FI content

D2.3.2

RESULTS AND FEEDBACK ANALYSIS - FINAL

March 2015

ABSTRACT

This deliverable provides best practice guidelines for user data gathering and transparency based on the outcome of the experiments addressing these issues. It also analyses the scenarios based on the overall outcome of the experimentation phases.

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SEVENTH FRAMEWORK PROGRAMME

FUTURE INTERNET PPP

DISCLAIMER

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EXECUTIVE SUMMARY

This deliverable presents the results and end user feedback delivered by after 2nd iteration testing for WP2 and makes recommendations for further user testing.

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ABBREVIATIONS

AR	Augmented Reality
CG	Computer Graphics
API	Application Programming Interface
SE	Specific Enabler
GE	Generic Enabler
FAQ	Frequently Answered Questions
XML3D	Three Dimensional Extensible Markup Language
POI	Point of Interest
GPU	Graphics Processing Unit
FI	Future Internet
FI-PPP	Future Internet – Public Private Partnership
GPS	Global Positioning System
DTV-S	Digital Video Broadcasting – Satellite
DTV-T	Digital Video Broadcasting – Terrestrial
EPG	Electronic programme guide
HbbTV	Hybrid Broadcast Broadband TV
UI	User Interface
VoD	Video on demand

1 - INTRODUCTION: SECOND EXPERIMENTATION CYCLE OF SOCIAL CONNECTED TV

1.1 - Scenario 1 - Rich Content

Testing of the Rich Content scenario involved trials of 'Content Enrichment for HbbTV' in order to validate content enrichment on standard HbbTV devices. Subsequent tests consisted of integration of the Rich Content scenario in the HbbTV Application Toolkit SE.

1.2 - Scenario 2 - Multi-Screen Experience

Testing of the Multi-Screen Experience scenario in the second testing cycle included two series of tests of the Fall of the Wall app in Berlin, testing of Vision in Lancaster and testing of Content Enrichment and Audio Mining in Berlin.

1.3 - Scenario 3 - Personalised Media

Testing of the Personalised Media scenario involved trials of a newly created Resume-Play for the ULANC Vision IPTV system designed to test various aspects of users' attitudes towards Activity Data. Subsequent tests consisted of a SmartTV application developed on top of TAL SE and the new interactive social annotation feature, which also facilitates content enrichment tests.

1.4 - Scenario 4 - Search and Discovery

Testing of the Search and Discovery scenario involved trials of a suite of new features to help users discover new video on demand (VoD) content in innovative ways. For this second experimentation it was envisaged to add social discovery through group recommendation and to integrate the Social Network SE. However, Search and Discovery was cancelled by TRDF, who opted to withdraw from all research work in November 2014.

2 - FINAL REPORT ON FIRST AND SECOND CYCLE EXPERIMENTS

2.1 - Overview of first cycle experiments

Date	Site	Scenario	Application	Leading Partner
June 2013	Berlin	Multi-Screen Experience	rbbtext	IRT, RBB
September 2013	Berlin	Multi-Screen Experience	ARD-EPG	IRT, RBB
September 2013	Berlin	Rich Content	Content Enrichment Demo	FOKUS
October 2013	Lancaster	Personalised Media	Cross-Device Resume Play	ULANC
November 2013	Berlin	Multi-Screen Experience	rbbtext	IRT, RBB
December 2013	Brittany	Search and Discovery	Search & Discovery App	TRDF
January 2014	Berlin	Multi-Screen Experience	ARD-EPG	IRT, RBB
March 2014	Lancaster	Personalised Media	Cross-Device Resume Play	ULANC
March 2014	Berlin	Rich Content	Content Enrichment Demo	FOKUS

2.2 - Content Enrichment Demo - Rich Content

2.2.1 - Introduction to the tested application and the experiment

The application tested was content enrichment on HbbTV. 15 participants (students and experts) tested the Content Enrichment App over two days. The test was held in the Fraunhofer TV lab in Berlin. For the early lab trial we used observation techniques and think-aloud sessions. The test users sat in front of the applications displayed on SmartTVs and commented upon any action they were required to complete, producing accurate, instant and honest feedback on various applications.

2.2.2 - Update on test objectives

The objective of the test was to validate content enrichment on standard HbbTV devices. We needed to assess the technical performance of the application on a range of HbbTV-enabled devices from various manufacturers. A further objective was to gather feedback on the user experience in terms of interacting with objects on the TV screen using a remote control as an interaction device.

The expected outcome of the trials was feedback regarding the general usability of the app and the presentation of interactive elements on the TV screen that would be used in future design of the UI and user experience. We also expected results on the technical performance of the Content Enrichment App on HbbTV devices.

