February — June 2011
Usability heuristics for TV second screens
Research Document

4Eyes Software Solutions team
Andreas Manios
Andys Sundaypink
Dmitry Litosh
Francesco Castri
Nam Nguyen
Iwan Cheng

Written for
NoTube
BBC Research And Development
# Table of Contents

Research Document ........................................................................................................... 1  
Table of Contents ................................................................................................................ 2  
Introduction .......................................................................................................................... 3  
Scenario Research .............................................................................................................. 5  
  Approach ............................................................................................................................. 6  
    Risks to avoid in Scenario Planning: .................................................................................. 6  
Context Description ............................................................................................................. 6  
  1. Environment ................................................................................................................... 6  
  2. User characteristics ....................................................................................................... 7  
  3. Ways of use .................................................................................................................... 8  
  4. Privacy issues ................................................................................................................. 8  
  5. Type of Programme ....................................................................................................... 8  
  6. Platform .......................................................................................................................... 9  
  7. Synchronisation ............................................................................................................ 9  
  8. Software ........................................................................................................................ 10  
  9. Interface ........................................................................................................................ 10  
Scenarios ............................................................................................................................ 11  
  Scenario 1 - Basic and Virtual Group interaction ............................................................... 11  
  Scenario 2 - Public Place .................................................................................................. 14  
  Scenario 3 - Family Interaction ......................................................................................... 19  
  Scenario 4 - Watching programme as a group .................................................................. 24  
Matrices .................................................................................................................................. 26  
Questionnaire Survey ......................................................................................................... 26  
Questionnaire Results ......................................................................................................... 27  
Scenarios output .................................................................................................................. 32  
Conclusion ............................................................................................................................ 33  
Prototype Research ............................................................................................................ 34  
  Functionalities Analysis .................................................................................................... 34  
    Second screen functionality ......................................................................................... 35  
    TV Screen functionality ............................................................................................... 38  
Concerns Analysis ............................................................................................................... 39  
  Level of Distraction ........................................................................................................... 40  
  Information Overload ........................................................................................................ 40  
  Synchronisation ............................................................................................................... 41  
  Level of Customisation ..................................................................................................... 41  
  Privacy Risks ...................................................................................................................... 42  
  Second screen functionalities .......................................................................................... 43  
  TV Screen functionalities ................................................................................................. 45
Usability Analysis .................................................................................................................. 46
Questionnaire .......................................................................................................................... 46
Analysis ................................................................................................................................... 50
Usability Guidelines .................................................................................................................. 57
Interface Guideline .................................................................................................................... 57
Interaction with TV Guideline ................................................................................................... 58
Different Devices Guideline ...................................................................................................... 58
Functions Guidelines ................................................................................................................ 59
Conclusion ................................................................................................................................. 62
Bibliography .............................................................................................................................. 63
Appendix .................................................................................................................................. 65
List of Mock-ups ....................................................................................................................... 65
Interview Script ........................................................................................................................ 78
Raw Result of Interview ............................................................................................................ 84
Survey Questionnaires I .......................................................................................................... 84
Survey Raw Results (Questionnaire I) .................................................................................... 89
Survey Questionnaire II ........................................................................................................... 100
Introduction

Social networks and group interaction has set a new direction and trend in the new century. The use of a mobile device, tablet or laptop has become so common that even ‘older’ media such as television can’t ignore its popularity. Is this a threat or an opportunity? How can we make the television watching experience integrate with current and new technology? The aim of our assignment is to answer these questions and provide principles and guidelines on how to enhance the television watching experience with the use of second screens.

During the progress of our research the aim of the project has been adjusted and sharpened accordingly with several meetings with the client and steering committee. Our team consists of 6 members who each play an important role in the research of TV second screens based on their experience and qualities.

We have completed two important milestones that defines our whole research on “TV heuristics for TV second screens”. These are the scenario document and the prototype document. In the scenario document we have presented several scenarios and possible uses of TV second screens. Based on the results of this document and feedback of our client we have continued to research further on the positive and negative effects of the functionalities provided in the scenario document. These are then further analyzed and researched. The final results are then presented as usability guidelines in the prototype document.

This document is the final deliverable to the client. It consists of the scenario and prototype research merged together with a fitting conclusion to finalize our work.

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1</td>
<td>17.05.11</td>
<td>• Merged scenario and prototype document</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Removed unnecessary part</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Modified the document structure</td>
</tr>
</tbody>
</table>
Scenario Research

Scenario planning is a model for learning about the future in which an enterprise strategy is formed by drawing a small number of scenarios, stories how the future may evolve, and how this may affect an issue that confronts the enterprise.

Scenarios are carefully crafted stories about the future embodying a wide variety of ideas and integrating them in a way that is communicable and useful. Scenarios help us link the uncertainties we hold about the future to the decisions we must make in the prototyping phase according to the client too.

The scenario planning method works by understanding the nature and impact of the most uncertain and important driving forces affecting the future. It is a group process which encourages knowledge exchange and development of mutual deeper understanding of central issues important to the future of client business.

The goal is to craft a number of diverging stories by extrapolating uncertain and heavily influencing driving forces. The stories together with the work getting there has the dual purpose of increasing the knowledge of the business environment and widening both the receiver's and participant's perception of possible future events. The method is most widely used as a strategic management tool, but it is also used for enabling group discussion about a common future.

The complete listing of problem definitions is located in the Assignment Description document.

This document is intended to be a preparation step before the Prototype Phase. As a result of this document a set of functionalities is obtained. These functionalities provide a basis for the possibility of real implementation of the Scenarios, explained in this document.

The Scenarios were validated by a survey among the potential end-users. The results showed that the potential users are indeed interested in the new ways of interacting with TV, that can be provided by the use of Second Screen and related infrastructure.

The rest of the document contains the following chapters:

1. **Approach** - the chosen approach for this document’s research is discussed there
2. **Context Description** - where we explain the context areas which influence the use of Second Screens
3. **Scenarios** - where we present our scenarios
4. **Questionnaire** - where we explain the characteristics of constructed questionnaire
5. **Questionnaire Results** - where the result of the survey is analysed and presented
6. **Scenarios output** - where we gather the functionalities and generic features of the devices that make the Scenarios work
Approach

For the work on the Scenarios of use, we have decided on the following approach:

1. Review of literature and web-resources that are related to the topic of second screens use as a parallel and complementary activity while watching TV
2. Brainstorming on different context aspects and possible ideas
3. Forming most probable scenarios from the context aspects and ideas
4. Validating the ideas on the scenarios with the use of questionnaire
5. Analyse the result of the questionnaire
6. Identify the core functionalities that Second Screens and TV should possess for the Scenarios

After getting the results from the questionnaires we can proceed to the prototyping.

The Context and Scenarios that we have chosen for the Scenario document are explained in the “Context Description” and “Scenarios” respectively.

Risks to avoid in Scenario Planning:

As in any research activity there are certain risks that should be avoided. We present these risks here as follows:

1. Treating scenarios as forecasts
2. Constructing scenarios based on too simplistic differences, such as optimistic and pessimistic
3. Failing to make scenario general enough in scope
4. Failing to focus scenarios in the areas of potential impact on the business
5. Failing to put enough imaginative stimulus into the scenario design

Context Description

We have identified several Context areas, where the usage of Second Screen devices can be differentiated. These are:

1. Environment
   The Environment where the user watches TV. People can watch TV individually or in groups. Thus, we divide the type of environment in two condition, individual and group. We should be able to see thoroughly the different scenario possibility that might happen between two different type of viewers.
   a. Individual
      ■The scenario should facilitate each individual to be able to enjoy their daily entertainment moment. However, the needs to have social life is still occurred to every individual. It is important to think of scenarios that enable them to avoid the feeling of being alone or even boredom. In recent years it have witnessed the phenomenal rise social networking sites such as Facebook, Friendster, Hyves,
LinkedIn and MySpace. In EU countries it is estimated that between 20 and 50 percent of Internet users have a profile on these sites. We should be able to provide any possibility to connect them with the social network via TV usage.

b. Group

- Viewer might as well watch the TV in a group. Viewer can watch TV with family, friends, or even strangers in the public area such as watching the world cup together in the park. Each different group might have different issues and characteristics to think of.

- Family
  - Within family you might not have to think about the **privacy** while interacting with each other. However, there are differences such as **age**, willingness, movie preferences, and time. One family member might be still 10 years old and does not want to watch Opera movie. But he or she might want to see the detective game which he or she argues because this movie enable everyone from any age range to join along to think who the culprit is and his motivation or alibi.

- Friends
  - Viewer can also watch TV with his/her friends. This type of group has slightly different issue than the family group. In the friend group, the privacy issue is higher than the **privacy** in the scope of family. However, the probability of having such age diversity is small. And they might have the same interest, therefore they decide to watch TV together such as interest in the sport, life show, or even a specific TV genre.

- Strangers
  - Viewer can also watch TV with totally strangers. This can happen when you share TV with so many people to watch World Cup in the public area such as pub and park. In this case, **privacy** is the top priority to consider. We should prohibit the stranger to view our profile as less as possible. In the other hand, we might want to share our comment or story about what we are watching. And maybe we want to do online betting for which team is going to win.

2. **User characteristics**
   
   Age, Gender, Physical disabilities, etc.

There are several characteristics that are relevant when looking at scenarios. The most important ones are, **age**, **language**, **location**, number and **physical disabilities**. These different characteristics are separate, but still relate to each other and all have an importance when looking at different scenarios.

a. When we are looking at **age**, it is important to put people in the same age group who have common interests and capabilities. For example, elderly might have trouble with motor controls or vision and are mostly interested in different subjects than little children.

b. The **language** barrier is obvious, but when we look further than just the problems, one might think of using different language filters to help people learning new languages. For
example, someone might want to choose watching a programme in which they speak Chinese, while the subtitles are in English.

c. **Location** is important for the mood of the user. There is a distinction to be made between the country or city you live in and the location as in is the user at a friend’s house, or at the pub etc...

d. The **number** of people and the number of second screens influence the scenario greatly. For example when you have a second screen in the form of a touch screen table with five users around it, you will have to share the screen and also take care of privacy issues.

e. Because we want to include as much of the population, there have to be taken care of a lot of accessibility issues for users with a physical disability. Users can have a combination of bad hearing, bad sight, bad motor skills etc... Things like providing big buttons, having subtitles, or communication by touch are things to consider having.

3. **Ways of use**
Quizzes, Social interaction, information mining, Games, etc.

a. **Information Mining**
   ■ Gathering extra information while entertaining to get better overview about what viewers currently watch.
   ■ When viewers watch movie, then they might want to know the preview of the movie, the trailer, some prologue, the actor and actress name, and some other extra information about the movie itself.
   ■ When viewers watch news, they might want to know the detail and extra information about the news. They might also want to get the same news but from different resources.

b. **Games**
   ■ Playing games can be done individually with the main screen or can be done in group.

c. **Quizzes**
   ■ Imagine a Quiz game on the TV, where the viewers can participate alongside the studio-players

d. **Social Interaction**
   ■ Facebook, Twitter and Instant Messaging interaction
   ■ Interaction with other watchers “On TV-screen”

4. **Privacy issues**
The Privacy issues of using and sharing Second Screen.
We will consider as Low Privacy issue, the user interactions with second screen, that don’t need personal information submission and sharing. Medium Privacy issue, concern user’s log-in and sharing of personal information. High Privacy issue is related for instance to the case in which the user is sharing a Second Screen with other people, allowing them to push and see personal information of other people.

5. **Type of Programme**
The type of programme directly affects the level of attention and desired interaction from a user. Some programmes, such as Music Videos usually have no important information in the video content itself, while Sports programmes (such as football match) grab the viewers attention almost fully.

- News
- Sports
- Cartoon
- Soap
- Movie
- Reality
- Music video
- TV-series
- Child-oriented programmes

6. **Platform**

Platform of the Second Screen - PC, Laptop, Smartphone, etc.

- Tablet such as iPad
  - There are some example of iPad app related to the usage of second screen:\n    - Watch TV shows from Hulu and Netflix and there are early efforts to sync on-air-programming with an iPad
    - Dish released a free iPad app that let subscribers watch live and recorded TV. But there is a catch, viewer need to have sling adapter in order this to work.
    - Comcast debuted a free iPad app that acts as a giant remote, letting the viewer control their Xfinity DVR.
    - Tivo allows subscribers to view guides, schedule, and manage recording, get recommendation or investigate a particular actor’s entire resume as well as post comments about a specific show or movie on twitter or Facebook
- Smart-phones such as iPhone, Android devices
- Laptop
- Touch Table / Microsoft Surface
- Proprietary devices

7. **Synchronisation**

Synchronisation is a crucial aspect to the notion of the use of second screens to compliment the TV viewing experience. As of now synchronization is really primitive and developed ad-hoc. Therefore scenarios that will be within the scope of our research need to be analysed to decide the proper synchronisation scheme for each of these use cases/scenarios. One can quickly identify two major synchronisation schemes:

\[\text{(taken from paper: iPad quickly becoming TV’s second screen - Lost Remote)}\]
○ First synchronization between the TV and a single second screen in the case where an individual is viewing TV and uses his second screen at the same time.
○ The second scheme refers to synchronization between the TV and multiple second screens, which is the case when a group of people are viewing TV from the same physical location.

There are other important topics regarding synchronization:
  a. Synchronization between second screen and social networking applications in respect to TV content
  b. Synchronization between TV station services offered specifically aimed to second screens (e.g. from web services, TV station servers/websites) and second screens
  c. Synchronization between second screens to facilitate interaction between a group of viewers
  d. In what cases asynchronous communication is better and in what cases synchronous communications should be preferred.

8. Software
Software that is used on Second Screen.
There can be various types of software that is running on the Second Screen - it can be merely a web-page, thus allowing all devices with a web-browser to participate or an ad-hoc application for the specific TV-channel. That apps can soon be followed by independently created software, oriented on a wide variety of channels/programme types.
  a. Web Browser
  b. TV-Channel oriented
  c. Independently created
  d. Social Network-oriented (with functions for TV-watching)
  e. Software on console devices, connected to TV (onscreen layer instead of 2nd screen)

9. Interface
All second screens vary in their interfaces - some have buttons, other only touch-screen. Additionally, several other interface functions allow for more capabilities and functions (such as camera - for face recognition).
  a. Laptop interface (buttons and screen) => multiple concurrent programs running
  b. Tablet and smart-phone interface (touchscreen) => usually one program on the screen
  c. Use of built-in camera
  d. Microphone
  e. Use of other devices, such as move-oriented devices (Kinect, PlayStation move)
Scenarios

This section presents you a set of scenarios that we have created to illustrate different functionalities. We think that these functionalities possess the most potential for use in Second Screens. We have separated the scenarios in the following categories:

<table>
<thead>
<tr>
<th>Interaction Type</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual</td>
<td>Home</td>
</tr>
<tr>
<td>Group of friends</td>
<td>Home</td>
</tr>
<tr>
<td>Group of friends in virtual shared space</td>
<td>Remotely located</td>
</tr>
<tr>
<td>Family group</td>
<td>Home</td>
</tr>
<tr>
<td>Group of unrelated people</td>
<td>Public place such as a pub</td>
</tr>
</tbody>
</table>

The concerns that were covered in the scenarios are the following:

- Level of distraction
- Information overload
- Synchronization
- Level of customization
- Device

Scenario 1 - Basic and Virtual Group interaction

This scenario shows basic interaction that people can perform with second screens in the group, together in the room. Apart from that, we also present a “Virtual Room” scenario, where people, while physically distant from each other, still interact in a shared virtual space with the use of the TV and Second Screen, thus having a “group” experience.

Basic Group interaction.

Alfonso, Jeremy, Nance, Mikael, and Thomas are friends. Jeremy is the only one who is not studying in the same college with the others. He has to go to special treatment because of his hearing disability. Nance is the only woman in that group. They all like the CSI series. They live in the same apartment. Usually they watch the series together. Even though they have the same interest but they usually do different activities while watching the show.
Alfonso, 20, Spanish
Jeremy, has hearing disability
Mikael
Thomas, 20, Netherland
Nance

double click to write...

subtitles

comment
thoughts
FB

Chat, Quiz, Answers
Virtual Room
Virtual group

THE END!
Possible actions:

- Alfonso, 20 years old Spanish man, prefers to listen the dubbed version of the program.
- Alfonso would also like to communicate with his Spanish friend (who is currently in Spain) about the show at the same time when they both watch it.
- Jeremy prefers to read or watch the subtitle on his own second screen because of his hearing disability. It makes it easier to follow the program by reading the subtitle while watching it.
- Mikael is browsing for the autobiography of the actors and the prologue.
- Thomas, 22 years old Netherlander, would like to be able to join the talent/knowledge games in which he is asked quiz questions. He would also like to start a game about the show that he is currently watching, like voting on who is a killer in the current episode of the TV-series.
- Nance likes to share her knowledge, thoughts, comments, opinions, or ideas to her social network which is Facebook. During watching, she shares the information to Facebook. To be able to express her thoughts, she likes to copy the scene and then paste it to the wall status of Facebook including her thoughts. Or send the scene with her comments to her friend to invite her to watch the same problem.
- When the commercials start a notification pops up asking the users to join in on a quiz to test their CSI knowledge. Questions about the characters and past CSI trivia are asked and the users must answer them in a given time. When the show is about to continue the results are then shown by all the friends in the room and the average statistics of the whole nation are compared to theirs. And of course the local winner is decided between their friends.

