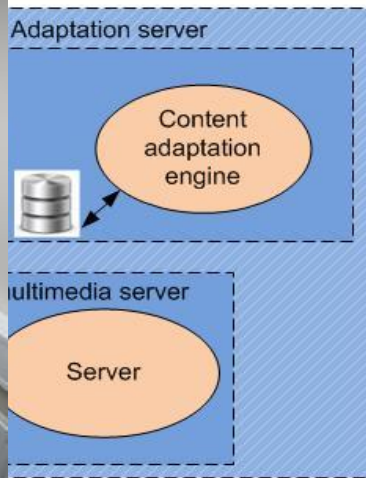
„The aim of the TV-WEB project is to **deliver Internet content** to those who do not usually use Internet services and **who have no broadband connection**.

The idea is to use the free digital terrestrial television (DTT) broadcasting frequency spectrum capacities for transmitting selected Internet content (such as news, e-services etc.) and **ensure a sort of Internet experience via TV devices** to certain less advantaged segments of the population, or those in rural areas without broadband access.

The concept of the project differs from the services provided by technologies such as connected and Smart TV where the Internet experience is ensured by connecting the TV to the Internet.. Instead, the SEE TV-WEB project foresees **delivery of Internet content to the homes solely using the DTT spectrum**.“

<http://www.see-tvweb.eu>

TV-WEB - ARCHITECTURE

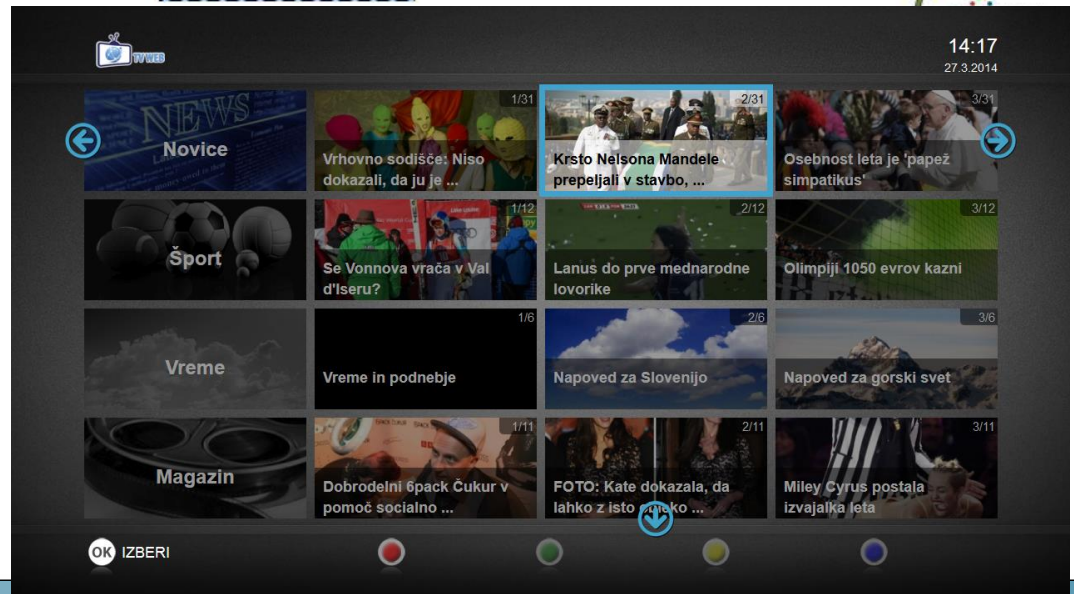
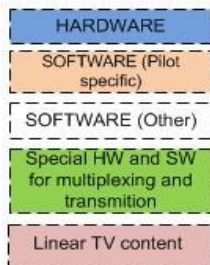
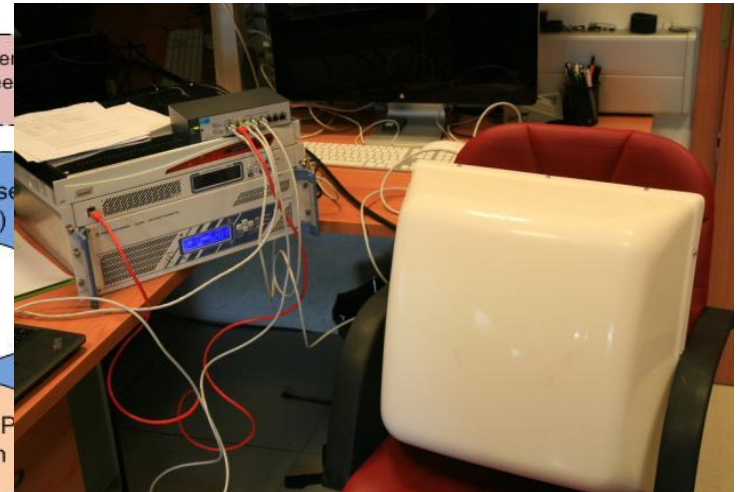