2.2.3 - Update on applied methods and tools for evaluation

User observation and think aloud methods were used to gather quick, honest feedback on the usability of the app and the users' expectations. The purpose of the trial was to gather feedback to inform further development work on the application.

2.2.4 - Update on infrastructure requirements

2.2.4.1 - Technical infrastructure

The tests were conducted in the FOKUS Hybrid TV Lab. For the test we used state of the art TVs from Loewe, Philips, Samsung, Sony, Panasonic, LG and set top boxes from Humax, TechniSat, Inverto and Videoweb.

An iMux HbbTV Playout Center was used to generate DVB-S & DVB-T signals and insertion of RedButton URL for HbbTV application triggering.

2.2.4.2 - Devices and SIMs cards, network

The TV sets were connected to the internet via the FOKUS WiFi and / or wired ethernet connection, as well as equipped with DVB input signal generated at FOKUS test lab

2.2.4.3 - Description of content used

For test purposes we used a video of Berlin scenes and enriched this with content from Wikipedia.

2.2.5 - Update on user recruitment and user involvement

The targeted end users of the app are TV viewers. For the trials, we recruited five students from the Technical University of Berlin and three internal experts, who are not involved in the project, to test the application.

2.2.6 - Report on running the additional experiments

The trial was run over a couple of days. There were no technical problems and the testers were cooperative and provided useful feedback and comments.

2.2.7 - Report on Outcomes

Our conclusion is that interactive content or additional content should not be placed on the main screen where there is a second screen device available as it is better for interactive content or additional content to take place on a screen or personalized device. We plan to further develop the multi-screen application using content enrichment and the Second Screen Framework SE, which will be used as the basis of further experiments in the second cycle.

2.2.8 - Summary of findings and evaluation

Interactive objects and related information should be made available on a second screen instead of a TV screen taking into account the usage situation of a shared screen vs. personal device. Interaction between second screen and TV should be possible for example to send related content (video about an object) back to a TV screen. Use of a remote control to navigate through supplemental information is inconvenient. Object markers on TV sets are not helpful and are confusing as TV devices are too slow to render smooth transitions and/or menu bar or on second screen. Usefulness and understanding depends on the type of content.

2.3 - ARD-EPG / rbbtext - Multi-Screen Experience

2.3.1 - Introduction to the tested application and the experiment

2.3.1.1 - Expert test - June 2013

The tested application was rbbtext. rbbtext is a second screen variant of the classic teletext service, developed within FI-CONTENT and further developed within FI-CONTENT2. rbbtext is part of the portfolio of

on-air services broadcast by RBB.The tests were conducted between 19 June and 23 August 2013 in testers' own households in the Berlin and Brandenburg region of Germany. Telephone and email were used in case of queries.

2.3.1.2 - Usability tests - November 2013

Applications tested were rbbtext and the ARD Electronic Programme Guide (EPG). rbbtext is a second screen version of the classic teletext service, developed within FI-CONTENT and refined within FI-CONTENT2. rbbtext is part of the portfolio of on-air services broadcast by RBB.

The ARD EPG is a programme guide presenting information about current and upcoming broadcasts on all TV channels and radio stations of to the ARD network. Besides the 14-day preview it also provides a 7-day preview of programmes with access to selected programmes as catch-up services. ARD EPG is part of the portfolio of on-air services broadcast by all ARD TV stations.

The tests took place on 15/11/13 and 18/11/13 in the main television building of RBB, Masurenallee 8-14, Berlin, Germany. The tests were devised by user testing company Youse, in cooperation with RBB.

Every tester received an introduction to the tests procedure and the equipment and applications to be used. Application-specific questions by testers were answered by the interviewer where applicable. For technical issues RBB staff was present. 5 testers were accompanied by 2 RBB personnel and 2 Youse personnel.

Tests were conducted sequentially and lasted for one hour per tester and were filmed for later analysis

2.3.1.3 - Field trial - February 2014

During the field trial the HbbTV version of rbbtext and ARD Electronic Programme Guide (EPG) were tested by users.

rbbtext is a second screen version of the classic teletext service, developed within FI-CONTENT and refined within FI-CONTENT2. rbbtext is part of the portfolio of on-air services broadcast by RBB.

The ARD EPG is a programme guide presenting information about current and upcoming broadcasts of all TV channels and radio stations belonging to the ARD network. Besides the 14-day preview it also provides a 7-day preview of the programme with access to selected programmes as catch-up services. ARD EPG is part of the portfolio of on-air services broadcast by all ARD TV stations.