<table>
<thead>
<tr>
<th>Context</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>Group but interact with the second screen individually</td>
</tr>
<tr>
<td></td>
<td>Interaction at home</td>
</tr>
<tr>
<td>Age</td>
<td>18 - 25 years old</td>
</tr>
<tr>
<td>Synchronisation</td>
<td>TV and Second Screen</td>
</tr>
<tr>
<td></td>
<td>Second Screen and Social Network</td>
</tr>
<tr>
<td>Type of Program</td>
<td>Criminal TV-series</td>
</tr>
<tr>
<td>Type of Activities</td>
<td>Quizzes, Data Mining, Voting Games, Scene-Grab&amp;Send, Social Interaction, Synchronisation, Dubbing, Subtitles</td>
</tr>
</tbody>
</table>

Table 1. Context of the basic-group scenario

Virtual Group variant.

Alfonso, Jeremy, Nance and Mikael have friends from college who are also interested in CSI. At times they schedule with their friends to watch the show, each one from his own house. Alfonso creates a channel (virtual room) and sends invitations to his roommates as well as their friends who are located at their homes. Those that are available and would like to share the experience with Alfonso, accept the
invitation and join the channel. The app offers features such as live chatting and access to knowledge games about the show such as the “who is the killer”. The viewers-players can answer their questions in different points during the show. The ones that predicted the murderer correctly gain some points. As the plot continues more clues are revealed, thus the points awarded are reduced. Each of the participants has an accumulative score that he has been awarded throughout a series of episodes. Thus in the end of the season a winner can be proclaimed based on the points he has accumulated.

Apart from Live Chatting, Members of the Virtual Room have the ability to mark and comment the events, happening on the screen, in real-time, in a way that all other participants see their remarks (with graphical tools, like circles, rectangles or notes, visible on the TV-Screen).

<table>
<thead>
<tr>
<th>Context</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>● Interact with the second screen as a group</td>
</tr>
<tr>
<td></td>
<td>● Interaction at different physical locations</td>
</tr>
<tr>
<td>Age</td>
<td>● 18 - 25 years old</td>
</tr>
<tr>
<td>Synchronisation</td>
<td>● TV and Second Screen</td>
</tr>
<tr>
<td></td>
<td>● Synchronization between second screens</td>
</tr>
<tr>
<td></td>
<td>● Synchronization between second screens and TV show content provider</td>
</tr>
<tr>
<td>Type of Program</td>
<td>● Criminal TV-series</td>
</tr>
<tr>
<td>Type of Activities</td>
<td>● Knowledge games</td>
</tr>
<tr>
<td></td>
<td>● Live-chat</td>
</tr>
<tr>
<td></td>
<td>● Social interaction</td>
</tr>
<tr>
<td></td>
<td>● Comments and graphical remarks on the “second layer” of the TV-screen</td>
</tr>
</tbody>
</table>

Table 2. Context of the virtual-group scenario

**Scenario 2 - Public Place**

This scenario involves group interaction in a public place where a TV program is being viewed on a central Television set. The group interaction is realized with individual second screens that are synchronized with the main TV set and interact with each other.
Mark is 18 years old, he enjoys watching football on TV with his friends, sharing his personal opinion as well as the occasional teasing with each other depending on the result of the match. Mark however left his country to participate in an Exchange Student programme in Cambridge and during the first month, there is an important match of the team he supports. Not having his buddies around, he decides to go alone to a pub to watch the game. Since he is not yet familiar with the city he arrives 15 minutes late for the game.
Once he is in, he notices that his team already scored a goal and he missed it. He uses his iPad and starts chatting with his friends back home and asks them who scored. Then thanks to the app available on his second screen he synchronizes it and selects the highlights of the missed goal action that he wants to see. He likes this Pub and the big television that they have very much, but the language is still a bit of an issue and he wants to listen to the commentary in his own language, so he selects that option on his iPad and he puts on earphones to follow the game as he prefers.
While watching the game one guy beside him starts protesting an apparent offside. Mark immediately calls up the alleged action on his second screen and enhancing the screenshot and using different camera angles they verify together if the referee was correct. The other guy after realizing that he was wrong, since he is supporting the opponent team, decides to bet with Mark on which of the two team finally will win the match.
Mark searches on his iPad also for other people currently synchronized like him with the main TV set, in order to chat with them. Thanks to another app, they are able to connect with each other and legally bet money, in real time and in a controlled manner, on the outcome of the match.

During the match he also wants to check on his personal device the real time standings for the rest of the teams that participate in the same competition as well as personal statistics of the players. At the end of the match Mark found a new friend that appreciated the device’s enhanced viewing of the match. Mark’s feeling of the game was almost the same as being at home with his friends.

<table>
<thead>
<tr>
<th>Context</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>● Interact with the second screen as a group</td>
</tr>
<tr>
<td></td>
<td>● Interaction at a public place</td>
</tr>
<tr>
<td>Age</td>
<td>● 18 - 25 years old</td>
</tr>
<tr>
<td>Synchronisation</td>
<td>● TV and Second Screen</td>
</tr>
<tr>
<td></td>
<td>● Synchronization between second screens</td>
</tr>
<tr>
<td></td>
<td>● Synchronization between second screens and TV show content provider</td>
</tr>
<tr>
<td>Type of Program</td>
<td>● Sports match</td>
</tr>
<tr>
<td>Type of Activities</td>
<td>● betting games</td>
</tr>
<tr>
<td></td>
<td>● Live-chat</td>
</tr>
<tr>
<td></td>
<td>● Social interaction</td>
</tr>
<tr>
<td></td>
<td>● Video content such as highlights and statistics accessible through second screen</td>
</tr>
</tbody>
</table>

Table 3. Context of the group interaction in public place scenario
Scenario 3 - Family Interaction

This scenario consists of 3 smaller scenarios where family interaction at home is the main theme.

1. "I got an idea, let see what is the most voted program"
Grandpa Lukman, Papa Joko, Mama Lusi, Lola are family. They are from Indonesia but they are living in the Netherlands for a while. Grandpa Viktor is already 75 years old, Papa Joko is 55 years old, Mama Lusi is 48 years old, and Lola is 10 years old. They are used to spending time together on Friday nights, usually watching their favourite talent show. This time since it is the Friday night before October 31st, little Lola proposes to hold a voting session about what to watch on TV via their second screen devices, because she is really enthusiastic and curious about watching an Halloween movie. Since she is almost never deciding what to watch, the voting system awards her more points than the other family members and this time she wins the voting session and some of the voting points are subtracted.

Mama and Papa want to make her happy and they agree with that decision, but they are not so sure whether the movie does not contain any blood, gore things, crime, or sex. So, Joko sets it into “under-age-14” mode, just to be sure that the programme will do the requested censoring to the movie. This mode means that for instance every gore part of the movie will be replaced by commercial advertisement or will be cut. But the others will still be able to see those parts via their second screens. It is because they have already configured their special app to their own characteristics and preferences. Therefore, the app can synchronize with the main TV programme and will give an updated screen with the gore part. They also decide to put the movie in English because they want their children to learn English as well.

Lola's knowledge of English vocabulary is still not sufficient. Sometimes she does not know the meaning of some words, so she opens her second screen, where subtitles are already present, and simply by touching the unknown words, she can find their meaning and definition or even explanation.

<table>
<thead>
<tr>
<th>Context</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>● Interact with the second screen as a group&lt;br&gt;● Family interaction at home</td>
</tr>
<tr>
<td>Age</td>
<td>● 3-14&lt;br&gt;● 36-60&lt;br&gt;● 60+</td>
</tr>
<tr>
<td>Synchronisation</td>
<td>● TV and Second Screen&lt;br&gt;● Synchronization between second screens&lt;br&gt;● Synchronization between second screens and TV show content provider</td>
</tr>
<tr>
<td>Type of Program</td>
<td>● Movie</td>
</tr>
<tr>
<td>Type of Activities</td>
<td>● voting session&lt;br&gt;● parental advisory and censoring&lt;br&gt;● english vocabulary learning assistance</td>
</tr>
</tbody>
</table>

Table 5. Context of the family group interaction at home scenario. Sub-scenario 1
The next day, Papa Joko and Lola watch ABC News for kids after they have finished their breakfast. While watching the programme, they turn on their special app which will synchronize with the TV Programme. Sometimes, Lola does not know the meaning of some words such as “Experimental Mashup” then she just has to find the explanation for those words, as she did for the movie, via her second screen. The app provides the explanation of every words from easy to difficult words. Lola can follow more easily the News and learn the meaning of each word that she does not understand.

The app is configured to enable an updating to Papa Joko’s second screen about Lola finding new words. It is used to monitor his little daughter for every words that she is curious about and every words that she has learnt. Then for instance the app will give him an update that Lola has just learned a new word: “Experimental Mashup”.

<table>
<thead>
<tr>
<th>Context</th>
<th></th>
</tr>
</thead>
</table>
| Environment | ● Interact with the second screen as a group  
● Family interaction at home |
| Age | ● 3-14  
● 36-60  
● 60+ |
| Synchronisation | ● TV and Second Screen  
● Synchronization between second screens  
● Synchronization between second screens and TV show content provider |
| Type of Program | ● TV news |
| Type of Activities | ● Vocabulary learning assistance |

Table 6. Context of the family group interaction at home scenario. Sub-scenario 2
The next Friday, they decide to watch all together their favourite talent show. They missed it last Friday because they were engaged to the Halloween movie. Mama Lusi launches a special app on her second screen to watch the last performance and see the comments about her favourite participant on that talent show. The app provides videos for every performance that has been performed in the programme.

Papa Joko does not really understand why his wife really likes that one. So he starts looking on his personal device for the artist’s profile and her performances, which are commented and quoted by other TV viewers, to better understand her qualities and abilities.
In the end of each performance, the **app provides a voting form**. So everyone can vote whether the performer can go to the next level or not. The voting system is not based only on “in/out”, but it is **divided in some category** to chose which particular aspect of the performer the TV viewer really appreciates more and which one less. So they have the feeling they participate more on the artist selection via **different criteria as a real judge of the talent show**. Some criteria could be:

- performance (1 to 5)
- singing ability (1 to 5)
- dancing abilities (1 to 5)

<table>
<thead>
<tr>
<th>Context</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td></td>
</tr>
<tr>
<td>Interact with the second screen as a group</td>
<td></td>
</tr>
<tr>
<td>Family interaction at home</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>3-14</td>
<td></td>
</tr>
<tr>
<td>36-60</td>
<td></td>
</tr>
<tr>
<td>60+</td>
<td></td>
</tr>
<tr>
<td>Synchronisation</td>
<td></td>
</tr>
<tr>
<td>TV and Second Screen</td>
<td></td>
</tr>
<tr>
<td>Synchronization between second screens</td>
<td></td>
</tr>
<tr>
<td>Synchronization between second screens and TV show content provider</td>
<td></td>
</tr>
<tr>
<td>Type of Program</td>
<td></td>
</tr>
<tr>
<td>Talent Show</td>
<td></td>
</tr>
<tr>
<td>Type of Activities</td>
<td></td>
</tr>
<tr>
<td>information retrieval regarding the content of the show</td>
<td></td>
</tr>
<tr>
<td>voting</td>
<td></td>
</tr>
</tbody>
</table>

Table 6. Context of the family group interaction at home scenario. Sub-scenario 3
Scenario 4 - Watching programme as a group

Phil, Chris and Daniel are poker fans. They all enjoy watching poker shows together on TV regularly.

Daniel is an avid poker player so when watching poker shows he doesn’t want to know what kind of cards each of the players is dealt, so he can have a more realistic feeling as if himself was sitting in the table with the other players. However he can join the quiz channel which is provided by the poker app. In this channel, he can put his bet on who is going to win.
Chris and Phil however who aren’t that proficient with poker, follow the show better when **knowing what cards each player is dealt**. What they do is that they switch the TV to a mode where the cards of each player are not made known to the viewers while Chris and Phil **access the cards information through an application in their Second Screens that is in sync with the poker show**. They can also **view the textual poker rules** as well as strategy video tips via their apps. This way all three friends can enjoy according to their liking.

<table>
<thead>
<tr>
<th>Context</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>● Interact with the second screen as a group</td>
</tr>
<tr>
<td></td>
<td>● Friend interaction at home</td>
</tr>
<tr>
<td></td>
<td>● Watching as a group</td>
</tr>
<tr>
<td>Age</td>
<td>● 15-35</td>
</tr>
<tr>
<td>Synchronisation</td>
<td>● TV and Second Screen</td>
</tr>
<tr>
<td></td>
<td>● Synchronization between second screens</td>
</tr>
<tr>
<td></td>
<td>● Synchronization between second screens and TV show content provider</td>
</tr>
<tr>
<td>Type of Program</td>
<td>● Sports</td>
</tr>
<tr>
<td>Type of Activities</td>
<td>● quiz and betting games.</td>
</tr>
<tr>
<td></td>
<td>● change camera/view</td>
</tr>
<tr>
<td></td>
<td>● information regarding the content of the show/programme</td>
</tr>
<tr>
<td></td>
<td>● textual captions</td>
</tr>
</tbody>
</table>

Table 8. Context of the friend group interaction at home scenario.
Matrices

Within this section we present the mapping of our initial Concerns (presented in the Assignment Description document) to our Scenarios.

**MAIN CONCERNS’ MATRIX:**

<table>
<thead>
<tr>
<th></th>
<th>Level of Distraction</th>
<th>Information Overload</th>
<th>Synchronization</th>
<th>Level of Customization</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L</td>
<td>M</td>
<td>H</td>
<td>L</td>
<td>M</td>
</tr>
<tr>
<td>Scenario 1</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Scenario 2</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Scenario 3</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Scenario 4</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

**SCENARIOS’ CONTEXT:**

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>Privacy risk</th>
<th>Location</th>
<th>Environment</th>
<th>Multilanguage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3-14</td>
<td>15-35</td>
<td>36-60</td>
<td>L</td>
<td>M</td>
</tr>
<tr>
<td>Scenario 1</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Scenario 2</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Scenario 3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Scenario 4</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

As we can see matching all the scenarios in the matrices we able to cover all the main concerns and context.

**Questionnaire Survey**

To validate the scenarios and also get impression of the various characteristics of the potential end-users, we have decided to conduct a questionnaire survey. The Questionnaires for the survey were created in parallel with the scenarios in order to achieve two main goals:
1. To get a general picture of how/what/when do our respondents watch on TV and whether they own and use a Second Screen device.
2. To tailor the questions to the scenarios, i.e. by answering these questions, respondents will show what ways and features of each scenario they prefer most.

As a platform for the survey a web page has been chosen for a number of reasons:
● it is easier for respondents to access a web-based survey and
● it is easier for us to send invitations to the survey, rather then interacting with the respondents face to face

Moreover gathering the statistics and answers becomes a trivial task. Finally, since the scope of the survey is to gather responses by diverse groups of people, the website deployment scheme facilitates the distribution of the questionnaires to people located outside the Netherlands. To that end we provided translated questionnaire web forms in the following languages:
● English
● Dutch
● Russian
● Italian
● Greek

As our survey was intended to be global, we didn’t distinguish the results obtained from each language.

The questionnaires were thus distributed in groups of different ethnicity, age, gender with respect to statistics that were gathered in a previous phase. The questions where divided into five major categories:
● General questions such as age and gender as well as questions regarding the TV watching habits
● General questions regarding the use of second screens
● Questions specific to TV watching in groups and social interaction
● Questions specific to the use of second screens
● Questions that were tailed to reflect the scenarios

The survey was deployed on the website http://4eyes-solutions.nl/ together with a database for the ease of data collecting and analysing.

Unfortunately, the intended amount of 120 respondents was not reached. However, we still assume that the resulted number 86 is enough to have a preliminary analysis of our work.

During the survey, we have received multiple complaints from the respondents about too long question description and complexity of the survey. These defects will of course be noted and avoided in the second survey for the Prototype document.

A list of our questions can be found in the Appendix.

**Questionnaire Results**

We completed our first survey for validating the scenarios. In this document we present some of the highlights we have discovered.
Demographics and TV views

For the scenarios questionnaire we have a final of 86 participants. Out of the participants 53 were male and 33 female mostly belonging to the age groups 12-24 and 25-45.

One of our first questions was about how much TV they watch in a week. The majority answered less than 5 hours, consisting of 67% of the participants. 19% watch 5-10 hours, 6% 10-20 hours and 8% watch more than 20 hours a week.

Public

We asked if they ever watch TV in public. Half of our participants answered never and 34 people watch 1 or 2 times a year. 7 people watch at least once a month and 4 people watch every week. In order to find out what programs these 52% watch. We have asked them to state which show they usually watch in public. As expected sports programmes were in the lead with 35 people, followed by the News with 5
We have a question concerning what people would mostly like to do with a second screen in public with strangers. This is ranked question where the most people (30%) like to “Select a language they understand” and another 23% likes to chat with friends about the program.

**Social**

We wanted to know what activities kept people busy during a programme, if any. This was a question where participants could check multiple options (see graph). Surprisingly only 26 of our participants checked “not doing anything else” The rest all had something else to do. The most people like to socialize on Facebook, Twitter or any other social media website. 11 people even stated that they use these social websites for something related to the program. 17 people have checked that the chat or call with a friend about the program. 7 people even like to keep updated and 15 like to look up information. For this question we also have another option where people could fill in any other options, out of these answers we received a lot of people liking to eat during the programme, playing games on their phone, do chores and browsing the web. We find that people don’t just solely watch TV. They especially like to surf on social media. And we are surprised people perform a lot of program related activities. Among ‘other’ answers, the top user filled in answers included gaming, cooking, ironing, eating, doing homework and reading. It seems people like to multitask and leave the TV on while they doe household chores.
We have added a question about people wanting to share what they were watching on Facebook and Twitter. We were afraid that because of privacy issues many people would not agree to share their TV viewing habits. In the end we were surprised to see that 48.84% of the participants would agree to this. The follow-up question is if they were interested to view to statuses of what their friends watch, 49% answered with yes.

Features

Further along the questionnaires many of our participants developed the idea of second screen devices. We asked a few basic yes/no questions what they would like to see or use regarding to second screens.