Linear TV content
(broadcaster's feed
local)

HbbTV media section
(carousel)

DVB-TS

HbbTV/MHP
application



TVWEB USER INTERFACE



UX AND USABILITY APPROACH

More than 15 live pilot tests in 7 partner states

Laboratory and field tests

Public events and fairs (uncontrolled environment)

Ux methodology used

- *Guided interview (talk aloud protocol, observation)*
- *Questionnaires (the TV-WEB service and methodology evaluation)*
- *Extremely rapid usability testing approach*
- *Card sorting*
- *Personas*
- *Focus groups*

TV-WEB UX PROCEDURE

Guided interview

- Interviewer
- Observer

UX questionnaire

Environment setup

UX methodology
questionnaire

| TV-WEB UX questionnaire | | | | |
|--|--|--------------|----------------|------|
| Location | | | | Date |
| 1. Personal information | | | | |
| Gender [F, M, group] | | | | |
| Age | | | | |
| Use of technology [Yes, No] | | | | |
| Technology experience (1=no experience; 5=regular user) | | | | |
| TV: | 1 | 2 | 3 | 4 5 |
| Computer: | 1 | 2 | 3 | 4 5 |
| Internet&applications: | 1 | 2 | 3 | 4 5 |
| Internet access [Yes, No] | | | | |
| Additional notes | | | | |
| 2. Tasks | | | | |
| Task 1 | What is the number of news stories in the category »X«? | | | |
| | Task completed: | Successfully | Unsuccessfully | |
| | Problems: | Yes | No | |
| | Notes: | | | |
| Task 2 | Search for the news titled »X« and find out who/what is »Y«. | | | |
| Task 3 | Set your optimal font size. | | | |
| 3. User interface interaction, navigation and design | | | | |
| Do you have any problems using the remote control? | | | | |
| Is the navigation clear and easy to use? | | | | |
| Are the "breadcrumbs" clear enough? | | | | |
| Do you find the functionality of the coloured buttons useful? | | | | |
| Would you like to have a special key on the remote control to exit the application? | | | | |
| Would you like to have a special key on the remote control that will navigate you directly to the home screen? | | | | |
| Is the font size large enough? | | | | |
| Is the font easy to read? | | | | |
| Do you like the design? Is the contrast ratio good enough? | | | | |
| 4. Content | | | | |
| Is the selected content appropriate? Would you like to add/change something? | | | | |
| 5. Overall impression and satisfaction | | | | |
| Do you find the service simple to use? | | | | |
| Would you like to use the service daily? | | | | |
| If yes, how much would you be willing to pay for the purchase of the service (both hardware and software)? | | | | |
| Overall impression and satisfaction with the service. Comments, wishes. | | | | |

PERSONAS

Primary Group 2 Rural Area

Gender Female
Marital Status Married
Children 2 (Anna, 6
Location Austria, H
Mobility VW Passa
Education Commer
Job Governm
Income 800 EUR
Work Environment Old office
Hobbies Reading, h
Music Classical
Interests, Likes Health, fa
Dislikes Big indus
the shoul
environm
Style Casual an
Jeans, ski
Character Commun
family typ
Goals Wants to
environm
internet a
private ar
Politics Left orien
Technology Skills Beginner
Goals TV Web Getting in
local info
environm