2.3.2 - Update on test objectives

2.3.2.1 - Expert test - June 2013

The tests were designed to be 'friendly' user tests to be conducted under realistic circumstances. The aims were to identify usability issues in advance of further testing, to identify areas for possible improvement and development of additional services, and to deliver methodological input into future testing and trials.

2.3.2.2 - Usability tests - November 2013

The purpose of the tests was to reveal basic usability problems in advance of upcoming field tests. Discovery of any such issues at this stage minimises any possible problems during the field tests.

2.3.2.3 - Field trial - February 2014

The objective of the field trial was to evaluate the Second Screen Framework by running tests under realistic circumstances. Real users were to test second screen applications at home under real conditions. During the trial, data about the frequency of use, changes in use of the applications (effect of habituation) and about problem-solving strategies was generated, giving rise to recommendations about optimization of applications from the perspective of end user needs and acceptance.

2.3.3 - Update on applied methods and tools for evaluation

2.3.3.1 - Expert test - June 2013

The testers were asked to test the applications for a period of seven consecutive days and to complete a questionnaire after each day, which functioned as a 'user diary'. Tests were designed to encompass tasks that a TV viewer would undertake during a viewing session. Testers were asked to participate in an interview following the end of the seven-day testing period.

2.3.3.2 - Usability tests - November 2013

Use cases were defined in consultation between RBB and the ARD, and research company Youse. Qualitative, semi-structured interviews were conducted after testing.

2.3.3.3 - Field trial - February 2014

To reach the aim of high acceptance and potential of use, several user-centered methods were used. The data collection followed a 'mixed methods' approach; three online questionnaires were set up as a quantitative data source, and for qualitative information on user needs, a focus group was conducted.

2.3.4 - Update on infrastructure requirements

2.3.4.1 - Expert test - June 2013

2.3.4.1.1 - Technical infrastructure

All testers were provided with an HbbTV-enabled TV or a set-top box and a tablet. Users were also able to make use of their own devices where they had them (e.g. iPhone). Various combinations of devices were tested:

- Samsung TV + Android tablet
- Samsung TV + Samsung Galaxy Tab
- Grundig TV + Samsung Galaxy Tab
- Panasonic TV + iPad
- Humax ICORD STB + iPad
- Samsung TV + Huawei Mediapad

2.3.4.1.2 - Devices, SIM cards, network

Testers used their home DSL network for TVs and set-top boxes and mobile network or home Wi-Fi for the tablets.

2.3.4.1.3 - Description of content used

The rbbtext HbbTV-application is signalled via the RBB DVB channel and is independent of the broadcast content. Content for rbbtext is produced especially for the teletext service by the relevant RBB department, which in turns feeds the HbbTV-version of the rbbtext service.

2.3.4.2 - Usability tests - November 2013

2.3.4.2.1 - Technical infrastructure

All technical equipment was provided by RBB. Tests were conducted on a TV connected to an HbbTV DVB satellite receiver (Inverto Volksbox) and a tablet. Users could choose between an Android-based (Samsung Galaxy Tab2) or an iOS-based tablet device (iPad). Devices were connected to the Internet using the RBB

infrastructure, including a wired LAN connection for the set-top box and a wireless LAN connection for the tablet.

2.3.4.2.2 - Devices, SIM cards, network

All devices and network connection were provided by RBB using RBB infrastructure.

2.3.4.2.3 - Description of content used

The rbbtext HbbTV-application is signalled via the RBB DVB channel, the ARD EPG is signalled via all ARD DVB channels. The availability of the applications is independent of the broadcast content.

Content for rbbtext is produced especially for the teletext service by the relevant RBB department, which in turns feeds the HbbTV version of the rbbtext service.

The ARD EPG content comes from the relevant department of the ARD Play-Out-Center, which is a joint facility of the ARD network. The ARD Play-Out-Center is hosted by RBB.

2.3.4.3 - Field trial - February 2014

2.3.4.3.1 - Technical infrastructure

The participants used their own technical infrastructure during the field trial, including an HbbTV-capable TV set, internet connection at home and a tablet PC (with iOS (15/30), Android (12/30) or Windows (3/30) operating system). For a detailed description of the testing group, please see below – paragraph “Description of the tester group”.)

2.3.4.3.2 - Devices, SIM cards, network

Test persons used their private infrastructure (devices, SIM cards and network). During the recruitment phase a questionnaire was used to ensure all participating testers were equipped with appropriate technical means (e.g. internet, HbbTV and own tablet PC) for running the field trial.

2.3.4.3.3 - Description of content used

The rbbtext HbbTV-application is signalled via the RBB DVB channel, ARD EPG is signalled via all ARD DVB channels. The availability of the applications is independent of the broadcast content.