<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>No, not interested</th>
<th>No, not useful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would you use an app that allows you cut a scene of a TV programme you are now watching to share with others</td>
<td>57%</td>
<td>29%</td>
<td>14%</td>
</tr>
</tbody>
</table>

* This is a good feature that people find useful and the majority would even use.

<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>No, zap channels</th>
<th>No, 1 show</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 shows you want to watch are on simultaneously, would you watch one on the TV and the other on your second screen</td>
<td>35%</td>
<td>13%</td>
<td>52%</td>
</tr>
</tbody>
</table>
* The majority would rather watch 1 show or zap between channels. At least 35% would like to have this feature.

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes, Discuss</th>
<th>Yes, Read</th>
<th>No, not interested</th>
<th>No, not useful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would you use an app to browse the programme and read comments/discuss with other people about the programme?</td>
<td>27%</td>
<td>24%</td>
<td>35%</td>
<td>14%</td>
</tr>
</tbody>
</table>

* The majority finds it interesting and more than half (51%) would use the feature. We think if this is done right than many of the other 35% can be persuaded over.

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would you like to create your personal favourites of programmes?</td>
<td>76%</td>
<td>24%</td>
</tr>
</tbody>
</table>

* 76% thinks creating a list of their favourite programs is a good idea so this is definitely a good feature to have.

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would you like to have the possibility to create a programme-related message with a screenshot tagged with an image, text or audio and send it to someone?</td>
<td>58%</td>
<td>42%</td>
</tr>
<tr>
<td>Would you like to change the received screenshot with ability to send its changed version back?</td>
<td>53%</td>
<td>47%</td>
</tr>
</tbody>
</table>

* People like to use the available screenshot features with the sharing option.

**Features participants would like to see**

Out of 86 participants, 44 have left behind their own suggestions. We picked a few interesting features users have written down along with our ideas:

“*some related info w. ability to explore interactively*”
Could be great for a children’s show where kids can interactively play along with the story.

“*public chat with people who watch the same programme*”
A great place to discuss and meet people with the same taste in TV shows.

“*remote control with channel preview*”
This is a great idea, a tablet can add functions that a remote control cannot. Instead of zapping through channels the tablets previews what is currently on and you can instantly select it.
Scenarios output

The constructed Scenarios involve a description and list of several important functionalities that both Second Screen and TV should possess. This chapter will explain what features should exist in both devices and what additional infrastructure (such as specific software) should exist to support the presented Scenarios.

The following table presents a mapping of Scenarios and needed functionalities: (Note: some of the functionalities, identified in the scenarios, can work differently then they are described in the Scenario story, for instance instead of showing captions on the second screen, the captions can appear on the TV as well.)

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Second Screen functionality</th>
<th>TV-screen functionality</th>
</tr>
</thead>
</table>
| Scenario 1 (Basic group interaction) | ● Provide voice dubbing  
● Provide subtitles  
● Browsing related information  
● Quizzes  
● Knowledge / Voting games  
● Scene-Grab & Send  
● Social interaction  
● Live-chat | ● Synchronisation with Second Screen  
● Provide visual and text information on the “second layer” above the main TV-picture |
| Scenario 1 (Virtual group) | ● Interact with shared virtual space  
● Scene-Grab & Send  
● Social interaction  
● Live-chat | ● Synchronisation with Second Screen  
● Provide visual and text information on the “second layer” above the main TV-picture |
| Scenario 2 | ● Betting games  
● Live-chat  
● Social interaction  
● Making video content such as highlights and statistics accessible  
● Provide voice dubbing | |
Conclusion

Through working on the Scenario Document the following milestones were achieved:

1. We have identified the areas of interest, which directly influence the usage of Second Screens while watching TV.
2. By combining these areas we have constructed the most interesting Scenario, oriented on the group interaction (as suggested by the product owner).
3. We have validated the Scenarios by making a Questionnaire survey among the potential end-users. This survey also helped us gather data regarding the attitude of the potential end-users towards TV-watching and the possibility of the Second Screen usage while watching TV.

Unfortunately, due to some mistakes that were done on the phase of questions creation, the findings of the survey may not be called 100% successful. This includes the fact that target group included a lot of people, who rarely watch TV and almost all of the respondents appeared in the age area of 15-45 years. Another obscure issue is the answer of about half of the total number of respondents, that they do not need the additional interactivity with the TV screen. This, however, can be perceived as a sign, that the potential users do not fully understand the potential of the new product without first trying it/or seeing its features in real life - a nice example of the same situation is the introduction of an iPad - a lot of skepticism was seen at first, but later it was a commercial success. Thus we can assume that we cannot truly base our expectations solely on the results of only one questionnaire survey.

Despite the above negative sides useful information can still be drawn from it. Respondents mostly positively reacted on the questions describing the new potential functions. That surely means that despite some of the skepticism based on the question of whether a user wants additional interactivity (almost half of the respondents replied “no”), users will appreciate some of the added functionality. Tailing questions, that were supposed to validate the Scenarios, also showed respondents interest. Most of them chose the most innovative answers, rather then the already present functions (like “updating status” or “searching information on Wikipedia”).

Based on the findings of the survey we have concluded that we can continue our project with the next, Prototyping step. The Scenarios that we have created and validated, although too specific in their interpretation in the current document, can be broken down to a set of technical and software functionalities, that Second Screens, TV-screens and infrastructure should posses in order for these Scenarios to work. These core functions, when combined, can provide the basis for a lot more different Scenarios and Use-Case implementations.

With these functionalities defined, the next Prototype step of the Project can be started.
Prototype Research

This section is the final milestone in the Release Stage of our project. It continues the Scenario Research phase and takes the results, obtained in the previous phase, as input.

In the previous Scenario phase the following results were obtained:
1. We have identified the most interesting and probable scenarios of Second Screen usage (with focus on group interaction)
2. Mapped them with concerns
3. Validated them using a Questionnaire on potential end-users
4. Made a survey on potential end-users regarding the usage of Second Screens and watching TV-programmes
5. Identified the core Functionalities of both Second Screens and TV that should make these Scenarios possible

We have examined the Scenarios and their related concerns to understand the core negative and positive effects that these functionalities impose on the use of watching experience. Based on these results we provide the Guidelines (together with GUI-sketches) on how to minimise the negative effects of these functionalities on the TV-watching experience and enhance the positive ones. The mock-ups in the document are used to illustrate certain functionalities in a more realistic and understandable way.

Altogether this document provides our research on usability of the functionalities found in the previous scenario document with the end result being the Usability Guidelines.

Functionality Analysis

This section contains the list of functionalities as they were devised in the previous phase of the Scenario document. Furthermore we attempt an analysis on the listed functionalities based on the premise that to do an effective concern and usability analysis we need first to break down the functionalities into their core operations while identifying also the visual objects on which these operations are applied. This approach will assist us in assessing to which degree the problems/concerns affect each functionality, thus enabling us to devise usability heuristics in order to combat the aforementioned concerns.

Functionality table

<table>
<thead>
<tr>
<th>Second screen functionality</th>
<th>TV Screen functionality</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Provide voice dubbing</td>
<td>• Provide visual and text information on the</td>
</tr>
<tr>
<td>• Provide subtitles</td>
<td>“second layer” above the main TV-picture</td>
</tr>
<tr>
<td>• Browsing related information /</td>
<td></td>
</tr>
</tbody>
</table>


Information retrieval regarding the content of the show
- Quizzes
- Knowledge / Voting games
- Scene-Grab & Send
- Social interaction
- Betting games
- Provide different camera views
- Parental advisory
- Vocabulary learning assistance
- Showing uncensored version
- Voting
- Making video content such as highlights and statistics accessible

- Synchronisation with Second Screen
- Censoring
- Provide different camera views
- Provide textual and visual information

## Second screen functionality
### Social interaction

<table>
<thead>
<tr>
<th>Visual Objects</th>
<th>Core Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Login form to log the viewer on to the social interaction (it might be possible using the openID or SSO, so the user does not need to log in again on the second screen app)</td>
<td>● Communicating or messaging to friends via chat box/room</td>
</tr>
<tr>
<td>● Chat form (messaging to friends)</td>
<td>● Authenticate viewer</td>
</tr>
<tr>
<td>● “share” button to share the content, actors, or images to the social group</td>
<td>● Create a virtual group</td>
</tr>
<tr>
<td>● “like” button to the programme</td>
<td>● Update event from the viewer to the social interaction app</td>
</tr>
<tr>
<td>● List of friends or people who join the second screen applications</td>
<td></td>
</tr>
<tr>
<td>● Preferences options (security, account, etc)</td>
<td></td>
</tr>
</tbody>
</table>

### Scene-Grab & Send

<table>
<thead>
<tr>
<th>Visual Objects</th>
<th>Core Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>● scene selection tool interface</td>
<td>7. scene grabbing function</td>
</tr>
<tr>
<td>● grabbed scene</td>
<td>a. scene selection</td>
</tr>
<tr>
<td>● list of recipients</td>
<td>b. scene grab</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
- social network applications list where the scene can be uploaded to
- send/share grabbed scene

**Provide voice dubbing**

<table>
<thead>
<tr>
<th>Visual Objects</th>
<th>Core Operations</th>
</tr>
</thead>
</table>
| • Languages list | • Select the language to dub  
|                 | • Synchronize the TV Programme and the dub. |
|                 | • options to display it to the main screen or to the second screen |

**Provide subtitles**

<table>
<thead>
<tr>
<th>Visual Objects</th>
<th>Core Operations</th>
</tr>
</thead>
</table>
| • Languages list  
• Text size options | • Select the language to display the subtitle  
|                 | • Synchronize the TV Programme and the subtitle.  
|                 | • Enlarge the text base on the viewer preferences |

**Quizzes**

<table>
<thead>
<tr>
<th>Visual Objects</th>
<th>Core Operations</th>
</tr>
</thead>
</table>
| • Quiz application interface  
• List of participants  
• Questions  
• Chat-box  
• Possible answers  
• Score of each player  
• Social networking applications list where the results can be uploaded | • Invite friends to join the quiz  
|                 | • Chat with players function  
|                 | • Commence the quiz game  
|                 | • Answer questions  
|                 | • Display the quiz result  
|                 | • Upload results in social networking applications |

**Voting as a feature of a show (e.g. talent show)**

<table>
<thead>
<tr>
<th>Visual Objects</th>
<th>Core Operations</th>
</tr>
</thead>
</table>
| • Ballots for each contestant  
• Information about each contestant  
• Links to replay the performance of each contestant  
• Voting result | • Display the contestants  
|                 | • Contestant selection  
|                 | • Display/replay the performance of the selected contestant  
<p>|                 | • Display information regarding the |</p>
<table>
<thead>
<tr>
<th>Visual Objects</th>
<th>Core Operations</th>
</tr>
</thead>
</table>
| • Uncensored version  
• Preferences box  
• Notification pop up to indicate that currently the viewer should look at their second screen since it will display the uncensored part of the TV programme | • Indicates which part is assumed as inappropriate and which one is appropriate part of the TV Programme.  
• Display the censored and uncensored part  
• Distribute the part base on the preferences of the viewer (e.g: base on age)  
• Send notification message or window  
• Synchronize the TV Programme with the Second Screen |

**Parental advisory**

**Browsing related information / Information retrieval regarding the content of the show**

<table>
<thead>
<tr>
<th>Visual Objects</th>
<th>Core Operations</th>
</tr>
</thead>
</table>
| • Interface of the search tool  
• The query which the search will be based on  
• Search results | • Enable/Disable the search tool  
• Construct the query  
• Display the results |

**Making video content such as highlights and statistics accessible**

<table>
<thead>
<tr>
<th>Visual Objects</th>
<th>Core Operations</th>
</tr>
</thead>
</table>
| • Highlights  
• Statistics  
  ○ Team statistics  
  ○ Player statistics  
  ○ History statistics | • Highlight selection function  
• Display/replay the selected highlight  
• Display the possible statistics categories  
• Selecting statistics category  
• Statistics searching function  
• Display statistics  
• Return to the normal flow of the program |

**Provide different camera views/angles**

<table>
<thead>
<tr>
<th>Visual Objects</th>
<th>Core Operations</th>
</tr>
</thead>
</table>
- list of possible views
- panel of favourite views
- the selected camera view/angle

- projection/preview of the possible views
- comparison between different camera views
- selection of a view
- switch back to a previous view
- store favourite views

### Vocabulary learning assistance

<table>
<thead>
<tr>
<th>Visual Objects</th>
<th>Core Operations</th>
</tr>
</thead>
</table>
| • Search input box where the viewer can write the search query parameter  
  • list of search result regarding to the TV content, it will display the meaning of the words and also the explanation of the words.  
  • “sound” button to know or listen how it is pronounced  
  • Advance search option  
  • Preferences option | • Search content base on the search query parameter given  
  • Transform the text to sound  
  • Enabling or disabling a notification message to the targeted person whenever some action (relating to the search content) is taken. |

### TV Screen functionality

#### Synchronization with Second Screen

<table>
<thead>
<tr>
<th>Visual Objects</th>
<th>Core Operations</th>
</tr>
</thead>
</table>
| • List of available second screen devices  
  • List of synchronized second screen devices  
  • Information about the available second screen devices (such as name, type, owner etc.)  
  • Information about the synchronized screen devices (such as connection time, etc) | • Display available second screen devices  
  • Display synchronized second screen devices  
  • Select second screen device to synchronize with  
  • Synchronize the selected screen device  
  • Display information about the available second second screen devices  
  • Display information about the synchronized second screen devices |

Provide visual and text information on the “second layer” above the main TV-picture

<table>
<thead>
<tr>
<th>Visual Objects</th>
<th>Core Operations</th>
</tr>
</thead>
</table>
The selected textual and visual information

The interface of the layout managing functionality

- enabling/disabling function
- option of placing this additional content to different places of the TV screen (like unused space, top of the screen, bottom of the screen etc)

### Censoring

<table>
<thead>
<tr>
<th>Visual Objects</th>
<th>Core Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>The censoring functionality interface</td>
<td>Enable/Disable the censoring</td>
</tr>
<tr>
<td>The censored content</td>
<td>Display the censored version</td>
</tr>
<tr>
<td>Notification whether the censoring is either enabled or disabled</td>
<td></td>
</tr>
</tbody>
</table>

### Provide different camera views/angles

<table>
<thead>
<tr>
<th>Visual Objects</th>
<th>Core Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>list of possible views</td>
<td>projection/preview of the possible views</td>
</tr>
<tr>
<td>panel of favourite views</td>
<td>comparison between different camera views</td>
</tr>
<tr>
<td>the selected camera view/angle</td>
<td>selection of a view</td>
</tr>
<tr>
<td></td>
<td>switch back to a previous view</td>
</tr>
<tr>
<td></td>
<td>store favourite views</td>
</tr>
</tbody>
</table>

### Concerns Analysis

In the Scenario’s phase we have related the Concerns, that are already defined in the Assignment Description document, to the possible user’s interactions with the second screen. We have identified among those, five most prominent problems that the user is facing while watching TV:

- Level of Distraction
- Information Overload
- Synchronisation
- Level of Customisation
- Privacy risks

Those Main Concerns are affected also by the Environment and the Context in which the user, also according to his/her individual characteristics and preferences, is situated. The impact to functionalities will be observed in two ways. First, we are going to analyse it from the point of view of each concern. It can be achieved by grouping the possible number of functionalities that might have the same concern.
Second, we are going to analyse each functionality in detail to be able to foresee all the possible impacts regarding concerns.

**Level of Distraction**

The functionalities that fall under the influence of this concern are:

<table>
<thead>
<tr>
<th>Second screen functionality</th>
<th>TV Screen functionality</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Browsing related information / Information retrieval regarding the content of the show</td>
<td>• Provide visual and text information on the “second layer” above the main TV-picture</td>
</tr>
<tr>
<td>• Quizzes</td>
<td>• Provide different camera views</td>
</tr>
<tr>
<td>• Knowledge / Voting games</td>
<td>• Provide textual and visual information</td>
</tr>
<tr>
<td>• Scene-Grab &amp; Send</td>
<td></td>
</tr>
<tr>
<td>• Social interaction</td>
<td></td>
</tr>
<tr>
<td>• Provide different camera views</td>
<td></td>
</tr>
<tr>
<td>• Vocabulary learning assistance</td>
<td></td>
</tr>
<tr>
<td>• Voting</td>
<td></td>
</tr>
<tr>
<td>• Making video content such as highlights and statistics accessible</td>
<td></td>
</tr>
</tbody>
</table>

**Analysis**

The distraction, provided by these functionalities usually comes from the prolonged period of time that a person spends interacting with the Second Screen instead of Watching TV.

This can happen for various reasons, such as:

- Unnecessary information displayed
- Too much of information displayed
- Displayed information is not related to the watched programme
- Distraction provided from interaction with friends
- Too intricate interface of the application

**Information Overload**

The functionalities that fall under the influence of this concern are:

<table>
<thead>
<tr>
<th>Second screen functionality</th>
<th>TV Screen functionality</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Browsing related information / Information retrieval regarding the content of the show</td>
<td>• Provide visual and text information on the “second layer” above the main TV-picture</td>
</tr>
<tr>
<td>• Social interaction</td>
<td>• Provide different camera views</td>
</tr>
<tr>
<td>• Making video content such as highlights and statistics accessible</td>
<td>• Provide textual and visual information</td>
</tr>
</tbody>
</table>
Analysis

The Information Overload happens when a person sees too much information that he cannot, unable or has no desire to process.

The Information Overload sometimes happens in cases of “raw” information search or ordinary interaction in uncontrolled (by Second Screen application) environment. This cannot be controlled, as it is a user’s desire to search for information in the search engine or to participate in communication with friends in social network websites.

However, for situations where the content is displayed via a Second Screen, or Second Screen connected to the TV screen, the amount and nature of the information should be filtered or altered in such a way that the user can consume it without being distracted from the watched programme.