Source
http://en.wikipedia.org/wiki/List_of_countries,
http://en.wikipedia.org/wiki/European_Parliament

Primary Group 1 Economically Weak

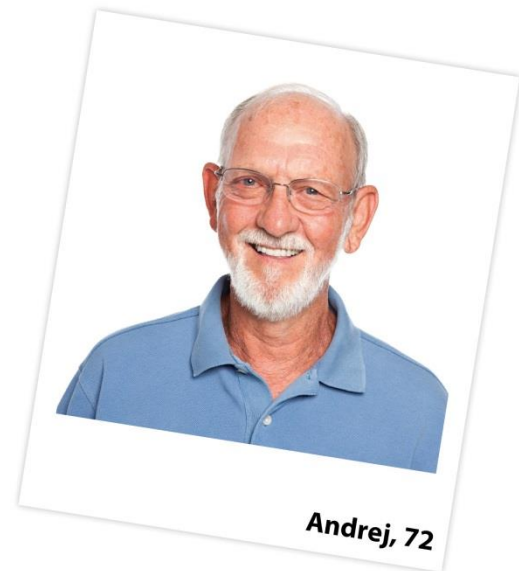
Gender Male
Marital Status Single
Children No
Location Montene
Mobility Bike
Education Compuls
Job Motorca
Income 490 EUR
Work Environment Car servi
Hobbies Bicycling
ing the g
Music Rock, alt
Interests, Likes Music, sp
local nev
Dislikes Pretenti
overtime
Style Cool, cas
sweaters
Character A little b
uncomm
Goals Wants to
therefor
access to
have a n
Politics Center-r
Technology Skills Beginne
with a co
Goals TV Web Getting
local info
concerts
music kn

Source
http://en.wikipedia.org/wiki/List_of_countries
http://en.wikipedia.org/wiki/Politics_of_Montenegro