Content for rbbtext is produced especially for the teletext service by the relevant RBB department, which in turns feeds the HbbTV-version of the rbbtext service.

The ARD EPG content comes from the relevant department of the ARD Play-Out-Center, which is a joint facility of the ARD network. The ARD Play-Out-Center is supervised by RBB.

2.3.5 - Update on user recruitment and user involvement

2.3.5.1 - Expert test - June 2013

Five testers were recruited from RBB staff, with participants from various departments of RBB. The departments were:

- RBB Interactive Services
- RBB Innovation Projects
- Fritz Radio
- RBB directorship
- Legal and Corporate Development

Selection criteria included a minimum familiarity with second screen devices. Five technically-aware testers from RBB were selected, aged between 29 and 64, 3 females and 2 males, with experience of internet use,

who owned a smart phone and who were familiar with tablet use. Additional criteria were a minimum once-weekly viewing of RBB/ARD broadcasts and a weekly use of video text.

2.3.5.2 - Usability tests - November 2013

Five technically-aware testers from RBB were selected, aged between 29 and 64, 3 females and 2 males, with experience of internet use, who owned a smart phone and who were familiar with tablet use. Additional criteria were a minimum once-weekly viewing of RBB/ARD broadcasts and a weekly use of video text.

2.3.5.3 - Field trial - February 2014

The tester group consisted of a mixed age gender ratio that corresponds to the socio-demographic structure of RBB viewers. 13 participants of the field trial were female and 17 male. All users were aged between 19 and 65 years (average age = 44,6 years) (see also RBB user profile by RBB Media Research department) and fulfilled all predefined recruitment criteria.

2.3.6 - Report on running the additional experiments

2.3.6.1 - Expert test - June 2013

General points:

- All testers used the second screen functionality in rbbtext.
- Most testers felt relaxed during use of the application and were satisfied.
- Most testers were generally impressed with the application.
- The majority of testers achieved their goals in using the application.
- The majority of testers found use of the application intuitive.
- One user felt, it would be useful if other applications could be accessed via the tablet while in the HbbTV text in use.
- The majority of testers used the taskbar to remotely control rbbtext.
- A more responsive design was requested.
- Note on devices:
- Unordered List Item Samsung 6000he series is problematic.
- The iPhone works well as a remote control but is less than optimal for reading text.
- The iPad is well suited to both functions.

Data collection and ethical issues:

- RBB has completed and submitted the FIC2 Ethical Requirements document.

2.3.6.2 - Usability tests - November 2013

Following the earlier expert tests which focused upon the rbbtext application, this series of testing was focused primarily upon the ARD EPG. The goal was the testing of the functionality of the two applications (i.e. rbbtext and ARD EPG) running simultaneously on connected devices and switching between these applications. Critical issues identified during these tests were to be corrected before the next round of field tests, which followed in February 2014.

2.3.6.2.1 - Data collection and ethical issues

RBB has signed the Ethical Requirements document.

2.3.6.3 - Field trial - February 2014

The testing series were conducted between January and March 2014 in the Berlin and Brandenburg region of Germany, in four stages with aims as stated below: Stage 1: online survey No.1 (27.01.-02.02.14)

- To use the applications rbbtext and ARD EPG without defined guidelines.
- To measure the first impression of the usability, design and frequency of use in a quantitative way.

Stage 2: online survey No.2 (03.02.-09.02.14)

- Carry out use cases (defined tasks to be executed by the users).
- To measure the frequency of use of different contents of rbbtext and ARD EPG.

Stage 3: online survey No.3 (10.02.-16.02.14)

- Overall experience after three weeks of testing at home.
- To measure the overall user experience and changes in the perception of both applications over a defined period of time.

Stage 4: focus group (06.03.14)

- Participants, the RBB team and YOUSE met for 2 two hours to discuss the usage of rbbtext and ARD EPG during the tests at users' homes.
- To generate and collect qualitative user feedback.

Before the official start of the study, test persons were contacted via telephone to give them sufficient information on the planned testing phases. Furthermore a handbook, which described all stages of the study in detail, was sent to the test persons. After the test persons filled out the second questionnaire (second testing week) a detailed guide with guidance on the application (e.g. how to connect the TV and the second screen device) was given to the participants.

2.3.7 - Report on Outcomes

2.3.7.1 - Expert test - June 2013

The following recommendations were made:

rbbtext:

- It would be advisable to adapt the mobile version of rbbtext to the navigation capabilities of touchscreen devices, i.e. to make pages scrollable.
- The connection status of devices should be more clearly indicated.
- The appearance of links and headlines should be more clearly differentiated.
- It should be investigated whether the Second Screen Framework pages on the TV have a transparent background.
- The tablet should support zooming

Connection process:

- As a temporary solution, the QR code zoom function should be made clearer.
- After scanning the QR code on the second device, there is a delay of some seconds before connection; users need some indication (i.e. the appearance of a Mac-style spinning wheel) that something is happening during this pause.
- The PD Launcher App seems to be an important solution to connection issues and should be available for all devices.
- In the long term a more 'elegant' connection process is needed.