Synchronisation
The functionalities that fall under the influence of this concern are:

<table>
<thead>
<tr>
<th>Second screen functionality</th>
<th>TV Screen functionality</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Browsing related information / Information retrieval regarding the content of the show</td>
<td>• Provide visual and text information on the “second layer” above the main TV-picture</td>
</tr>
<tr>
<td>• Quizzes</td>
<td>• Synchronisation with Second Screen</td>
</tr>
<tr>
<td>• Knowledge / Voting games</td>
<td>• Censoring</td>
</tr>
<tr>
<td>• Social interaction</td>
<td>• Provide different camera views</td>
</tr>
<tr>
<td>• Betting games</td>
<td>• Provide textual and visual information</td>
</tr>
<tr>
<td>• Provide different camera views</td>
<td>• Subtitles and voice dubbing</td>
</tr>
</tbody>
</table>

Analysis

The Synchronisation aspect involves the spatial and temporal synchronization of the content between Second Screen and TV, in such way that they cooperate, providing to the end user real-time services and useful functionalities (i.e. in case of different angle view on the Second Screen, but also an environmental synchronization, which involves that the Second Screen and TV screen should be able to connect each other and share the information about the content that is displayed on time). Moreover, in the group environment, the Second Screens should also be able to automatically connect to each other (perhaps for safe reasons, this should be done through a TV) for participating in group interaction activities.

Level of Customisation
The functionalities that fall under the influence of this concern are:
Second screen functionality | TV Screen functionality
---|---
• Provide voice dubbing  | • Provide visual and text information on the “second layer” above the main TV-picture
• Provide subtitles  | • Provide different camera views
• Browsing related information / Information retrieval regarding the content of the show  | • Provide textual and visual information
• Quizzes  | 
• Knowledge / Voting games  | 
• Scene-Grab & Send  | 
• Social interaction  | 
• Provide different camera views  | 
• Vocabulary learning assistance  | 
• Voting  | 
• Making video content such as highlights and statistics accessible  | 

Analysis
The Customisation concerns deals with the ability of the user to customise the way the interface of the Second Screen and the TV-Screen looks like, having an efficient and useful list of options for each functionality and so an easier interaction with such devices.

This concern is very important as with high Customizability the user can have the most usable and appropriate interface for watching experience.

Privacy Risks
The functionalities that fall under the influence of this concern are:

<table>
<thead>
<tr>
<th>Second screen functionality</th>
<th>TV Screen functionality</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Browsing related information / Information retrieval regarding the content of the show</td>
<td>• Synchronisation with Second Screen</td>
</tr>
<tr>
<td>• Quizzes</td>
<td>• Censoring</td>
</tr>
<tr>
<td>• Knowledge / Voting games</td>
<td>• Provide textual and visual information</td>
</tr>
<tr>
<td>• Social interaction</td>
<td></td>
</tr>
<tr>
<td>• Betting games</td>
<td></td>
</tr>
</tbody>
</table>

Analysis
Privacy is at risk when an application needs to collect your personal information in order to be able to let the user continue interacting. This concern is important since it relates with the user credentials and sensible information and data.
Second screen functionalities

So far, we have analysed the relation between functionalities and concerns by grouping several functionalities that introduce the concern impact. Next, we are going to explore the concerns from the point of view of functionalities (i.e. how the functionalities can influence the risk of negative consequences represented by concerns). Every functionality is expanded with its negative or positive effects on one or more concerns.

Here follows the list of functionalities:

1. **Social interaction**
   The number of distraction for this functionality is variant. It depends on the behavior of the viewer itself and also depends on the type of TV programme that is currently being watched. While watching a movie, there might be the case that doing other activities will have a high level of distraction since you don’t want to switch too often from the main screen to the second screen. By having done that, you might lose some part of the movie. But if you are watching a programme that is quiz or game oriented, it might not affect your attention since you might want to share your opinion about the quiz or the game with your friends.

2. **Scene-Grab & Send**
   The synchronisation between the TV and the app should be highly reliable otherwise it can distract the user whilst interacting with the app. This application might lead to privacy issues when sending the part of the scene to his or her community. It might contain private information. The level of attention for this kind of activity should be high in order to enable each user to realise that there is either a new part of a scene that can be grabbed or there is any scene received by one of his or her friends.

3. **Provide voice dubbing**
   The synchronisation between the second screen applications and the TV Main screen has to be highly reliable. Synchronisation will affect the level of distraction of the viewer/listener. If there is delay between the images and the audio it will definitely distract the viewer/listener. On the other hand, it will really help the viewer/listener to enjoy the show if it is synchronised in time. However, privacy risks and information overload are not relevant for this functionality.

4. **Provide subtitles**
   It will raise high distraction when you watch a programme on the main screen and read the subtitle via the second screen. It will be much better if the option to have subtitles is provided in the main screen instead and customisable on the Second Screen. The synchronisation between the TV main screen and second screen has to be high.

5. **Quizzes**
   The quizzes will be given when commercials are on during a programme or at the end of the programme, otherwise they can cause high level of distraction. The viewers will receive a notification on their second screens thus it will increase the awareness. However, the
**synchronisation** between the TV Programme, second screen app, and main screen should be **highly reliable.**

This functionality can also lead to **privacy risks.** For example, in order to participate to a quiz you will need to introduce some of your personal data, needed by the game itself and necessary to notify and deliver the reward to you in case you win.

6. **Knowledge / Voting games**

Knowledge or voting games most likely will be given during the commercials break or even after the TV programme is finished in order to not **increase the level of distraction.** The **synchronisation** might have to be **not highly reliable** constantly, because there will be the case that the games will be given or distributed to the viewer.

7. **Voting**

The functionality of Voting is almost the same as quizzes. It will be given before or at the end of the TV programme. However, you can also vote during the commercial break. The concerns affected by that will be slightly the same as for quizzes, **the level of distraction will be low and the use of notifications will increase the level of attention** for the voting session. However, since it is a voting activity, **it will not lead to high privacy risks.**

8. **Parental advisory**

Since parental advisory functionality is used to create different views of the same show for the same part of TV for different kind of users, it will need **highly reliable synchronisation** with the TV Programme. This might also **lead to distraction** if the number of censored part is high. It will make the viewers **switch their attention several or too many times.** However, the **level of awareness can be increased** by sending notification messages to indicate that the second screen is currently viewing the uncensored part.

9. **Browsing related information / Information retrieval regarding the content of the show**

This activity happens, more often, depending on the user behavior, preferences, and willingness. The **level of distraction** depends also on the kind of information desired, and on the way how the information is presented to the user. It might cause **information overload** if the information given is not filtered or just too much for the screen (main screen or second screen). When it happens, it **can cause high level of distraction** for the user. The level of **synchronisation** also depends on the way how the information is delivered. If the information is gathered based on the user action, then there is no need to have high synchronisation. On the other hand, if the information is pushed from the TV programme to the user’s second screen based on your preferences and given while watching the TV Programme, then it will need **high synchronisation** with the TV Programme.

10. **Making video content such as highlights and statistics accessible**

Some option of that functionality will need **highly reliable synchronisation** but some other not. If we want to see the past event, then it does not need high synchronisation. But if we want to be able to replay the part of the game or some action that we have just seen, then we need to have good synchronisation. It is also possible that it will introduce **information overload.**
11. **Provide different camera views**

It might lead to **high level of distraction** when it is not arranged properly. The option to be able to watch some views on the second screen and the main view on the TV screen will probably lead to the highest level of distraction. Moreover, it also need to have **highly reliable synchronisation**, otherwise it will reduce or disturb the TV watching experience.

12. **Vocabulary learning assistance**

This type of activity will happen depending on the user knowledge and willingness. This might affect the level of distraction. It might also lead to information overload when the information given is huge. If it happens, it can cause high level of distraction. There are possible ways to deliver the information which might influence the level of synchronisation between the TV programme and the Screen.

### TV Screen functionalities

This section completes the concern analysis by mapping TV Screen functionalities on the identified concerns. Following the structure of the previous section we expand the TV Screen functionalities with the concerns they have an impact on. Here follows the list:

1. **Provide visual and text information on the “second layer” above the main TV-picture:**
   - Enabling/disabling functions and the option of placing additional content to different places of the TV screen (like unused space), requires **high level of customizability**. The other concerns are less affected by this functionality, apart from **information overload**. This one in particular may reduce the level of customisation if the quantity of information is too high to be easily managed by the user.

2. **Synchronisation with Second Screen:**
   - A good synchronisation is fundamental and critical for a correct and enjoyable utilisation of most of the functionalities already described. A bad synchronisation can be the reason of a **high level of distraction** interrupting the normal TV visualisation and functionality utilisation. That can be caused also by an **excessive information overload**, creating problems of real time response by some of the application.

3. **Censoring:**
   - Requires a high **level of customizability** in order to not create distraction for the end-user as showing undesired information, or on the other hand cutting parts of interest. A good **synchronisation** is required to allow a normal TV watching experience, without anomaly pause during the visualisation of the main screen.

4. **Provide different camera views:**
   - A good **synchronisation** is required in this case as well to change according to the user preference the most suitable camera view, without losing time or creating distraction for the user.
while switching from camera to camera. A good, **high level of customisation** offers the end-users a wide choice, allowing them to find a common decision especially when watching the same TV main screen all together.

5. **Provide textual and visual information:**
   Requires a **low level of information overload**, in order to not visualise too many undesired information on the main screen, creating an **high level of distraction**. This is possible with an **high level of customizability**, choosing while it is more opportune, according to the kind of program and company while watching TV, to be distracted by other information not regarding in the specific the watching experience.

---

**Usability Analysis**

This chapter deals with the usability analysis. Usability is a non-functional requirement for a human-interactive object. It defines the ease of use and learn-ability for a person to interact with this object. Usability analysis is a research process needed to define and find the best implementation of the object, that will enhance the positive side of interaction with the device, including learning and ease of usage, and will lower the impact of the negative sides (or completely eliminate them). An essential part of the usability analysis is the investigation of every possible use of the object and the consequences in each possible case.

In our case we have as the object of interest the abstract concept of “Usage of a Second Screen while watching TV-programmes”. In our previous research we have defined the possible scenarios that can be utilised while interacting with a Second Screen and watching TV at the same time. These scenarios can be broken down in the functionalities, that are further analysed above from the concerns point of view.

In order to do the analysis of our concept we need to analyse our functionalities from the usability point of view, bearing in mind the concerns that cause negative or positive effects on the use of the object. Some aspects of functionalities seem trivial and easy to define from the usability point of view, for example **“high level of customization”** of the graphical objects on the TV screen in order to lower **“level of distraction”**. Some of them can be only analysed with a physical prototypes and focus groups. The rest of them cannot be analysed by us due to the lack of an unbiased view, because the scenarios and functionalities are the result of our research. Therefore we have decided to do the analysis with the help of a questionnaire on people, who regularly watch TV.

**Questionnaire**

We have decided to analyse our functionalities using a face-to-face survey on a group of potential end-users. For this purpose we have created a set of mock-up-pictures, describing each functionality, its variations in the context of our scenarios. The idea of the survey was to show the mock-ups to the respondents and to ask open questions about what they think of the mock-ups, functionalities, interfaces, usage and distraction.
All interviews were recorded.

**Purpose**
The purpose of the interview was to gather the ideas and thoughts that the potential end-users had on the functionalities of the Second Screen and TV, mock-up interfaces, issues related to the functionalities and whether they found them useful, distracting, etc.

**Mock-ups**
For the mock-ups we decided to make a graphical representation of an interaction process that user has interacting with Second Screen while watching various TV-programmes and executing different tasks.

For making the pictures we have used the online editor Cacoo - [http://cacoo.com/](http://cacoo.com/).

As a basis for the picture layout we have decided to show a tablet-PC (iPad-like device) in front of the TV in a perspective as if a person is sitting in front of the TV screen holding the tablet.

An example of the picture, that we have used to show the overview of Second Screen capabilities is shown below:
A picture shows the tablet interface while watching a football match with a set of possible options that can be made:

- Mining for information on match, teams, players, championship, links to past matches
- Sharing preferences (for sharing statuses on Facebook, Twitter, etc.)
- Screen Grab (to cut a piece of program and send it with comments somewhere or to someone)
- Inviting friends to watch the same programme (also possibly Virtual Room functionality)
- Organising Quiz games
- Choosing different camera angles to see the match from different viewpoint
- Preferences on where to show visual information and camera angles
- Option to Re-watch the moments (also possibly functionality to mark specific moments for yourself)
- Notification settings

The other mock-ups that we have created will be placed (along with the mock-up above) in the Appendix. They were based on the following scenarios:

- Football match
- TV-Series

Second Screen

Football Match

4Eyes - Usability Heuristics for TV 2nd Screens: Research Document
- Changing Camera angle (with 2 ways of implementations)
- Social Interaction with friends (comments and rating)
- Virtual Room
- Screen grab (with 2 ways of implementation)
- Subtitles
- Display of information on the TV-screen
- Mobile device (where smart-phone was placed, instead of tablet pc)

The mock-ups provided base for the questions, however not all the questions were based on them.

**Questions**

For the survey we have prepared a set of open questions with a possible follow-up questions (a complete script for the questionnaire is placed in the Appendix).

We have covered the following topics:

- Football match and the overall interface
- TV-series and the overall interface
- Changing camera angles and thoughts on this feature
- Social interaction together with TV-watching
- How Social Interaction is distracting
- Health issues
- Information overload
- What people do during commercials
- Screen Grab and Re-watch functionalities
- Accessibility (subtitles/voice dubbing)
- Quizzes/Games/Voting
- Parental Advisory/Censoring
- Virtual Room
- Thoughts on the use of different devices as Second Screen
- Synchronisation issues
- Workflow of the Second Screen interface
- Customizability
- General question about the Second Screen

For each topic with a functionality that we had a mock-up for, a picture was presented to the respondent with a short explanation on how this functionality worked. If he had any other questions about the mock-up, they were additionally answered.

The questions were asked in open manner, without giving any “lead” to a desired answer. So instead of “Would you like to have such feature?” we asked “What do you think about this feature?”, so that a respondent could give as independent and open answer as possible.

Each of this topic came together with a set of follow-up questions, considering possible issues, whether the feature was distracting or not and whether something should be changed.
The interviews took approximately from 30 to 60 minutes each. The notes were taken that were later clarified using a voice record of the interview.

**Analysis**

Before starting the core interview section of the survey, we have gathered some statistical information about the respondents, their age, gender and amount of hours, they usually spend on watching TV.
Different camera views
Most people like this functionality since they can watch one action from several different camera angles. They will definitely use it especially for sport programme but it is also possible for other types of programme such as talent show programmes and detective movies. However, most of them agree that viewing the different angles on the second screen will definitely distract their concentration to watch the programme.
They prefer to view the different camera angles on the TV as the main screen and probably control it via second screen and remote control. They also like the idea to be able to know where the cameras are located. They said that it is a nice feature to have especially when it is displayed in the main screen (which is illustrated as in the mock-up).
The number of the angles that can be displayed in the main screen is up to 4 or depends on the size of the TV.

Social interaction
Some interviewees are actively using the social network but some other are not. Most of them will definitely use this functionality because they agree that it is a useful one. However, there are also some people who are not going to do any social interaction while watching TV because it will distract them.
Most people like to interact with people or friends that are currently watching the same movie. They like to post updates and share information on what is currently watched and read updates from others. But it should be also possible to share the information about the movie to everyone or to friends that he or she has chosen.

Some people prefer to have the notification on the TV main screen. The notification system should be designed well so that it will not distract the viewer. It would be nice if the text is enlarged and the programme can be paused. Therefore, they can enjoy the programme and enable them to read the comment directly. They would like to have an option to turn on and turn off the comment notification from the social network during the TV show. Some people would like to receive notifications while watching a movie but some prefer not to receive any notification. They want to read the comments after the movie is finished.

Information Overload

Of the activities that the interviewees were asked to evaluate, there was definitely a trend towards the social networking applications such as Facebook or Twitter as several respondents considered that such applications have functions that are not too distracting, while on the contrary most of the respondents agreed that chatting is the most demanding activity in terms of allocation of cognitive resources. Moreover based on the accumulated answers searching information through Wikipedia or IMDB websites are not considered as too distracting activities. Another interesting observation is that being on the phone with friends or family was not considered as a distracting activity.

For the proposed functionalities information overload was more of an issue for the quiz/knowledge/voting games while for the taking screenshots functionality respondents where mostly positive that such an activity will not pose significant issues of information overload. It must also be noted that we did not get responses from all interviewees regarding these new functionalities, based on the premise that without prior experience to similar activities it is difficult to assess the magnitude of information overload. Thus also negative responses may be partly attributed to this same reason.

What was clear however is that most of the respondents thought that the type of programme they are watching could affect the distraction level.

One important observation is that all but one of the respondents answered that at least one of the listed activities is not overly distracting. This can be interpreted that people can combine watching TV with other activities as long as they get accustomed to distributing their cognitive resources between these activities.

Screen grab and Re-watch

Most people were really positive about these sharing scenes with their friends. Interesting is that some users want to have precise control which part of the programme to grab. Even though they think this
function would distract them. They estimate taking two to three minutes to share the scene. Some interviewees would prefer to be able to pause the flow of the programme to have time to share scenes. Some interviewees prefer to have directors of the programme to pick out some predefined scenes that they can grab and send, because the director knows all the interesting parts. This option would distract them less, because the sharing possibly be done with one click or touch. Grabbing scenes should be able to be done after the programme has finished. A way of making this easier is to be able to mark moments in the programme with markers, so you can easily grab the scene afterwards.

Most interviewees also were positive about the Re-watch. They would like to use it for when they missed a part, or re-watching highlights, or to catch up to the storyline.