Primary Group 3 Old & Disabilities

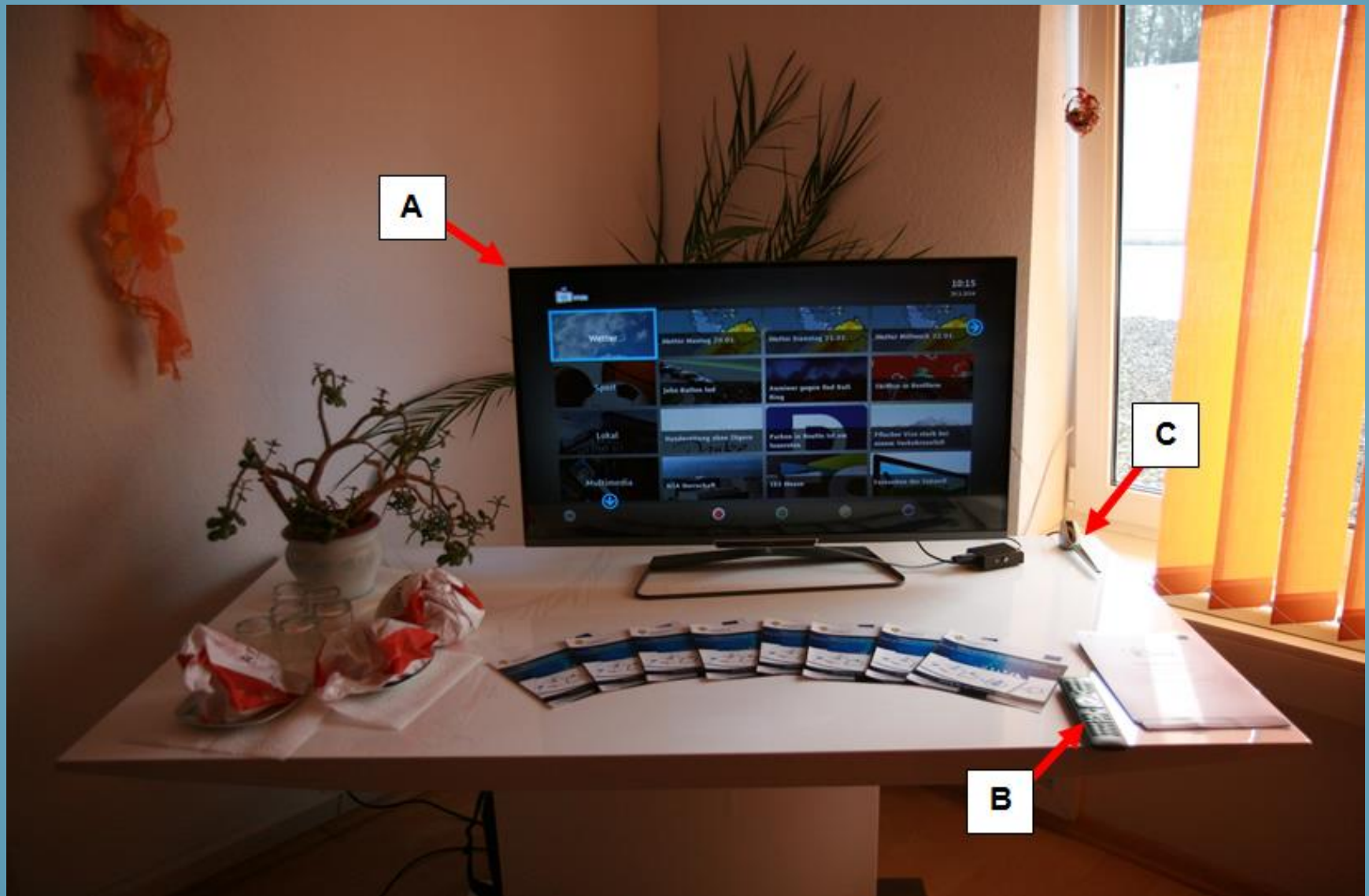
Gender Male
Marital Status Married
Children 1 (Matic, 45 Years old)
Grandchildren 2 (Katja, 10 years old & Darja 15 years old)
Location Slovenia, Ljubljana
Mobility Opel Senator B
Education Secondary education (college)
Job Pensioner (former geometry teacher)
Income 950 EUR net pension
Work Environment -
Hobbies Classical concerts, opera, tennis, going
for a walk, wine
Music Classical music
Interests, Likes Education, family, politics, health
Dislikes Unpunctuality, chaos
Style Casual (jeans, polo shirts)
Character friendly, calm, wise, family type,
inquisitive
Goals To live a happy life with his wife and his
family, to travel as far as possible, to have
internet access to plan his travels and
to improve his knowledge about other
countries
Politics Center-left (Pozitivna Slovenija)
Technology Skills Absolute beginner, has never worked
with a computer
Goals TV Web Getting internet access for planning his
travels and learning more about other
countries like general and current infor-
mation, history or culture (like the things
standing on wikipedia).

Source
http://www.stat.si/eng/novica_prikazi.aspx?id=3461
http://de.wikipedia.org/wiki/Wahlen_in_Slowenien#Parlamentswahl_2011



Andrej, 72

ENVIRONMENT SETUP



TV-WEB UX EVALUATION PROCEDURE

Develop a special methodology approach towards evaluating the UX methodology used (to evaluate the TV-WEB service)

Based on the NASA-TLX test

Gain insights into:

- Participants' perception of the UX evaluation procedure
 - the perceived physical effort during the UX procedure and while solving tasks,
 - the perceived mental effort
 - the perceived time complexity,
 - the perceived frustration/pleasantness, and finally,
 - the perceived attitude towards the participants, presentation style and content appropriateness.
- <http://h>

| | | |
|------|------|------|
| Name | Task | Date |
|------|------|------|

Mental Demand How mentally demanding was the task?

Very Low | Very High

Physical Demand How physically demanding was the task?

Very Low | Very High

Temporal Demand How hurried or rushed was the pace of the task?

Very Low | Very High

Performance How successful were you in accomplishing what you were asked to do?

Perfect | Failure

Effort How hard did you have to work to accomplish your level of performance?

Very Low | Very High

Frustration How insecure, discouraged, irritated, stressed, and annoyed were you?