2.3.7.2 - Usability tests - November 2013

General issues:

- Scrolling functionality is needed – should be implemented
- Recognition of links is problematic for users – should be improved and implemented.

User responses to ARD EPG:

- Functionalities/aspects described as ‘good’:
- Mediathek (catch-up service)
- Simultaneous previews of all channels
- Design
- Instant focus on current programme
- Features which users requested:
- Easier connection process between tablet and TV
- Programme overview page
- Back button

User responses to rbbtext:

- Functionalities/aspects described as ‘good’:
- General design
- Miniature previews
- Improved videotext
- Weather display
- Features which users requested:
- More regional focus
- Improved navigation overview
- More ‘emotional’ design

2.3.7.3 - Field trial - February 2014

In addition to the daily free use of both applications the participants were asked to conduct certain use cases in the course of the survey. Based on these use cases the applications were rated regarding their usability in terms of EN ISO 9241-11 (cf. Prümper et. al (1993)). During the entire field trial usability problems were collected and analysed. Overall the users performed the following use cases of the rbbtext in most cases without major difficulties:

- To display and hide the second screen application on the TV (93,3% success rate/without any problems)
- To find and read news out of a certain category (66,7% success rate/without any problems).
- To open a link on the tablet PC (86,7% success rate/without any problems)

Also the ISO usability score (a quantitative evaluation tool for usability) rated by the test persons after executing the use cases shows good results (ISO-Score 112,71 out of 147).

ARD EPG was more complex and more difficult to operate (clearly shown by lower success rates and rating of the ISO usability score compared to rbbtext (ISO-Score 90,28 out of 147), and was used for the following use cases:

- To watch a trailer (46,7% success rate/without any problems)
- To switch the channel on the TV via tablet PC navigation (43,3% success rate/without any problems)
- To search and watch a past programme (46,7% success rate/without any problems).

Half of the participants did not have any problems in most of the use cases. All in all both applications showed a good usability, which might be optimized by little improvement. The following bullets give a summary of usability problems occurred during the field trial:

- Process of coupling the tablet PC with the TV was not always clear to the participants
- Success rate/percentage of persons who had no problems was 56,7 % for rbbtext and 60 % ARD EPG.
- About 1/3 of the users (36,7 % rbbtext/26,7 % ARD EPG) did not connect their tablet without any advice to the TV.
- 1/3 of the users (26,7 % rbbtext/30 % ARD EPG) did not see the icon/option to connect their tablet with the TV at first glance.

- 1/3 of all participants used the help function of the ARD.connect page during the connection process, because the steps of connecting were not clear to them.
- Users did not set the ARD.connect bookmark on their own
- Only 23 % of the users set the bookmark on their own.
- Half of the participants (50 %) set the bookmark after reading the instruction handed out for the second survey on their own.
- If the bookmark was set, the participants rated it as useful to open the application – 32 % of the persons who set the bookmark mentioned that they used it almost every time to open rbbtext or ARD EPG, and 77 % of the users who used the bookmark stated that it was useful.
- Reasons stated for not setting the bookmark were: the option to set a bookmark was not seen/known or the user was not interested in.
- Advices for installing the ARD.connect bookmarking app were overseen by the users
- 7 out of 11 participants installed the ARD.connect bookmarking app and rated the app as useful.
- Those who did not install the app (4 out of 11 participants) claimed that they have overseen the advice for installing the app.
- Users wanted a back button to navigate (rbbtext and ARD EPG)
- User claimed that they lost connection to the second screen application when they pushed the back button on the browser (qualitative statements from open questions)

Overall the usability of rbbtext was perceived as acceptable. There was no urgent need for the improvement of rbbtext regarding its usability.

The assessment of the usability of ARD EPG was evaluated as mediocre. An improvement of ARD EPG regarding its usability is not urgently necessary but desirable from the users' point of view. The learnability of both applications was assessed as mediocre (ARD EPG: M = 4,25 out of 7) to good (rbbtext: M = 5,93 out of 7). Once necessary steps were understood there was a high chance for the effect of habituation.