**Accessibility: Subtitles and voice dubbing**

Most of the interviewees were negative about these two functions. Most think viewing subtitles on the second screen would be too distracting, some would use it only as a last resort. People really prefer subtitles to be on the main screen. They really like to be able to adjust the size of the subtitles, and they also like the changes made to subtitles to not require a restart of the program.

There is also a need for saving the subtitles for viewing afterwards. For example, you are watching a movie, and there are things that are not clear immediately. You can then save the subtitles for viewing them during commercials to understand things better.

Most also did not like dubbing, the argument being that it sounds bad. Though some do like it when they would travel in the form of using it with earphones. Using this in a group would lower interaction with friends. Though interviewees think they would be able to focus more on what is happening on the screen, because they don’t have to also focus on the subtitles.

**Quizzes/Games/Voting**

A considerable amount of interviewees were not interested in the quizzes, though the majority of the interviewees that were interested liked the quizzes to pop up during the commercials, though some would prefer the quizzes to pop up during the programme, so it would be more exciting. Though in this case some prefer to have the programme pause, to allow for some time to do the quiz. The questions should be showed on the second screen. Some people also like to have multiple difficulties for the quizzes, like easy, medium and hard.

Most interviewees weren’t that interested in voting in talent shows, they also wouldn’t use the extensive voting, even though they would think for the enthusiasts this would make a fine addition. Some also preferred a voting system adapted to the show, for example in ‘Idols’, the jury can push two buttons, a big cross or a check.

As for holding a voting session to decide what to watch next the majority didn’t like this idea, because they would just prefer to discuss it directly. The interviewees that would use this feature, would think it would be more applicable in a family situation.

Most interviewees do like to be shown recommendations when asked for, or a list of favorites.
Parental advisory
Interviewees are mostly not interested in this option or do not find it useful. This could be because of this certain age group are less concerned with censorship than for instance parents with kids. Half of the interviewees have stated that they think this feature is only useful with kids, but they would not use it themselves. This feature if used does ruin a certain element to view TV since the watcher cannot access the full content of the programme. The person watching should not be interrupted with censorship and be force to look at the second screen. The people who do favor Parental Advisory wish to have a list of programmes where they can see if a programme is suitable. Another comment has been made that technically it might not be possible since syncing between two devices will be hard to do. For instance when a violent scene appears on the TV and censorship is on, then these scenes have to be cut or fully censored while at the same time the full scene would play on the second device. How can 2 groups of people still watch the same program if the censored version has been cut down.

Virtual Room
Almost every one of the people interviewed said that the Virtual Room is a very good and interesting idea, especially when they are watching TV alone. The second layer on the main screen where graphics remarks are showed was rejected because of being too distracting. Instead they preferred the idea to have the virtual room space on the second screen, but with the condition of watching only certain kinds of TV programmes, like sport events or talent shows, when sharing their own opinions and discussions with other friends is always wanted by the common TV user. While watching movies they absolutely rejected the idea and objected the possibility to mark part of a certain scene and send it to their friend in time, while the movie is still going on. Thus, those that still liked that idea, they suggested to have the possibility to pause the programme and use that functionality without loosing anything and with less distraction.

Devices
Mobile phone
Most respondents have agreed that because of the size of the mobile phone it is an ideal variant for usage in public places. It is also quite portable and best suited for quick actions, for example an invitation for a friend to watch the current program.

However respondents also pointed out that a mobile phone has some drawbacks, i.e.

- It has smaller screen, therefore it is hard to read and use it as a screen with information
- Typing is hard
- An ordinary mobile phone (not taking in account new sophisticated dual-core models) can provide less functions then more powerful devices such as tablets and PC/Laptop

Tablet
Most of the respondents stated that a Tablet is an ideal variant for almost any type of interaction with TV, whether it is at home or at public place. It has also a big screen and low weight. One of the respondents also stated that a tablet is not distracting.
The only negative response came from one respondent who suggested that a tablet is more distracting than the smart-phone.

**PC/Laptop**

Positive responses about PC/Laptop included the following ones:

- It is good for home
- It has large screen
- The interaction with a laptop or PC is faster than using any other device

Negative responses about PC/Laptop states that it is:

- Weighs much
- It is bigger and more complex than any other device and therefore not as portable
- It is distracting because of the large availability of other programs running on it

As seen from the results, most respondents see mobile phone as an ideal variant for public places, tablet as an ideal variant for any place and laptop for home use. The respondents’ answers it is clear that they all see these devices as useful for TV interaction.

**Synchronisation**

Most interviewees agree that the synchronisation is one main issue which needs extra attention and consideration. If there is delay too often, then it will spoil the watching experience. Therefore, they will definitely not going to use it anymore. However, small number of synchronisation is still acceptable such as delay 1 second for once or twice. They also think that the delay is not acceptable if it comes to dubbing and subtitle functionality. Those two function really need high reliable synchronisation.

**Workflow**

Most people agree “guide” functionality through the TV programme is useful. But it might be better to display the “guide” at the first time only. The “guide” should give a quick hints and it should not contain too many messages or contents. They should be able to turn it off whenever they don’t need it. It might be possible to turn it on and turn it off by pressing some sort of special key.

Some people agree to have similar kind of interface but it might contain different kind of options for different programme.

However, there is also people that does not like this “guide”, they prefer to have paper-instruction instead. And some people prefer to spend their time to explore the application without any guidance to familiarise themselves with the features provided.

**Customizability**

Some people prefer to use default settings that have been provided by the app itself. But some other are really willing to be able to customise the default one especially if the one provided is not really usable. Mostly will say that they are not going to prolong the use of app if there is no way to customise the applications. In the other hand, if the ability to customise the applications will distract them too much
they will also not going to use it. It is suggested to categorise the customisation options in order to help them look for certain functionality for short time.

Most people agree that rearranging the position is useful since they can personalise the position of certain elements base on their preferences. It makes them feel like it is their personal app. And this kind of ability should be applied for both TV screen and second screen. Some of them think that the rearranging ability is preferred in the second screen. But however, other interviewee said that it might be a nice feature but not really fundamental one for the app.

They prefer to display only the main or basic functions especially for smaller device. But it should also enable them to add more functions to be displayed on their screen and which feature they want to hide. Some people wants to have the same interface even though it is in different device. But some others want to have simpler interface if it is on a smaller device.

All interviewees do not like to change their preferences on the fly. It seems complex for them. They prefer to have special options menu to change their preferences.

Some people would like to display the most amount of information on the TV screen and the Second screen is mainly used for controlling it. It is because they do not want to lose focus from the TV screen. But the information given should be arranged nicely and only needed information.

There are also some people against this idea. They do not like the idea that the TV screen will display information other than the programme. Therefore, it might be nice if there is a possibility to choose where they can display the information. Sometimes, they want see the information on the TV screen but might be other time they want to view it on their second screen. And it is also possible that the information given on the TV screen is the summary or the highlight of the programme and the detailed information will be given on the second screen.

**Usability Guidelines**

This section comprises the Usability Guidelines for the the usage of Second Screen while participating in TV-watching activity. The following guidelines are obtained from the Scenarios, Functionalities and Concerns analyses. Together they represent a set of aspects that should be considered in order to maximise the TV watching experience with the positive effects of interaction with Second Screen and minimize the negative ones.

There are 4 sections: Interface, Interaction of Second Screen with TV, Guidelines for different devices and Guidelines for functions.

**Interface Guideline**

- The customizability options should be intuitive and understandable.
- The options of customizability should cover not only the functionalities on the second screen but also the on the main TV-screen as well.
The options for customizability should not allow the user to spoil the experience (e.g. allowing the GUI elements hovering all the screen).

The options for customizability should be categorised.

A customisable interface of where exactly to display what information would help.

A user should be able to customise the amount of update notifications he is getting and the place where to display them (Second Screen or TV Screen).

A user should be able to choose what type of notifications he or she wants to have such as vibration, sound, or pop-up.

Some of the information should be displayed on the TV screen instead of Second Screen, for example in the situations when the displayed information is of interest for more people than just for handler of the Second Screen.

There should be an option to show all the information on one of the devices - either Second Screen or TV-screen.

There should exist a “guide” option for Second Screen interface that will educate the user.

There should exist a “guide” option for TV-programmes that will guide the user through the available programmes that he can watch.

If designing an application for different types of devices, their size and input functions should be considered:

- Laptop has the biggest screen and the fastest input due to bigger keyboard. Due to the bigger screen, more Graphical elements can be placed on the layout.
- Smart-phone has the smallest screen, thus the not all elements can be placed there. Therefore only the essential ones should be left and aligned in the most usable way.
- Tablet is in the middle between Laptop and Smart-phone.

**Interaction with TV Guideline**

- Second Screen and TV should be able to connect each other wireless, without interaction from the user.
  - If the interaction would still be needed, it should have straightforward and intuitive flow.
- The User should always be notified on the state of the connection. In case if the connection will be interrupted, the User should be immediately notified.
- If the synchronisation between two devices suffers from lag, which can be detected with a software, user should also be notified, to prevent frustration.
- The TV and Second Screen should automatically exchange the information about the program or activities that are performed.
- When several Second Screens are available, one can be chosen as the primary second screen so that it oversees the synchronization.
- There should be available privacy preferences for detecting a type of Second Screen interacting with a TV - in case if TV is public certain functions on the Second Screen should be blocked (e.g. changing a camera angle, that would frustrate other viewers).

**Different Devices Guideline**
● It would be nice if the Second Screen software could be deployed in different ways on the device - stand-alone application for a separate device and web-browser (for example if someone wants to use someone else’s device).
  ○ Laptop or PC should support both web-browser (if available) and ordinary applications
  ○ Tablet and Smart-phone should only support ordinary applications
● Support for different types of input interaction (touch screen and not touch screen)
● Mobile phone applications should be more public-place oriented
● Laptop or home PC applications should be more home oriented.
● Due to the hardware, processing and screen-size limitations, certain functions on mobile phone should be substituted with “degraded” variants, so that the user will still have them available. For example “different angles” functionality can display latest images from the cameras instead of “live” picture.
● Different devices provide different level of distraction:
  ○ Laptop or PC users will be distracted by other applications running on their systems. However, they have the fastest input speed due to the bigger keyboard.
  ○ Smart-phone users have the smallest size of the screen and the slowest speed of word input.
These details should be considered - for example when playing a “Knowledge Game” a laptop user will type in the answer quickly then the mobile user and will spend less time not watching TV.
● Several functions should be accessible both on the TV-screen and on the Second Screen (depending on the users’ needs).

**Functions Guidelines**

● For displaying relevant information about the show, some pre-filtering of information should definitely be in place, since the user does not want to read the whole “Wikipedia-like” article, but can be only interested in some details, for example about a particular artist or episode of the show.
● The information displayed on the TV-screen should be structured and organized in such a way that it will not limit the view of the program for the viewers. If the amount of the additional information is so big that it will take major part of the screen, then the original content should be scaled down so that it whole can still be viewable.
● Social Interaction
  ○ The user should be able to view list of his or her friends who is currently watch the same TV programme as he or she is.
  ○ The list of friends should be viewed on the second screen.
  ○ The user should be able to share any information, grabbed scene, and/or thought to his or her social network. It should be done inside the application without the need to go to the actual social network.
  ○ The user should be able to choose who is able to read his or her updates while watching the TV programme.
● Different Camera Views
○ The number of different camera views on the TV-screen should be adjusted according to the size of the TV screen. However, it should be up to 4 maximum. There should be one main view and at least one additional view.

○ The selection of camera views should be controlled either via second screen or remote control.

● Knowledge, Quizzes, and Voting games
  ○ The knowledge, quizzes, and voting should be given during commercial breaks or after the programme is ended.
  ○ The user should be able to choose on which level (easy, medium, difficult) he or she wants to join the knowledge game and quizzes.
  ○ The question should be given in the second screen. But there should be an option on which screen the user would like to view the question.
  ○ The user should be notified when the knowledge game, quiz, or voting is being given and started.
  ○ The user should not spend a lot of time to select the answer. The question should be straightforward and related to the part of programme they have watched before the commercial break.
  ○ In case of voting game, the option is mostly only between two choices. The selection of the option can be controlled via remote control such as press 5 if you agree and press 7 if you disagree. It can also be controlled via second screen such as press red cross button to disagree and press green check button to agree.

● Scene grab
  ○ During the programme
    ■ The selection of the scene should be quick and straightforward. It can be big green button which say “Grab me”. When it is pressed, then it should synchronise with the TV programme on which exact time it is being pressed and on which part of the scene.
    ○ The scenes should be also available to be grabbed even though the programme is ended.
    ○ After the programme is ended
      ■ The user should be able to select which part of the scene he or she wants to grab.
      ■ The selection can be based on the exact time of the scene.
      ■ The selection can be based on the predefined scenes that are provided by the TV programme.
  ○ It should be possible to save and load the grabbed scene at any time.
  ○ An interface to grab the scene should allow a user to do it in no more then 1-2 minutes.

● Virtual room
  ○ An option should exist that would allow the programme to be paused when a new comment is displayed, so that the user will not lose track of the programme when answering to it.

● Subtitles
  ○ The size of the subtitle should be adjustable.
  ○ The changes to the selection of subtitle language should not require the programme to restart.
○ The subtitle should be able to be saved and viewed later when the user is willing to read and view it.

● Parental advisory/Censorship
  ○ Users should be notified whether the programme contains scenes not suitable for children.
  ○ A quick option should be available to activate “censored” mode, where certain scenes will be hidden on the main screen.
  ○ An option to watch these scenes on the Second Screen should be provided.
Conclusion

Purpose of this research was to investigate the usability heuristics of TV Second Screens: what are the possible ways of using a Second Screen to enhance the TV-watching experience, how these ways affect usability and the way people watch TV programmes.

During our study, which involved brainstorming sessions, literature reviews and questionnaire surveys on potential users, we came with a set of scenarios of Second Screen usage. A special attention was given to a group interaction, both virtual and real. These scenarios were later broken down into a set of functionalities that made them possible. We also came with a set of concerns that affect the TV-watching experience while interacting with a Second Screen. After further interview analysis of usability implications, that are caused by the Second Screen functionalities, we have ended with a set of usability guidelines.

These guidelines, if considered, provide a basis which allows architects and designers of Second Screen devices achieve higher usability for their product.

Based on our analysis, the “screen grab and share”, “different camera angle-views”, and “data-mining” functionalities could be easily considered for further investigations. These three features are those to whom everyone finally seemed more interested with the possibility to apply them for instance during the Olympic’s Games, World Cup, or others sport events.

However, we also think they can be applied while watching “Talent-Show” or “Reality-Show” type of programme.

Moreover, TV-News is also the kind of TV programme that will never lose its viewers. In that case, we also think that is a good idea enhance it by letting the viewer have thorough information about the news he/her is more interested in.

Several directions for further investigations emerged from this study. Firstly, as our exploration did not consider technological boundaries, a new study can be conducted to align the findings of this research with the technological possibilities such as study about its synchronisation. Secondly, as our research was conducted using a theoretical knowledge and the interview sessions were also made using paper based mock-ups, a possible study can be made in real family or group environments with physical prototypes.

Despite the aforementioned limitations, we hope that this research would be a valuable asset for further uses.
Bibliography


5. Martin, Reed and Ana Luisa Santos, Mike Shafran, Henry Holtzman, and Marie-Jose Montpetit. *neXtream: A Multi-Device, Social Approach to Video Content Consumption*. 2010


12. https://sites.google.com/site/vu2screenstudy/home


Appendix

List of Mock-ups

1. Tablet - Football Match

![Second Screen]

2. Tablet - TV-series
3. Camera Angles on 2nd Screen - 2 Steps:
First.
Second:

3. Camera Angles on TV Screen - 2 Steps:

- The match continues to play on the main screen in normal mode.
- Device shows the views from different camera angles. Depending on how powerful is the device, they can be in real-time or not.
- User can choose a game from what angle he wants to see.
First:

By clicking on this button a user can activate "choose different angle" mode.

With this option the previews of different camera angles will be shown on TV-screen.

With the "information on TV" option available user can see additional information, as positions of several cameras in the field.
Second:

4. Social Interaction - Comments:
5. Screen Grab - Sliders
6. Screen Grab - Predefined Scenes:
7. Accessibility - Subtitles on Second Screen:
8. Virtual Room

Amanda: What?
Peter: What country are you from?
Amanda: What? What? Wh - ?
Peter: "What" ain't no country I've ever heard of. They speak English in what?
Amanda: What?
Peter: English, dear lady, do you speak it?
Amanda: Yes! Yes!
Peter: Then you know what I'm sayin'!
Amanda: Yes!
Peter: Describe what Second Screen looks like!
Amanda: What?
9. Mobile Phone as Second Screen - Football match
10. Customizability - Information on TV-screen:
<table>
<thead>
<tr>
<th>Football match</th>
<th>Control options and actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Players</td>
<td>Share &lt;br&gt;Screen Grab &lt;br&gt;Invite friend to watch &lt;br&gt;Organize Quiz &lt;br&gt;Choose Camera angle &lt;br&gt;Show Cam. angles on TV &lt;br&gt;Re-watch the moments &lt;br&gt;Information on TV &lt;br&gt;Vibration &lt;br&gt;Sound Notification</td>
</tr>
<tr>
<td>Andreas</td>
<td></td>
</tr>
<tr>
<td>Andys</td>
<td></td>
</tr>
<tr>
<td>Francesco</td>
<td></td>
</tr>
<tr>
<td>Dmitry</td>
<td></td>
</tr>
</tbody>
</table>

Notification about the tweet someone wrote about this match
An icon showing cameras for different possible angle views
Pop-up notification about a message from a friend
A menu option that specifies whether new information is displayed on the Second Screen or on TV screen
Interview Script

Script for face to face Interview for the "Usability heuristics for TV second screens" study.

This is a document that should be used to conduct a questionnaire survey for the Prototype-document. It contains guidelines, questions and mock-up pictures that should be discussed with the respondents.