Very Low | Very High

<http://humansystems.arc.nasa.gov/groups/tlx/>

THE TV-WEB METHODOLOGY EVALUATION QUESTIONNAIRE

| TV-WEB methodology evaluation questionnaire | | | | | | | | | | |
|---|---|------|-----------|------|---|---|---|---|--|--|
| Location | | Date | | | | | | | | |
| Personal information | | | | | | | | | | |
| Gender [F, M, group] | | | | | | | | | | |
| Age | | | | | | | | | | |
| Use of technology [Yes, No] | | | | | | | | | | |
| Technology experience (1=no experience; 5=regular user) | | | | | | | | | | |
| TV: | 1 | 2 | 3 | 4 | 5 | | | | | |
| Computer: | 1 | 2 | 3 | 4 | 5 | | | | | |
| Internet&applications: | 1 | 2 | 3 | 4 | 5 | | | | | |
| Internet access [Yes, No] | | | | | | | | | | |
| Additional notes | | | | | | | | | | |
| N | Question | Pos. | Undecided | Neg. | | | | | | |
| 1 | Physiological-psychological aspects | | | | | | | | | |
| 1.1 | Physical difficulty/effort of solving TV-WEB <u>Ux</u> procedure (simple vs. extremely complex) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 1.2 | Mental difficulty/effort of solving TV-WEB <u>Ux</u> procedure (simple vs. extremely complex) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 1.3 | Time complexity of solving TV-WEB <u>Ux</u> procedure (brief vs. extremely time consuming) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 1.4 | Presentation style – procedure/task/question clarity (clear/understood vs. extremely confusing) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 1.5 | Presentation style - attitude towards participants (pleasant vs. extremely unpleasant) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 1.6 | Presentation style – ambient setup (pleasant vs. extremely unpleasant) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |

| 2 | Procedure content/task selection | | | | | | | | | |
|-------|--|---|---|---|---|---|---|---|--|--|
| 2.1 | Personal information section appropriateness (appropriate vs. not appropriate) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 2.2 | Task selection overall appropriateness (appropriate vs. not appropriate) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 2.3 | Task 1: What is the number of news stories in the category »X«? | | | | | | | | | |
| 2.3.1 | Task 1 – time complexity (brief vs. extremely time consuming) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 2.3.2 | Task 1 – intuitiveness, pleasantness (intuitive/pleasant vs. not intuitive at all/frustrating) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 2.4 | Task 2: Search for the news titled »X« and find out who/what is »Y«. | | | | | | | | | |
| 2.4.1 | Task 2 – time complexity (brief vs. extremely time consuming) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 2.4.2 | Task 2 – intuitiveness, pleasantness (intuitive/pleasant vs. not intuitive at all/frustrating) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 2.5 | Task 3: Set your optimal font size. | | | | | | | | | |
| 2.5.1 | Task 3 – time complexity (brief vs. extremely time consuming) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |

| | consuming) | | | | | | | | | |
|-------------------|--|------|---|---|---|---|---|------|--|--|
| 2.5.2 | Task 3 – intuitiveness, pleasantness (intuitive/pleasant vs. not intuitive at all/frustrating) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 2.6 | Content related questions (appropriate vs. not appropriate) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 2.7 | User interface interaction, navigation and design related questions (appropriate vs. not appropriate) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 2.8 | Overall service impressions and satisfaction/payment related questions (appropriate vs. not appropriate) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| 3 | Overall grade/satisfaction | | | | | | | | | |
| 3.1 | Time spent while solving the TV-WEB <u>Ux</u> procedure (subjective feeling of time spent in minutes) | < 10 | 1 | 2 | 3 | 4 | 5 | > 60 | | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| | | - | - | - | - | - | - | | | |
| | | 2 | 3 | 4 | 5 | 6 | | | | |
| | | 0 | 0 | 0 | 0 | 0 | | | | |
| 3.2 | The TV-WEB <u>Ux</u> procedure overall grade - frustration? (not frustrating/pleasant vs. extremely frustrating) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| Additional notes: | | | | | | | | | | |