2.3.7.3.1 - User experience

Although several smaller usability problems occurred during the field trial the participants rated the user experience (which means the overall evaluation of usage) of both applications as very good. The intuitive usage of rbbtext and ARD EPG was predominantly rated as positive, which indicates a logical and intuitive operability (see INTUI analysis of the third survey: ARD EPG M = 3,7-5,2 out of 7 and rbbtext M = 3,5-6 out of 7). Especially the clarity and the logical operability were rated as distinctive characteristics of rbbtext.

The operability of ARD EPG was experienced as being rather effortless, memorable and intuitive (for detailed information see also analysis of INTUI in the annex).

The user experience of both applications was assessed as being above average to good (see user experience questionnaire analysis of the first survey: ARD EPG M = 1,2-1,7 and rbbtext M = 0,3-1,8 on an interval from -1 to 2,5).

The user experience of ARD EPG and rbbtext can also be located higher than the benchmark of other comparable web applications (cf. Schrepp et. al (2013)). Only little optimization would be needed to serve an excellent user experience (for detailed recommendations see paragraph recommendations).

Moreover the test showed no evocation of negative emotions during the usage of rbbtext and ARD EPG (see PANAS analysis of the second survey: ARD EPG negative emotions M = 1,4 and rbbtext negative emotions M = 1,2 out of 5).

2.3.7.3.2 - Design

rbbtext showed the best ratings regarding the simplicity and professionalism of the layout and achieved results above average for all dimensions regarding the design (see also VisAWI analysis rbbtext M = 4,4-5,4 out of 7).

Also the design of ARD EPG was rated very positive (see also VisAWI analysis ARD EPG M = 5,3-5,9 out of 7).

In comparison to other comparable products the design of both applications appeared as attractive (see also benchmark for other products VisAWI M = 3,5-4,5 out of 7).

2.3.7.3.3 - Focus group results

Most of the statements that came up during the focus group underline the tendencies shown in the data generated from the surveys. Knowledge about second screen applications before the field trial was low. The participants confirmed that they did not know much about HbbTV second screen applications before the field trial. Although most of them were constantly using second screens (e.g. tablet PC, mobile telephone) while watching TV, they had no idea about connecting their tablet PC to the HbbTV applications. Personal perception of using ARD EPG and rbbtext was rated very good In general both applications were rated very good considering the design, functionalities and user experience.

No clear tendency regarding use of rbbtext and ARD EPG as a second screen application in future
The participants had different point of views and underlined the results obtained from the survey (half of the group was willing to use the application also via second screen in the future). Some of them claimed that there is no personal benefit to use the tablet PC – they will only use the second screen application of ARD EPG or rbbtext to not interrupt the TV consumption of another person present. Particularly for the ARD EPG the personal added value is not clear to the participants, because most of them already use other EPGs (e.g. integrated EPG on TVs or set-top boxes, the internet or TV guides in the press) to look up TV programming. But some functions like watching trailers or past broadcasts (from the Mediathek) were mentioned as outstanding for the ARD EPG and were rated very positive by the participants.

Proposed changes on ARD EPG from user's point of view To reduce the complexity of ARD EPG some participants supposed an individualized presentation of the programme overview (on the home screen ARD EPG "Alle Sender jetzt"), because they were overwhelmed with the mass of information and channels.

Proposed changes of rbbtext from users point of view On the one hand some participants wanted the rbbtext not to be a closed system. They stated that – if they wanted to have detailed information on a topic (e.g. political news) – they have to use the web/other websites (and have to leave the rbbtext application). But on the other hand, another group of participants had the opposite opinion by saying that the rbbtext, as a closed and easy to use system, is a very good alternative for persons having only basic skills or are afraid of using the web.

Technical issues which occurred during the field trial

The following list summarizes all technical problems mentioned by test persons during the field trial:

- Disruption of connection between tablet and TV (minimum bandwidth required)
- Long duration of streaming (Mediathek and trailer of ARD EPG) due to low bandwidth
- Difficulties when using the second screen with Windows 8
- Delay opening the task bar and ARD EPG
- Opening the task bar by the Red Button was temporarily not possible
- The preview trailers could not be shown successfully on the iPad Air. (This was a technical issue due to the disabling of the HbbTV functionality on the device).
- Difficulties connecting the tablet because the cursor was moving away and the QR code was not shown
- Switching to another channel (ARD EPG) sometimes did not work on the tablet
- Programmes (e.g. Olympic Games) were shown chronologically incorrectly, some days were missing

2.3.7.3.4 - Recommendations

The following bullets give recommendations on how to optimise rbbtext and ARD EPG, based on the quantitative (survey data) and qualitative statements (focus group data) given in the precedent paragraphs:

General recommendations (regarding both applications):