Points to remember:

- Be on time with paper, pen and voice-recorder
- Be friendly and polite
- Don’t rush
- Don’t start with reading the questions immediately. Ask a person a little about himself, relation to TV and mobile devices.
- Start your voice-recorder
- Take notes
- Although the second screen is the primary focus of the research, the TV screen itself shouldn't get overlooked.
- Ask your questions clearly, don’t use many complicated terms. If used - explain them first.
- Don’t interrupt the answer. If you want to ask a follow-up question - ask when the respondent will finish
- When showing the mock-up to the interviewee, ask his opinion about the interface, whether he sees himself using it, what he thinks of the functions, etc. Don’t stress his attention on the mock-up too much — if he will have questions, he will ask them by himself.
- Ask thought provoking questions and avoid yes/no questions. We want to get an opinion and a thought.
- Avoid leading questions, such as “Do you think this is a good idea?”. Use “What do you think of that idea?” instead. Clarify the answer with summarizing it and making a follow-up question.
- Don’t think of a next question, when person still answers the current one!
- Review the information in the end of the interview. If needed, review your notes with the respondent.
- Thank the interviewee!

Preparing for the interview:

3. Introduce yourself. Ask whether a person would like to have an interview for the project. Read the following text: “My name is X and I’m going to read from this script to make sure that I cover everything. (My colleague Y is going to be taking notes.)
You probably already have a good idea of why we asked you here, but let me go over it again briefly. We are doing a research project on how to enhance the TV-watching experience with the use of tablets, smartphones and other mobile devices. So we’re asking people to look at a few paper-based mock-ups so that we can learn more about this topic. The session should take about 60 minutes.
The first thing I want to make clear right away is that we’re testing our ideas, not you. You can’t do anything wrong.
As we look at the mock-ups, I’m going to ask you as much as possible to try to think out loud. This will be a big help to us.
Also, please don’t worry that you’re going to hurt our feelings. We’re doing this to improve our knowledge, so we need to hear your honest reactions."

4. Introduce the concept of “Second Screen”. Briefly show it can be used when watching TV-programmes. Use the following mock-ups:

- Tablet and Football Match
- Mobile Phone
- Tablet and TV-series

- Ask the interviewee a couple of preliminary questions such as:
  - how many hours of TV they watch per week on average,
  - whether they own a connected device
  - whether they are already using their device whilst watching TV.

**Conducting the core interview:**

Imagine if you could have the possibility to switch the camera angle view, while watching a TV programme/event (as a football match for instance)

**Show mockup 1**, what do you think about such functions? [explain]
How do you feel about these feature?

[additional]
Can you think of any possible issues when using this feature?
**[show mockup with camera angles functionalities]**
Would you rather watch multiple views on TV and choose specific one on the second device or watch multiple views on the Second Screen and one on the TV?
How many angles at the same time would you like to watch on the second screen?

**Social interaction**
**Show mockup 2**, what do you think you can do with such functions? [explain]
How do you feel about this feature?
Can you think of any possible issues when using this feature? Would you like to be notified when a comment or rating has been placed by your friends? Would you read this while watching the programme or wait until the show is over? Why? When posting statuses about the programme would you like your whole friends list to know or just only the friends that also watch the programme?

[not essential if already answered by the interviewee] Which of these will distract you the most and why in comparison to the others
- Using an programme related app to interact with the TV
- Checking Twitter/Facebook
- Chatting with friends
- Talking with friends in the room

Health
When using a second screen along with a TV screen. You have to focus on two devices. Do you think watching 2 screens will affect your health or comfort? why?

Information/cognitive overload
Can you concentrate on the TV while doing these activities and why (not):
- Reading text i.e. Wikipedia, Imdb etc..
- Twitter/Facebook
- Chatting with friends
- Knowledge / Quiz / Voting games
- Take screenshots and share with friends
- Calling

[not essential, ask only if you have time] When the commercials are, on which of the following will you do?
- Watch commercials
- Play along Knowledge / Quiz / Voting games about the same programme without changing channel if available
- Contact friends of my social network, from a list that shows who is on-line and watching the same programme.
- change channels
- participate in the knowledge game/quiz about the show on the second screen
- other:

Screen Grab & Send and Re-watch functionalities
**Show mockup (with Screen Grab), what do you think this mockup does? [explain]**

- It is used to send my friend a part of the programme I currently watch and possibly add it with my comments.
- What do you think about using a graphical interface with a sliders where I can choose the exact part.
- What do you think about using predefined scenes of that programme for this feature.

How do you feel about this feature?
Which issues can you think of when using this feature?
- Do think this would distract you from watching TV.
- Do think you will not use this feature if this action will take from you more then a minute.
- Do want to be able to re-watch the best part of the TV-programme (for example of a football match)
- Do want to be able to mark the parts that you would like to re-watch later.

**Accessibility: Provide subtitles/Provide voice dubbing**
When using subtitles on your TV everyone can see them. If you are the only one using them on the it could disturb others watching.
Subtitles on your second can give you more customizability(color, size, language, font) etc.
Which do you prefer and why?
Would you use the audio option to hear a different language of the programme?
Can you think of any issues when using these features?

**Quizzes/Games/Voting**
When you are watching a programme on TV, you may join a quiz related to that programme.
What do you think of doing the quiz during the programme or rather during the commercials?

(If during programme) What do you think of pausing the programme during the question so you can focus on answering the question?

What is your opinion on having the quiz questions appear on the second screen rather than on the main screen?

When you are watching a talent show (like Xfactor) with voting sessions, what do you think of an more detailed voting interface which allows you to for example also rate a talent’s voice quality, performance etc, rather than the SMS-voting option? Will that makes watching this programme more interesting for you?
Imagine you are sitting on the couch with your family or friends, what do you think about having a voting session to determine the next TV programme that you are going to watch? Or perhaps if your devices analysed your favourite types of programme and provided you with a recommendation?

**Parental advisory/Censoring**
When you are watching a movie at home with your family, some movies might not be suited for everyone, what do you think of censoring inappropriate content on the TV, like blood for the younger audience and showing the uncensored version on your second screen?

How would this influence your comfort and would it distract you too much?

**Virtual Room**
Provide visual and text information on the “second layer” above the main TV-picture
A “virtual room” functionality allows friends who are physically away from each other participate in the TV-watching activity as if they are together, using a shared virtual space - either a TV-screen or a Second Screen. By using a 2nd layer on top of the screen (either TV or Second screen), friends can exchange their comments, participate in the discussion or mark specific areas of the screen with graphical tools to draw attention of the others to some detail.

[Show Mockup with Virtual Room]

How do you feel about this feature?
Can you think of possible situations when you would use this feature?
Would having text and graphical drawings on the TV from your friends distract you from watching TV?
And what if they are on the second screen?

**Mobile phone**
*Show mockup 3, what do you think this mockup does? [explain]*
How do you feel about mobile devices used as a second screen?
What are the advantages and issues?
Would you prefer to use the device with physical buttons or touchscreen?
Why do you find this better over the other?
Would you use this device when you are in a small group with family and/or friends?
Do you think this device is distracting for watching TV?

**Tablet (Likert)**
How do you feel about mobile devices used as a second screen?
What are the advantages and issues?
Would you use this device when you are in a small group with family and/or friends?
Do you think this device is distracting for watching TV?
**PC/Laptop (Likert)**
How do you feel about mobile devices used as a second screen?
What are the advantages and issues?
Would you use this device when you are in a small group with family and/or friends?
Do you think this device is distracting for watching TV?

**Synchronisation issues**
What would you think using an app if the timing of the app is off by 1 to 3 seconds from the TV screen (synchronisation of subtitles, dubbing)?
What do you think of an app which lags regularly with content on the TV screen?
What influence do you think watching subtitles on your device will have on your focus on the TV screen?
[show mockup]

**Workflow**
What do you think of hint messages that guide you through the interface programme?
What do you think of being “guided” through the TV-programmes by receiving suggestions and notifications for the programmes that I would like or my favourite ones?
What would you think of having different application interfaces and options for different kinds of TV-programmes?

**Customizability**
If you cannot customize your current applications, would you still use those applications? Why?
Do you think rearranging the position of certain elements on the TV screen is a useful addition? Why?
How about on the second screen? Why?
Would you like to have all the functions that are available for a bigger screen when using a smart phone even if the text/buttons will appear smaller?
Would you like to be able to always change my preferences on-the-fly, rather then go to special “options” menu? If so, when do you think this can prove to be useful?
Would you like to see only the primary/essential functions? Do you think the advanced options should be hidden until you would like to use them?
Do you want the option for the information to be shown only on the TV-screen while the Second Screen will be mostly used for interaction? [Show Mockup]

**General (Likert)**
Now that you got an impression of what a second screen can be used for
Would you use a second screen while watching TV? Why?
Do you have now other potential TV-related scenarios that people could want to use a second screen for?
Raw Result of Interview

It is delivered in the file which title is Result of Questionnaire II.xls
It can also be accessed via this link:
https://spreadsheets.google.com/ccc?key=0AjCw6XCxDaB7dFdHblF2bnZUWXZfeFZMRzVhNnpjY2c
&hl=en#gid=0

Survey Questionnaires I:

User Characteristics
1 What is your age : ..... 
2 What is your gender : .............
3 How much do you watch TV a week?

4 How often do you zap between channels while watching television?
   ○ Only when there isn’t something interesting on TV
   ○ Rarely
   ○ Regularly
   ○ Often

5 If a TV show offers the chance to interact with the programme i.e. vote, play along, participate would that make you watch TV more?
   ● No, it doesn’t interest me
   ● Maybe, depending on the activity
   ● Yes, that would be great

General Questions about 2nd screen devices

6 Do you own a smartphone or tablet?
   ● I own a smartphone
   ● I own a tablet
   ● I own both
   ● I don’t have anything

7 Do you own a notebook (or have a pc in the same room with a TV) ?
   ● Yes
   ● No
Questions regarding social interaction and group watching

8 How often do you watch a “whole” TV programme, as football matches in a public area such as pub, restaurant, airport etc?
   ○ Never (skip next question)
   ○ 1 or 2 times a year
   ○ At least once a month
   ○ Every week

9 What kind of programme do you usually watch in the public area?
   ○ sport game such as football
   ○ reality show
   ○ talent shows
   ○ the news
   ○ others (please specify it) ...............................................................

10 What kind of other activity you are doing while watching the programme?
   e.g:
   ○ not doing anything else
   ○ twittering/facebooking/hyves with friends
   ○ twittering/facebooking/hyves on the topic related to the programme
   ○ chat/calling with friends or other persons about the programme
   ○ keep updated with other programme
   ○ look up information about the programme i.e. reviews, actors etc
   ○ doing some other activity (please specify it) ...........................................

Specific Questions using a second screen device

11 How often do you use additional electronic medium such as smartphone, notebook/pc, iPad while watching TV?
   ○ Never
   ○ Sometimes
   ○ Only when someone is texting/calling
   ○ Always

12 What kind of programme can you imagine that you would use a second screen with?
   ○ Action Movie
   ○ Quiz/game shows
   ○ Talent shows X factor / Idols / SYTCD
   ○ TV-series
   ○ Geographic channel
   ○ Newscast
   ○ Sports programme/match
   ○ Other (please specify) ...
13 Would you use an app that allows you cut a scene of a TV programme you are now watching to share with others?
   ○ yes, i think it’s useful
   ○ no, it’s useful but not interested
   ○ no, i don’t find that useful

14 Would you use an app that allow you to browse among programmes and read comments/discuss with other people about the programme?
   ○ yes, I like to discuss the programme with other people
   ○ yes, I like to read what others say
   ○ no, It’s a good idea but I would not do that
   ○ no i don’t see the usefulness

15 2 shows you want to watch are on simultaneously, would you watch one on the TV and the other on your second screen?
   ○ yes, i think it’s useful
   ○ no, i would rather zap between channels
   ○ no, i would just watch one show

16 Would you like to create your personal favorites of programmes (i.e. notifying you when a next episode is about to start)?
   ○ yes
   ○ no

17 Would you like to have the possibility to create a programme-related message with a screenshot tagged with an image, text or audio and send it to someone?
   ○ yes
   ○ no

18 Would you like to change the received screenshot with ability to send its changed version back?
   ○ yes
   ○ no

19 Would you agree to share on Facebook or Twitter the TV programmes that you're watching? (posts status updates of what you're watching)
   ○ yes
   ○ no

20 Would you be interested in checking the statuses of what people are watching?
   ○ yes
   ○ no

21 What would be cool to have on your tablet if it was connected to your TV?
Specific Questions tailed to the Scenarios

1. Imagine that you’re sitting in one room with your friends, watching a TV-series on the screen. Please check what of these possibilities you find the most appealing (rate them from highest to lowest):
   - a. Send a piece of the programme you watch to a friend
   - b. Organise a Quiz or Bet among the friends about the TV-series. For instance “who is the killer?”
   - c. Update the status on the Social Network about what you are watching
   - d. Search the Wikipedia for the information on the actors or the show

2. While watching television in a public place with strangers (for instance a football match), what kind of interaction with your second screen would you prefer (rate them from highest to lowest):
   - a. Find pieces of videos, as replay, highlights that you missed and you simply wants to watch them again.
   - b. Chatting within friends or people around you about the programme that you are watching, asking for more information and leaving comments.
   - c. Select the language from your device (if the programme is in the language you don’t understand)
   - d. Choose and watch the programme from different camera angle on your second screen
   - e. Search information available relative to the programme that you are watching

3. Imagine that you are watching a poker game on the TV at home, what kind of possible interaction and information you would like to have with your second screens?
   - a. Learn how to play poker since you are still beginner in this game
   - b. Be able to read textual poker rule and regulation information
   - c. Be able to see the face down cards of each player
   - d. Be able to communicate with other friends to talk about the game
   - e. Share your thought via your social network

4. Imagine that you are watching TV with your kids at home and they want to watch a movie that is recommended for an older age public. You are not sure whether it contains inappropriate scene. What do you want to have implemented by the TV programme and second screen?
   - a. Censor the part that is assumed as inappropriate
   - b. Even though it is censored in the TV, but as an adult you still want to see the censored part from your second screen.
   - c. Nothing, just leave it at it is. In the end they need to get used to that inappropriate scene
5. Your kids are still in the age to learn some new words. Usually you have to accompany your kids while they are watching TV so you provide them with an answer whenever they have question about the new words and you can also monitor them for not learning any bad words. What do you want to have for your second screen?
   a. Provides translation, definition, and explanation about the word in easy way
   b. Gives an update to the parents about any new words they have just learnt
   c. Nothing, my kids are really smart for their ages. They remember every words inside the dictionary
   d. Provides subtitles whether they are not able to understand all the conversations

6. If you are all sitting in front of the TV and you want to decide about what to watch according to the preferences of everyone, would you like to have a vote session that can impartially decide for all of you?
   a. The vote system is based on points, subtracting every time you are choosing what to watch, and adding when you lose the vote session
   b. Nothing like that, i will choose whatever i want to see and the others must watch whatever i decide
   c. The vote system is based on majority scheme, so that the majority win and decide
   d. The vote is retrieving information about the selected programmes and select the best one, based on comments and references on the web

7. If there are members of the family that are not familiar with the language or they have hearing disabilities, would you like to provide them (rate Them from highest to lowest):
   a. Subtitles in the selected available language on second screen
   b. Possibility to listen the dubbed version of the TV programme via earphone connected to the second screens
   c. Add subtitles on the main screen
   d. Change the language for everyone on the main television

8. Imagine you are watching a TV programme at home alone. You are able to communicate with several friends, who are watching the same programme, through a shared communication space, which is called “Virtual Room”. This “Virtual Room” functionality is intended to bring a feeling of shared watching experience to you. You can comment what is happening on the screen, mark specific moments with graphical tools (like arrows, which will point to others what are you talking about). Rate the following options based on the feeling of what you find the most appealing:
   a. Use the TV-screen as a shared space for displaying comments, marks and other related information. The information is displayed “on top” of the video image, that is displayed on the TV
   b. Use the Second screen for the purpose, explained above. Note that with Second Screen not all functionality (like displaying content on top of the screen image) can be achieved.
   c. Use your shared space for Quiz-like games (for instance bet with your games on what will be the conclusion of the TV-series episode)
Survey Raw Results (Questionnaire I):

| Number of records in this query: | 86 |

<table>
<thead>
<tr>
<th>Question 1</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>What is your age?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Answer</td>
<td>Count</td>
<td>Percentage</td>
</tr>
<tr>
<td>0-11 (A1)</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>12-24 (A2)</td>
<td>47</td>
<td>54.65%</td>
</tr>
<tr>
<td>25-44 (A3)</td>
<td>37</td>
<td>43.02%</td>
</tr>
<tr>
<td>45-64 (A4)</td>
<td>2</td>
<td>2.33%</td>
</tr>
<tr>
<td>65+ (A5)</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>No answer</td>
<td>0</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 2</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>What is your gender?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Answer</td>
<td>Count</td>
<td>Percentage</td>
</tr>
<tr>
<td>Female (F)</td>
<td>33</td>
<td>38.37%</td>
</tr>
<tr>
<td>Male (M)</td>
<td>53</td>
<td>61.63%</td>
</tr>
<tr>
<td>No answer</td>
<td>0</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 3</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>How much do you watch TV a week?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Answer</td>
<td>Count</td>
<td>Percentage</td>
</tr>
<tr>
<td>Less than 5 hours (A1)</td>
<td>58</td>
<td>67.44%</td>
</tr>
<tr>
<td>5-10 Hours (A2)</td>
<td>16</td>
<td>18.60%</td>
</tr>
<tr>
<td>10-20 Hours (A3)</td>
<td>5</td>
<td>5.81%</td>
</tr>
<tr>
<td>20 Hours or more (A4)</td>
<td>7</td>
<td>8.14%</td>
</tr>
<tr>
<td>No answer</td>
<td>0</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 4</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>How often do you zap between channels while watching TV?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Answer</td>
<td>Count</td>
<td>Percentage</td>
</tr>
<tr>
<td>Only when there isn’t something interesting on TV (A1)</td>
<td>33</td>
<td>38.37%</td>
</tr>
<tr>
<td>Rarely (A2)</td>
<td>9</td>
<td>10.47%</td>
</tr>
<tr>
<td>Regularly (A3)</td>
<td>27</td>
<td>31.40%</td>
</tr>
</tbody>
</table>
### Question 5