EXECUTION AND PRELIMINARY RESULTS

Performed at different loactions

- Montenegro
- Bosnia and Hercegovina
- Serbia

Varios environments

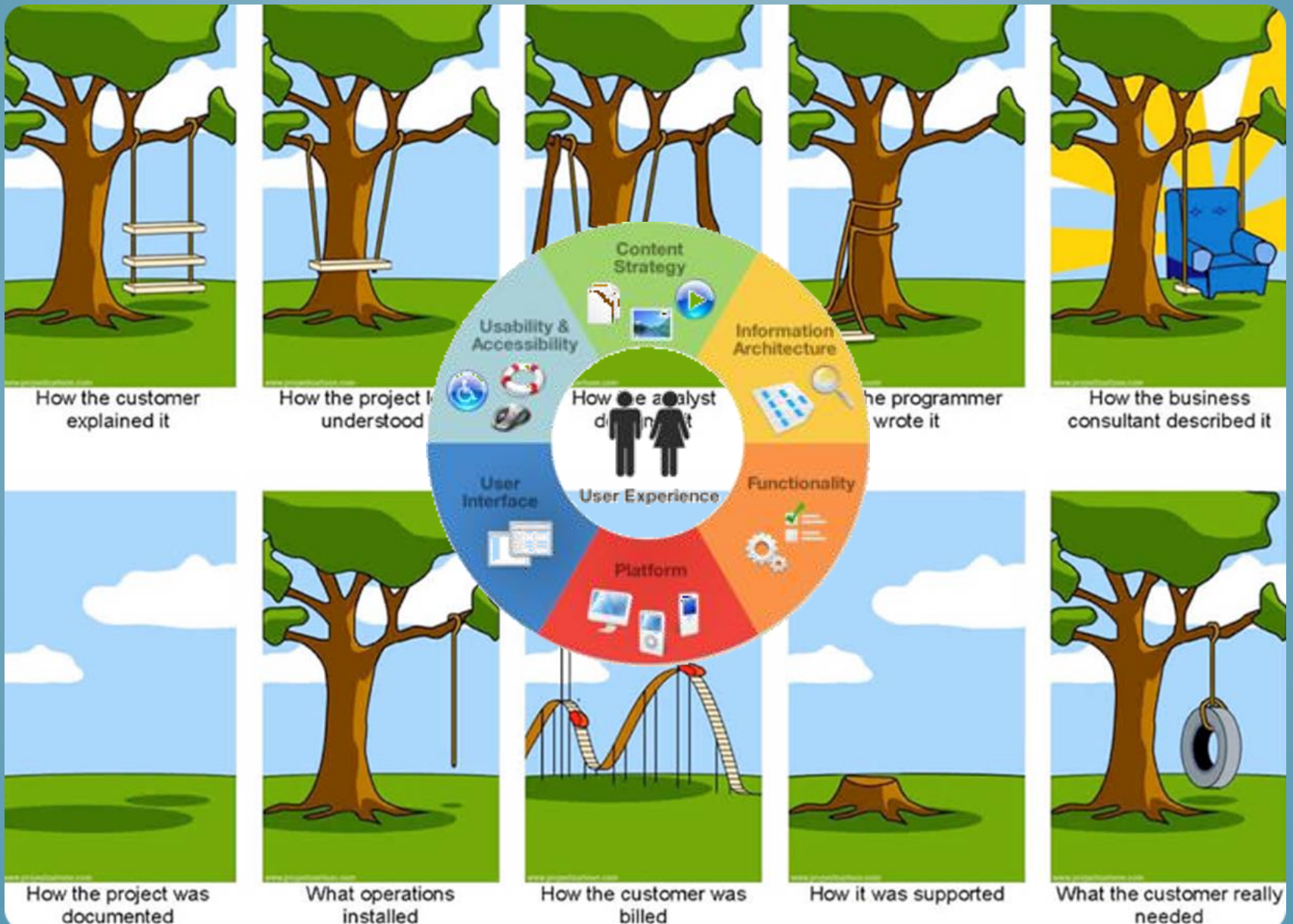
- Laboratory setup
- Live events and presentations
- Home environment

Very positive results – the majority of users evaluated the procedure itself with best grades

UX TEST IMPRESSIONS



BUT...



CONCLUSIONS



Thank You!

DISCUSSION