- Test persons did not expect the second screen option nor knew that this function exists.
- A suitable marketing concept (e.g. advertisement, pop-ups on the HbbTV application) might reduce this problem substantially.
- Many participants had problems during the process of connecting the tablet with the TV.
- Optimize the help function during the connection process in order to successfully establish the connection e.g. check the wording of the help function.
- Add a step-by-step introduction of all steps to be performed on the TV and on the Tablet. Use the same description for every help option (on TV and tablet).
- Locate the “help” button centrally (on the main page) so that it is easy to find.
- Do not spread different information/content behind the “help” buttons on the TV and on the ARD.connect website.
- The principle of the ARD.connect website and the ARD.connect bookmark for connecting the tablet with the TV was often not understood by the participants.
- Offer the opportunity to automatically connect a second screen to the TV once the connection was established with the same device (e.g. when users open the rbbtext, a pop up might occur on the tablet asking “Do you want to connect to rbbtext?” “Yes”/“No”/“Do not ask again”) So the ARD.connect bookmark does not need to be set and the scan of the QR code would not need to be renewed.
- Give the opportunity to install the ARD.connect app for all operating systems and strongly promote the use of the ARD.connect app (marketing and advertising needed).

Recommendations regarding rbbtext:

- Partially, the navigation seemed to be unclear for the participants.
- Add a back button and explanation of the navigation principles under the help function.
- Some participants claimed that the information they received from rbbtext was sometimes too superficial and they had to look up other websites to get further information.
- Keep the rbbtext as a closed system and do not add a URL box. Keeping the simplicity will be the best way to not get into trouble with complexity and usability problems.
- If both the older Teletext version (with navigation over numbers) and the HbbTV version of rbbtext are working in parallel, there will be a need to link the content of rbbtext to the current broadcast (e.g. the moderator says “Please look up Teletext page 200 for further information”).
- Add a link/field (e.g. beside the display which shows the time and name of the current broadcast) that contains further information regarding the current broadcast.

Recommendations regarding ARD EPG:

- Some participants had problems finding the “play” button (26,7 % tried to play the trailer by pressing what they thought was a „play“ button).
- This design element should be improved.
- Switching to another channel was not clear to all participants and needs to be easier.
- Draw an optical frame around “Senderkennung” (identification of station) on the tablet version of ARD EPG (otherwise the users click onto the running programme as 23,3% of the participants did).
- Some participants felt that the ARD EPG was too complex to use.
- Highlight the opportunity to individualize the view of the main page under button “Mein TV” (my TV).
- Allow users to fade out channels they do not want to see.
- Highlight channels the user marked as „mag ich“ (I like) also on the main page.
- Give the chance to sort the channels according to personal preferences.
- Change the name of „Mag ich“ (I like) button e.g. into „Favorit“ (favourite) to avoid giving the user an association with the “Like”-button on Facebook, as this evokes data security issues.
- Participants were very pleased with the EPG, but desired in addition a programme overview across all broadcasters – ARD EPG is competing with native TV-EPGs websites offering information of the TV programme and conventional TV papers.

- Add a personal value to the ARD EPG e.g. by highlighting the usage and advantages of the Mediathek and trailer functions compared to other EPGs or TV guides (e.g. for communication of the marketing of ARD EPG).

2.3.8 - Summary of findings and evaluation

2.3.8.1 - Expert test - June 2013

Navigation:

- Users have a different expectation of a tablet as compared to a TV. They expect pages on a tablet to be "pushed".
- There is no functioning scroll bar and there is a lack of haptic (tactile) feedback.
- There is little or no differentiation between links and headings.
- Connection status is not always clear.

Device Connection Process:

- QR Code is too small.
- No tester noticed that it is possible to enlarge the QR code on screen.
- Different QR code-reader apps react differently.
- The connection process is seen as taking too long.
- The user must use two devices simultaneously (tablet and remote control) and this is not popular

2.3.8.2 - Usability tests - November 2013

The evaluation report made the following observations (a summary included here with more detailed appendices available as part of D7.3.1):

Application	Use Case	Issues identified	Proposed Solution/s	Outcome
ARD EPG	Open EPG on second screen	Option to start connection process not found	• Highlight the option to use a second screen within the TV application; • Clearer button naming; • Consistent button naming or icons throughout all applications using the Second Screen Framework	Will be considered in future releases of applications using the framework
ARD EPG	Open EPG on second screen	Users do not use option to set a bookmark or install the bookmark-app	• Change English term “Bookmark” to German “Lesezeichen” • Clearly explain the advantages of setting a bookmark or using the bookmark app and the disadvantages of not doing so.	Will be considered in the next release of the Second Screen Framework