If a TV show offers the chance to interact with the programme i.e. vote, play along, participate would that make you watch TV more?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No, it doesn’t interest me (A1)</td>
<td>39</td>
<td>45.35%</td>
</tr>
<tr>
<td>Maybe, depending on the activity (A2)</td>
<td>39</td>
<td>45.35%</td>
</tr>
<tr>
<td>Yes, that would be great (A3)</td>
<td>8</td>
<td>9.30%</td>
</tr>
<tr>
<td>No answer</td>
<td>0</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

### Question 6

Do you own a smartphone or tablet?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>I own a smartphone (A1)</td>
<td>54</td>
<td>62.79%</td>
</tr>
<tr>
<td>I own a tablet (A2)</td>
<td>5</td>
<td>5.81%</td>
</tr>
<tr>
<td>I own both (A3)</td>
<td>5</td>
<td>5.81%</td>
</tr>
<tr>
<td>I have neither (A4)</td>
<td>22</td>
<td>25.58%</td>
</tr>
<tr>
<td>No answer</td>
<td>0</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

### Question 7

Do you own a notebook (or have a pc in the same room with a TV) ?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes (Y)</td>
<td>77</td>
<td>89.53%</td>
</tr>
<tr>
<td>No (N)</td>
<td>9</td>
<td>10.47%</td>
</tr>
<tr>
<td>No answer</td>
<td>0</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

### Question 8

How often do you watch a "whole" TV programme i.e. football matches in a public area such as pub, restaurant, airport etc

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never (skip next question) (A1)</td>
<td>41</td>
<td>47.67%</td>
</tr>
<tr>
<td>1 or 2 times a year (A2)</td>
<td>34</td>
<td>39.53%</td>
</tr>
<tr>
<td>At least once a month (A3)</td>
<td>7</td>
<td>8.14%</td>
</tr>
<tr>
<td>Every week (A4)</td>
<td>4</td>
<td>4.65%</td>
</tr>
<tr>
<td>No answer</td>
<td>0</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

### Question 9
### Question 10
What kind of other activity are you doing while watching a programme? (public or at home)

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>not doing anything else (SQ001)</td>
<td>26</td>
<td>30.23%</td>
</tr>
<tr>
<td>twittering/facebooking/hyves with friends (SQ002)</td>
<td>40</td>
<td>46.51%</td>
</tr>
<tr>
<td>twittering/facebooking/hyves on the topic related to the programme (SQ003)</td>
<td>11</td>
<td>12.79%</td>
</tr>
<tr>
<td>chat/calling with friends or other persons about the programme (SQ004)</td>
<td>17</td>
<td>19.77%</td>
</tr>
<tr>
<td>keep updated with other programme (SQ005)</td>
<td>7</td>
<td>8.14%</td>
</tr>
<tr>
<td>look up information about the programme i.e. reviews, actors etc (SQ006)</td>
<td>15</td>
<td>17.44%</td>
</tr>
<tr>
<td>Other</td>
<td>21</td>
<td>24.42%</td>
</tr>
</tbody>
</table>

### Question 11
How often do you use additional electronic medium such as a smartphone, notebook/pc, iPad while watching TV?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never (A1)</td>
<td>9</td>
<td>10.47%</td>
</tr>
<tr>
<td>Sometimes (A2)</td>
<td>32</td>
<td>37.21%</td>
</tr>
<tr>
<td>Only when someone is texting/calling (A3)</td>
<td>23</td>
<td>26.74%</td>
</tr>
<tr>
<td>Always (A4)</td>
<td>22</td>
<td>25.58%</td>
</tr>
<tr>
<td>No answer</td>
<td>0</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

### Question 12
What kind of programme can you imagine that you could use a second screen with?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action Movie (SQ001)</td>
<td>15</td>
<td>17.44%</td>
</tr>
<tr>
<td>Quiz/game shows (SQ002)</td>
<td>32</td>
<td>37.21%</td>
</tr>
<tr>
<td>Talent shows (e.g X factor / Idols / SYTCD) (SQ003)</td>
<td>22</td>
<td>25.58%</td>
</tr>
<tr>
<td>TV-series (SQ004)</td>
<td>20</td>
<td>23.26%</td>
</tr>
<tr>
<td>Geographic channel (SQ005)</td>
<td>22</td>
<td>25.58%</td>
</tr>
<tr>
<td>Newscast (SQ006)</td>
<td>34</td>
<td>39.53%</td>
</tr>
<tr>
<td>Question 13</td>
<td>Would you use an app that allows you cut a scene of a TV programme you are now watching to share with others</td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Answer</td>
<td>Count</td>
<td>Percentage</td>
</tr>
<tr>
<td>Yes, i think it’s useful (A1)</td>
<td>49</td>
<td>56.98%</td>
</tr>
<tr>
<td>No, it’s useful but not interested (A2)</td>
<td>25</td>
<td>29.07%</td>
</tr>
<tr>
<td>No, i don’t find it useful (A3)</td>
<td>12</td>
<td>13.95%</td>
</tr>
<tr>
<td>No answer</td>
<td>0</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 14</th>
<th>Would you use an app to browse the programme and read comments/discuss with other people about the programme?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Answer</td>
<td>Count</td>
</tr>
<tr>
<td>Yes, I like to discuss the programme with other people (A1)</td>
<td>23</td>
</tr>
<tr>
<td>Yes, I like to read what others say (A2)</td>
<td>21</td>
</tr>
<tr>
<td>No, It’s a good idea but I would not do that (A3)</td>
<td>30</td>
</tr>
<tr>
<td>No I don’t see the usefulness of it (A4)</td>
<td>12</td>
</tr>
<tr>
<td>No answer</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 15</th>
<th>Would you watch one of the two shows you want to watch are on simultaneously, would you watch one on the TV and the other on your second screen?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Answer</td>
<td>Count</td>
</tr>
<tr>
<td>Yes, I think it’s useful (A1)</td>
<td>30</td>
</tr>
<tr>
<td>No, I would rather zap between channels (A2)</td>
<td>11</td>
</tr>
<tr>
<td>No, I would just watch one show (A3)</td>
<td>45</td>
</tr>
<tr>
<td>No answer</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 16</th>
<th>Would you like to create your personal favourites of programmes (i.e. notifying you when a next episode is about to start etc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Answer</td>
<td>Count</td>
</tr>
<tr>
<td>Yes (Y)</td>
<td>65</td>
</tr>
<tr>
<td>No (N)</td>
<td>21</td>
</tr>
<tr>
<td>No answer</td>
<td>0</td>
</tr>
<tr>
<td>Question 17</td>
<td>Count</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Would you like to have the possibility to create a programme-related message with a screenshot tagged with an image, text or audio and send it to someone?</td>
<td></td>
</tr>
<tr>
<td>Answer</td>
<td></td>
</tr>
<tr>
<td>Yes (Y)</td>
<td>50</td>
</tr>
<tr>
<td>No (N)</td>
<td>36</td>
</tr>
<tr>
<td>No answer</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 18</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would you like to change the received screenshot with ability to send its changed version back?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Answer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (Y)</td>
<td>46</td>
<td>53.49%</td>
</tr>
<tr>
<td>No (N)</td>
<td>40</td>
<td>46.51%</td>
</tr>
<tr>
<td>No answer</td>
<td>0</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 19</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would you agree to share on Facebook or Twitter the TV programmes that you're watching? (posts status updates of what you're watching)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Answer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (Y)</td>
<td>38</td>
<td>44.19%</td>
</tr>
<tr>
<td>No (N)</td>
<td>48</td>
<td>55.81%</td>
</tr>
<tr>
<td>No answer</td>
<td>0</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 20</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would you be interested in checking the statuses of what your friends are watching?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Answer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (Y)</td>
<td>42</td>
<td>48.84%</td>
</tr>
<tr>
<td>No (N)</td>
<td>44</td>
<td>51.16%</td>
</tr>
<tr>
<td>No answer</td>
<td>0</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 21</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>What would be cool to have on your tablet if it was connected to your TV?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Answer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (Y)</td>
<td>44</td>
<td>51.16%</td>
</tr>
<tr>
<td>No answer</td>
<td>42</td>
<td>48.84%</td>
</tr>
</tbody>
</table>

| Question 22 [1]                                                           |       |            |
| Imagine that you're sitting in one room with your friends, watching a TV-series on |       |            |
the screen. Please check what of these possibilities you find the most appealing. [Ranking 1]

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Send a piece of the programme you watch to a friend (A1)</td>
<td>18</td>
<td>20.93%</td>
</tr>
<tr>
<td>Organise a Quiz or Bet among the friends about the TV-series. For instance “who is the killer?” (A2)</td>
<td>18</td>
<td>20.93%</td>
</tr>
<tr>
<td>Update the status on the Social Network about what you are watching (A3)</td>
<td>13</td>
<td>15.12%</td>
</tr>
<tr>
<td>Search the Wikipedia for the information on the actors or the show (A4)</td>
<td>37</td>
<td>43.02%</td>
</tr>
</tbody>
</table>

Question 22 [2]

Imagine that you're sitting in one room with your friends, watching a TV-series on the screen. Please check what of these possibilities you find the most appealing. [Ranking 2]

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Send a piece of the programme you watch to a friend (A1)</td>
<td>23</td>
<td>26.74%</td>
</tr>
<tr>
<td>Organise a Quiz or Bet among the friends about the TV-series. For instance “who is the killer?” (A2)</td>
<td>19</td>
<td>22.09%</td>
</tr>
<tr>
<td>Update the status on the Social Network about what you are watching (A3)</td>
<td>22</td>
<td>25.58%</td>
</tr>
<tr>
<td>Search the Wikipedia for the information on the actors or the show (A4)</td>
<td>22</td>
<td>25.58%</td>
</tr>
</tbody>
</table>

Question 22 [3]

Imagine that you're sitting in one room with your friends, watching a TV-series on the screen. Please check what of these possibilities you find the most appealing. [Ranking 3]

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Send a piece of the programme you watch to a friend (A1)</td>
<td>30</td>
<td>34.88%</td>
</tr>
<tr>
<td>Organise a Quiz or Bet among the friends about the TV-series. For instance “who is the killer?” (A2)</td>
<td>26</td>
<td>30.23%</td>
</tr>
<tr>
<td>Update the status on the Social Network about what you are watching (A3)</td>
<td>17</td>
<td>19.77%</td>
</tr>
<tr>
<td>Search the Wikipedia for the information on the actors or the show (A4)</td>
<td>13</td>
<td>15.12%</td>
</tr>
</tbody>
</table>

Question 22 [4]

Imagine that you're sitting in one room with your friends, watching a TV-series on the screen. Please check what of these possibilities you find the most appealing. [Ranking 4]

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Send a piece of the programme you watch to a friend (A1)</td>
<td>15</td>
<td>17.44%</td>
</tr>
<tr>
<td>Organise a Quiz or Bet among the friends about the TV-series. For instance “who is the killer?” (A2)</td>
<td>23</td>
<td>26.74%</td>
</tr>
<tr>
<td>Update the status on the Social Network about what you are watching (A3)</td>
<td>34</td>
<td>39.53%</td>
</tr>
<tr>
<td>Search the Wikipedia for the information on the actors or the show (A4)</td>
<td>14</td>
<td>16.28%</td>
</tr>
</tbody>
</table>
Question 23 [1]
While watching television in a public place with strangers (for instance a football match), what kind of interaction with your second screen would you prefer (rate them from highest to lowest)[Ranking 1]

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Find pieces of videos, as replay, highlights that you missed and you simply wants to watch them again. (A1)</td>
<td>23</td>
<td>26.74%</td>
</tr>
<tr>
<td>Chatting with friends or people around you about the programme that you are watching, asking for more information and leaving comments. (A2)</td>
<td>20</td>
<td>23.26%</td>
</tr>
<tr>
<td>Select the language from your device (if the programme is in the language you don’t understand) (A3)</td>
<td>26</td>
<td>30.23%</td>
</tr>
<tr>
<td>Choose and watch the programme from different camera angle on your second screen (A4)</td>
<td>9</td>
<td>10.47%</td>
</tr>
<tr>
<td>Search information available relative to the programme that you are watching (A5)</td>
<td>8</td>
<td>9.30%</td>
</tr>
</tbody>
</table>

Question 23 [2]
While watching television in a public place with strangers (for instance a football match), what kind of interaction with your second screen would you prefer (rate them from highest to lowest)[Ranking 2]

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Find pieces of videos, as replay, highlights that you missed and you simply wants to watch them again. (A1)</td>
<td>22</td>
<td>25.58%</td>
</tr>
<tr>
<td>Chatting with friends or people around you about the programme that you are watching, asking for more information and leaving comments. (A2)</td>
<td>13</td>
<td>15.12%</td>
</tr>
<tr>
<td>Select the language from your device (if the programme is in the language you don’t understand) (A3)</td>
<td>9</td>
<td>10.47%</td>
</tr>
<tr>
<td>Choose and watch the programme from different camera angle on your second screen (A4)</td>
<td>21</td>
<td>24.42%</td>
</tr>
<tr>
<td>Search information available relative to the programme that you are watching (A5)</td>
<td>21</td>
<td>24.42%</td>
</tr>
</tbody>
</table>

Question 23 [3]
While watching television in a public place with strangers (for instance a football match), what kind of interaction with your second screen would you prefer (rate them from highest to lowest)[Ranking 3]

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Find pieces of videos, as replay, highlights that you missed and you simply wants to watch them again. (A1)</td>
<td>15</td>
<td>17.44%</td>
</tr>
<tr>
<td>Chatting with friends or people around you about the programme that you are watching, asking for more information and leaving comments. (A2)</td>
<td>12</td>
<td>13.95%</td>
</tr>
<tr>
<td>Select the language from your device (if the programme is in the language you don’t understand) (A3)</td>
<td>18</td>
<td>20.93%</td>
</tr>
<tr>
<td>Choose and watch the programme from different camera angle on your second screen (A4)</td>
<td>24</td>
<td>27.91%</td>
</tr>
<tr>
<td>Question 23 [4]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
<td>-----------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>While watching television in a public place with strangers (for instance a football match), what kind of interaction with your second screen would you prefer (rate them from highest to lowest) [Ranking 4]</td>
<td>Answer</td>
<td>Count</td>
</tr>
<tr>
<td>Find pieces of videos, as replay, highlights that you missed and you simply wants to watch them again. (A1)</td>
<td>19</td>
<td>22.09%</td>
</tr>
<tr>
<td>Chatting with friends or people around you about the programme that you are watching, asking for more information and leaving comments. (A2)</td>
<td>14</td>
<td>16.28%</td>
</tr>
<tr>
<td>Select the language from your device (if the programme is in the language you don’t understand) (A3)</td>
<td>13</td>
<td>15.12%</td>
</tr>
<tr>
<td>Choose and watch the programme from different camera angle on your second screen (A4)</td>
<td>18</td>
<td>20.93%</td>
</tr>
<tr>
<td>Search information available relative to the programme that you are watching (A5)</td>
<td>22</td>
<td>25.58%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 23 [5]</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>While watching television in a public place with strangers (for instance a football match), what kind of interaction with your second screen would you prefer (rate them from highest to lowest) [Ranking 5]</td>
<td>Answer</td>
<td>Count</td>
<td>Percentage</td>
</tr>
<tr>
<td>Find pieces of videos, as replay, highlights that you missed and you simply wants to watch them again. (A1)</td>
<td>7</td>
<td>8.14%</td>
<td></td>
</tr>
<tr>
<td>Chatting with friends or people around you about the programme that you are watching, asking for more information and leaving comments. (A2)</td>
<td>27</td>
<td>31.40%</td>
<td></td>
</tr>
<tr>
<td>Select the language from your device (if the programme is in the language you don’t understand) (A3)</td>
<td>20</td>
<td>23.26%</td>
<td></td>
</tr>
<tr>
<td>Choose and watch the programme from different camera angle on your second screen (A4)</td>
<td>14</td>
<td>16.28%</td>
<td></td>
</tr>
<tr>
<td>Search information available relative to the programme that you are watching (A5)</td>
<td>18</td>
<td>20.93%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 24 [1]</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Imagine that you are watching a poker game on the TV at home, what kind of possible interaction and information you would like to have with your second screens? [Ranking 1]</td>
<td>Answer</td>
<td>Count</td>
<td>Percentage</td>
</tr>
<tr>
<td>Learn how to play poker since you are still beginner in this game (A1)</td>
<td>19</td>
<td>22.09%</td>
<td></td>
</tr>
<tr>
<td>Be able to read textual poker rule and regulation information (A2)</td>
<td>17</td>
<td>19.77%</td>
<td></td>
</tr>
<tr>
<td>Be able to see the face down cards of each player (A3)</td>
<td>38</td>
<td>44.19%</td>
<td></td>
</tr>
<tr>
<td>Be able to communicate with other friends to talk about the game (A4)</td>
<td>7</td>
<td>8.14%</td>
<td></td>
</tr>
<tr>
<td>Share your thoughts via your social network (A5)</td>
<td>5</td>
<td>5.81%</td>
<td></td>
</tr>
<tr>
<td>Question 24 [2]</td>
<td>Imagine that you are watching a poker game on the TV at home, what kind of possible interaction and information you would like to have with your second screens? [Ranking 2]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Answer</td>
<td>Count</td>
<td>Percentage</td>
<td></td>
</tr>
<tr>
<td>Learn how to play poker since you are still beginner in this game (A1)</td>
<td>18</td>
<td>20.93%</td>
<td></td>
</tr>
<tr>
<td>Be able to read textual poker rule and regulation information (A2)</td>
<td>29</td>
<td>33.72%</td>
<td></td>
</tr>
<tr>
<td>Be able to see the face down cards of each player (A3)</td>
<td>12</td>
<td>13.95%</td>
<td></td>
</tr>
<tr>
<td>Be able to communicate with other friends to talk about the game (A4)</td>
<td>16</td>
<td>18.60%</td>
<td></td>
</tr>
<tr>
<td>Share your thoughts via your social network (A5)</td>
<td>11</td>
<td>12.79%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 24 [3]</th>
<th>Imagine that you are watching a poker game on the TV at home, what kind of possible interaction and information you would like to have with your second screens? [Ranking 3]</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Answer</td>
<td>Count</td>
<td>Percentage</td>
</tr>
<tr>
<td>Learn how to play poker since you are still beginner in this game (A1)</td>
<td>14</td>
<td>16.28%</td>
</tr>
<tr>
<td>Be able to read textual poker rule and regulation information (A2)</td>
<td>13</td>
<td>15.12%</td>
</tr>
<tr>
<td>Be able to see the face down cards of each player (A3)</td>
<td>22</td>
<td>25.58%</td>
</tr>
<tr>
<td>Be able to communicate with other friends to talk about the game (A4)</td>
<td>22</td>
<td>25.58%</td>
</tr>
<tr>
<td>Share your thoughts via your social network (A5)</td>
<td>15</td>
<td>17.44%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 24 [4]</th>
<th>Imagine that you are watching a poker game on the TV at home, what kind of possible interaction and information you would like to have with your second screens? [Ranking 4]</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Answer</td>
<td>Count</td>
<td>Percentage</td>
</tr>
<tr>
<td>Learn how to play poker since you are still beginner in this game (A1)</td>
<td>9</td>
<td>10.47%</td>
</tr>
<tr>
<td>Be able to read textual poker rule and regulation information (A2)</td>
<td>23</td>
<td>26.74%</td>
</tr>
<tr>
<td>Be able to see the face down cards of each player (A3)</td>
<td>7</td>
<td>8.14%</td>
</tr>
<tr>
<td>Be able to communicate with other friends to talk about the game (A4)</td>
<td>33</td>
<td>38.37%</td>
</tr>
<tr>
<td>Share your thoughts via your social network (A5)</td>
<td>14</td>
<td>16.28%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 24 [5]</th>
<th>Imagine that you are watching a poker game on the TV at home, what kind of possible interaction and information you would like to have with your second screens? [Ranking 5]</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Answer</td>
<td>Count</td>
<td>Percentage</td>
</tr>
<tr>
<td>Learn how to play poker since you are still beginner in this game (A1)</td>
<td>26</td>
<td>30.23%</td>
</tr>
<tr>
<td>Feature</td>
<td>Count</td>
<td>Percentage</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>-------</td>
<td>------------</td>
</tr>
<tr>
<td>Be able to read textual poker rule and regulation information (A2)</td>
<td>4</td>
<td>4.65%</td>
</tr>
<tr>
<td>Be able to see the face down cards of each player (A3)</td>
<td>7</td>
<td>8.14%</td>
</tr>
<tr>
<td>Be able to communicate with other friends to talk about the game (A4)</td>
<td>8</td>
<td>9.30%</td>
</tr>
<tr>
<td>Share your thoughts via your social network (A5)</td>
<td>41</td>
<td>47.67%</td>
</tr>
</tbody>
</table>

**Question 25**

Imagine that you are watching TV with your kids at home and they want to watch a movie that is recommended for an older age public. You are not sure whether it contains inappropriate scene. What do you want to have implemented by the TV Programme and second screen?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Censor the part that is assumed as inappropriate (A1)</td>
<td>42</td>
<td>48.84%</td>
</tr>
<tr>
<td>Even though it is censored in the TV, but as an adult you still want to see the censored part from your second screen. (A2)</td>
<td>24</td>
<td>27.91%</td>
</tr>
<tr>
<td>Nothing, just leave it as it is. In the end they need to get used with those inappropriate scene (A3)</td>
<td>20</td>
<td>23.26%</td>
</tr>
<tr>
<td>No answer</td>
<td>0</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

**Question 26**

Your kids are still in the age to learn some new words. Usually you have to accompany your kids while they are watching TV so you can be their oracle whenever they have question about the new words and you can also monitor them for not learning any bad words. What do you want to have for your second screen?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provides translation, definition, and explanation about the word in easy way (A1)</td>
<td>52</td>
<td>60.47%</td>
</tr>
<tr>
<td>Give an update to the parents about any new words they have just learnt (A2)</td>
<td>14</td>
<td>16.28%</td>
</tr>
<tr>
<td>Nothing, my kids are really smart for their ages. They remember every words inside the dictionary (A3)</td>
<td>8</td>
<td>9.30%</td>
</tr>
<tr>
<td>Provide subtitles whether they are not able to understand all the conversations (A4)</td>
<td>12</td>
<td>13.95%</td>
</tr>
<tr>
<td>No answer</td>
<td>0</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

**Question 27**

If you are all sitting in front of the TV and you want to decide about what to watch according to the preferences of everyone, would you like to have a vote session that can impartially decide for all of you?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>The vote system is based on points, subtracted every time you are choosing what to watch, and added when you lose the vote session (A1)</td>
<td>16</td>
<td>18.60%</td>
</tr>
<tr>
<td>Nothing like that, i will choose whatever i want to see and the others must watch whatever i decide (A2)</td>
<td>21</td>
<td>24.42%</td>
</tr>
<tr>
<td>The vote system is based on majority scheme, so that the majority win and decide (A3)</td>
<td>35</td>
<td>40.70%</td>
</tr>
</tbody>
</table>
The vote is retrieving information about the selected programmes and select the best one, based on comments and references on the web (A4)  

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No answer</td>
<td>0</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

No answer

**Question 28**

If there are members of the family that are not familiar with the language or they have hearing disabilities, would you like to provide them:

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subtitles in the selected available language on second screen (SQ001)</td>
<td>51</td>
<td>59.30%</td>
</tr>
<tr>
<td>Possibility to listen the dubbed version of the TV programme via earphone connected to the second screens (SQ002)</td>
<td>40</td>
<td>46.51%</td>
</tr>
<tr>
<td>Add subtitles on the main screen (SQ003)</td>
<td>44</td>
<td>51.16%</td>
</tr>
<tr>
<td>Change the language for everyone on the main television (SQ004)</td>
<td>26</td>
<td>30.23%</td>
</tr>
</tbody>
</table>

**Question 29 [1]**

Imagine you are watching a TV programme at home alone. You are able to communicate with several friends, who are watching the same programme, through a shared communication space, which is called “Virtual Room”. This “Virtual Room” functionality is intended to bring a feeling of shared watching experience to you. You can comment what is happening on the screen, mark specific moments with graphical tools (like arrows, which will point to others what are you talking about). Rank the following options based on the feeling of what you find the most appealing:[Ranking 1]

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use the TV-screen as a shared space for displaying comments, marks and other related information. The information is displayed “on top” of the video image, that is displayed on the TV (A1)</td>
<td>31</td>
<td>36.05%</td>
</tr>
<tr>
<td>Use the Second screen for the purpose, explained above. Note that with Second Screen not all functionality (like displaying content on top of the screen image) can be achieved. (A2)</td>
<td>40</td>
<td>46.51%</td>
</tr>
<tr>
<td>Use your shared space for Quiz-like games (for instance bet with your games on what will be the conclusion of the tv-series episode) (A3)</td>
<td>15</td>
<td>17.44%</td>
</tr>
</tbody>
</table>

**Question 29 [2]**

Imagine you are watching a TV programme at home alone. You are able to communicate with several friends, who are watching the same programme, through a shared communication space, which is called “Virtual Room”. This “Virtual Room” functionality is intended to bring a feeling of shared watching experience to you. You can comment what is happening on the screen, mark specific moments with graphical tools (like arrows, which will point to others what are you talking about). Rank the following options based on the feeling of what you find the most appealing:[Ranking 2]

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use the TV-screen as a shared space for displaying comments, marks and other related information. The information is displayed “on top” of the video image, that is displayed on the TV (A1)</td>
<td>31</td>
<td>36.05%</td>
</tr>
<tr>
<td>Use the Second screen for the purpose, explained above. Note that with Second Screen not all functionality (like displaying content on top of the screen image) can be achieved. (A2)</td>
<td>40</td>
<td>46.51%</td>
</tr>
<tr>
<td>Use your shared space for Quiz-like games (for instance bet with your games on what will be the conclusion of the tv-series episode) (A3)</td>
<td>15</td>
<td>17.44%</td>
</tr>
</tbody>
</table>
Use the TV-screen as a shared space for displaying comments, marks and other related information. The information is displayed “on top” of the video image, that is displayed on the TV (A1) | 33 | 38.37%  
Use the Second screen for the purpose, explained above. Note that with Second Screen not all functionality (like displaying content on top of the screen image) can be achieved. (A2) | 30 | 34.88%  
Use your shared space for Quiz-like games (for instance bet with your games on what will be the conclusion of the tv-series episode) (A3) | 23 | 26.74%  

Question 29 [3]
Imagine you are watching a TV programme at home alone. You are able to communicate with several friends, who are watching the same programme, through a shared communication space, which is called “Virtual Room”. This “Virtual Room” functionality is intended to bring a feeling of shared watching experience to you. You can comment what is happening on the screen, mark specific moments with graphical tools (like arrows, which will point to others what are you talking about). Rank the following options based on the feeling of what you find the most appealing:[Ranking 3]

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use the TV-screen as a shared space for displaying comments, marks and other related information. The information is displayed “on top” of the video image, that is displayed on the TV (A1)</td>
<td>22</td>
<td>25.58%</td>
</tr>
<tr>
<td>Use the Second screen for the purpose, explained above. Note that with Second Screen not all functionality (like displaying content on top of the screen image) can be achieved. (A2)</td>
<td>16</td>
<td>18.60%</td>
</tr>
<tr>
<td>Use your shared space for Quiz-like games (for instance bet with your games on what will be the conclusion of the tv-series episode) (A3)</td>
<td>48</td>
<td>55.81%</td>
</tr>
</tbody>
</table>

Survey Questionnaire II:

Questionnaire Draft

Types of questions:

- Likert scale - a person rates the question from 1 (strongly disagree) to 5 (strongly agree)
- Open questions - a person specifies its own answer
- Order - person orders the options from most probable to least probable

Each of the questions would come with introduction, explaining the terms that are used there
[A SHORT INTRODUCTION OF STUDY AND EXPLANATION OF WHAT WE ARE ACTUALLY RESEARCHING]

1. Watching Football:
2. Watching TV-

series: Pictures to explain what is the Second Screen

Please express your thoughts on the following statements

Different camera views (Likert)

Imagine if you could have the possibility to switch the camera angle view, while watching a TV programme/event (as a football match for instance)

1. On the TV I would like to watch the main camera angle and on the second screen I would like to watch views from other angles to switch to the chosen angle on the main screen.
a. Interaction Step
   1:

b. Interaction Step
   2:
2. I would like to watch several views on the TV and not on the second screen. On the second screen I would like to still be able to choose the angle that I am interested in.
   a. Interaction Step
      1:
b. Interaction Step
   2:

3. I think watching 3 angles at the same time is doable (1 on the TV and 2 on the second screen)
4. I think watching 5 angles at the same time is doable (1 on the TV and 4 on the second screen)

Health (Likert & Open)

1. I think a second screen device can cause neck pain
2. I think using 2 screens can make me dizzy or light headed
3. Do you think watching 2 screens can be a health risk and why (Open)

Information/cognitive overload (Likert question)
Rate the following information on how well you can concentrate on the TV while: [redundant]

- Reading text i.e. Wikipedia, Imdb etc..
- Twitter/Facebook
- Chatting with friends
- Knowledge / Quiz / Voting games
- Take screenshots and share with friends
- Calling
1. When the commercials are on I will probably
   - Watch commercials
   - Play along Knowledge / Quiz / Voting games about the same programme without changing channel if available
   - Contact friends of my social network, from a list that shows who is on-line and watching the same programme.
   - Change channels
   - Participate in the knowledge game/quiz about the show on the second screen
   - Other:

Social interaction (Likert)

1. When watching a programme on TV, or browsing for a programme on Second Screen, it does not bother me to be notified if my friends have a comment or rating on that programme.
2. I would read the comment/rating immediately instead waiting till the end of the programme.
3. I do not think reading and receiving comments from my friends would distract me from watching TV.
4. When posting statuses about the programme to the social network I do not want my whole list of friends to know. Only the ones that I have chosen (for example those friends who also watch this programme).

5. Reorder these from most distracting to less distracting activities:

- Using a programme related app to interact with the TV
- Checking Twitter/Facebook
- Chatting with friends
- Talking with friends in the room

**Screen Grab & Send and Re-watch functionalities (Likert)**

1. I would like to use a Screen Grab & Send function to send my friend a part of the programme I currently watch and add to it my comments.
2. I prefer to use a graphical interface with a slider and time information so I can choose the exact part.

3. I would rather be able to choose from predefined scenes of that programme.
4. I think this would distract me from watching TV.
5. I think I will not use this feature if this action will take from me much time (“how much time do you expect?”).
6. I want to be able to re-watch the best part of the TV-programme (for example of a football match).
7. I want to be able to mark the parts that I would like to re-watch later.

Accessibility: Provide subtitles/Provide voice dubbing (Likert)

1. I think I would like to have subtitles on the main TV screen
2. I think I would like to have subtitles on my second screen
3. I think I would like to change the language audio of the TV programme using my Second Screen.
4. I think I would like to listen to different language audio using my Second Screen
5. Watching subtitles on my second screen would distract me a lot
Quizzes/Games/Voting (Likert)

1. I would like to have the quiz question appear on the second screen rather than on the main screen
2. I would like to play a Quiz game during the commercials rather than during the programme
3. I think the programme should pause during the question so I could focus on the answering the question on my second screen
4. I would like to have a voting interface for Voting programmes (like Xfactor) instead of an SMS-voting option
5. I would use a voting session possibility with my friends or relatives to choose a TV-programme that we are going to watch.
6. I think the use of games or voting possibilities with a group of friends would make our TV-watching more fun.

Parental advisory/Censoring (Likert)
In case you are watching a TV-programme with scenes that are not advisable for your kids, you can have an option hide these pars from them.

1. I would like to censor parts on the main TV screen.
2. I would like to view the uncensored parts on my second screen.

Provide visual and text information on the “second layer” above the main TV-picture (Likert)
A “virtual room” functionality allows friends who are physically away from each other participate in the TV-watching activity as if they are together, using a shared virtual space - either a TV-screen or a Second Screen. By using a 2nd layer on top of the screen (either TV or Second screen), friends can exchange their comments, participate in the discussion or mark specific areas of the screen with graphical tools to draw attention of the others to some detail.

1. I think I would use this “virtual room” function.
2. I think having a 2nd layer on my TV-screen is useful.
3. I think I would prefer to have my virtual room space in my Second Screen.
4. I think having graphical drawings or text information from my friends on a second layer over the main TV screen would distract me.
5. I think having graphical drawings or text information from my friends on my Second Screen would distract me.

Mobile phone (Likert)

1. I would like to use a mobile phone as a second screen while watching TV
2. I would use this device to interact with a TV in public places [redundant]
3. I would use this device to interact with the TV within a small group of family/friends [redundant]
4. I think I can be easily distracted from watching TV when using this device (if yes, then why?)

**Tablet (Likert)**

1. I would like to use a tablet as a second screen while watching TV
2. I would use this device to interact with a TV in public places [redundant]
3. I would use this device to interact with the TV within a small group of family/friends [redundant]
4. I think I can be easily distracted from watching TV when using this device. (if yes, then why?)

**PC/Laptop (Likert)**

1. I would like to use a laptop/pc as a second screen while watching TV.
2. I would use this device to interact with a TV in public places. [redundant]
3. I would use this device to interact with the TV within a small group of family/friends. [redundant]
4. I think I can be easily distracted from watching TV when using this device. (if yes, then why?)

**Synchronisation issues (Likert)**

1. I would still use an app if the timing of the app is off by 1 to 3 seconds from the TV screen (synchronisation of subtitles and dubbing of the language sound)
2. I would use a “degraded” mode with low quality video and audio on my Second Screen if the normal quality lags too much. (for the face-to-face ask “would you use a degraded or just don’t use functions at all”?)

**Interaction workflow (Likert)**

1. I would like to be “guided” through the interface programme by hint-messages
2. I would like to be “guided” through the TV-programmes by receiving suggestions and notifications for the programmes that I would like or my favourite ones.
3. I would like to have different application interface and options for different kinds of TV-programmes
4. I would like to have the same principles in workflow and interaction of the application for each type of TV-programme (not taking in account programme-type dependent options)
Customizability (Likert & Order)

1. When I cannot customize my current apps then I will not use these apps.
2. I find it important to rearrange the position of certain elements on the TV screen.
3. I find it important to rearrange the position of certain elements on the second screen.
4. I would like to be able to always change my preferences on-the-fly, rather than go to special "options" menu.
5. I would like to see only the primary/essential functions in the application. The advanced options should be hidden until I would like to use them.
6. I want the option for the information to be shown only on the TV-screen while the Second Screen will be mostly used for interaction.
7. I would abandon the application if I will not understand the interface in first 10 minutes.

General (Likert)
Now that you got an impression of what a second screen can be used for

1. I think the TV-watching process should be enhanced with an extra device
2. I would use it
3. I think second screen would benefit TV-watching experience in the group.