Application	Use Case	Issues identified	Proposed Solution/s	Outcome
ARD EPG	Open EPG on second screen	Application does not start on tablet without a refresh of the webpage	• Solve technical issue	Technical issue will be addressed in next release of the Second Screen Framework
ARD EPG	Use case: watch trailer	Design element similar to a play button recognised as the actual button	• Remove/alter design element	Will be considered in the next release of the application
ARD EPG	Use case: watch trailer	Playback of video on TV not recognised as it was started from the tablet	• Improve on-screen communications; give option where the video should be played	Will be considered in the next release of the application. Might be a legal issue for some TV stations
ARD EPG	Disconnect EPG	Icon not recognised	• More understandable icon; Separate connection settings menu	Will be considered in the next release of the application
ARD EPG	Switch from EPG to rbbtext	Additional QR-code scan needed / procedure not understood	• Clearer status messages on-screen; • Clearer instructions within the connection process; • Automatic connection process	Options will be discussed in the redesign phase of the Second Screen Framework
rbbtext	Find and read news for a particular topic	Difficulty opening the application	• Make the app launchable via the teletext-button of the remote control	User did not try that option – it was already implemented
rbbtext	Find and read news for a particular topic	Difficulty to identify the selected item in the main menu (Startleiste)	• Better graphics to indicate selected application-widget	will be considered for next design updates
rbbtext	Connect rbbtext and second screen	Users do not use option to set a bookmark or install the bookmark-app	• Change English term “Bookmark” to German “Lesezeichen” Clearly explain the advantages of setting a bookmark or using the bookmark app and the disadvantages of not doing so.	will be considered in the next release of the Second Screen Framework
rbbtext	Connect rbbtext and second screen	User is unsure whether the connection process needs to be started from the tablet or TV	• Highlight the option to use a second screen within the TV application	Will be considered for next release of the application

Application	Use Case	Issues identified	Proposed Solution/s	Outcome
rbbtext	Connect rbbtext and second screen	Option to start connection process not found	• Highlight the option to use a second screen within the TV application; • Clearer button naming; • Consistent button naming or icons throughout all applications using the second screen framework	Will be considered in future releases of applications using the framework
rbbtext	Connect rbbtext and second screen	Additional interaction on TV needed after second screen connection is initiated	• Clearer status messages or automatic start of the applications	Automatic application start implemented
rbbtext	Connect rbbtext and second screen	Application does not start on tablet without a refresh of the webpage	• Solve technical issue	Technical issue will be addressed in next release of the Second Screen Framework
rbbtext	Send a link from the TV to the tablet	Problem identifying links on TV	• Either better indication of link or better on-screen placing	Better indication of link implemented
rbbtext	Switch between rbbtext and ARD EPG	Additional QR-code scan needed / procedure not understood	• Clearer status messages on-screen; • Clearer instructions within the connection process; • Automatic connection process	Options will be discussed in the redesign phase of the Second Screen Framework
rbbtext	Disconnect rbbtext	Problem recognising relevant icon on-screen	• Improved on-screen dialogue	Will be considered for next release of the application

2.3.8.3 - Field trial - February 2014

The following paragraphs give an overview of the main results of the online survey and the focus group conducted during the field trial. The results of the online survey are divided into the description of frequencies and the analysis of usability, user experience, and design with regard to rbbtext and ARD EPG.

After presenting the results of the survey, findings from the focus group results are summarized. In general the summary of results combines the analysis of qualitative (open questions in the surveys, focus group results) and quantitative data (frequencies from the surveys).

2.3.8.3.1 - Frequencies of using rbbtext and ARD EPG in daily life

Until the end of the study both applications were used for an average of 13 to 15 minutes per day (13 min ARD EPG, 15 min rbbtext). rbbtext and ARD EPG in general (with or without tablet PC) were more often used alone than accompanied by family or friends (40% used almost daily the ARD EPG alone, 43% used almost daily rbbtext alone).

2.3.8.3.2 - Second screen usage before the field trial

Before the field trial the usage of a second screen in connection with ARD EPG and rbbtext was low (32% have never used the tablet and 26% used the tablet PC only once for rbbtext; 52% had not yet used the tablet PC for EPG). The participants had not connected the TV to the tablet PC before this occasion because they were not interested in or not aware of the option.

2.3.8.3.3 - Usage of second screen applications ARD EPG and rbbtext in daily life

In the beginning of the study second screen was mostly used alone (54% used rbbtext on the tablet PC never in the presence of other people, 87% used ARD EPG several times alone but only 40% stated to have also used EPG several times in the presence of other people). But the usage of the second screen in the presence of other people increased throughout the time of the study (60% stated to have used rbbtext on the second screen with family/friends several times up to daily, 53% used EPG several times up to almost daily in the presence of other people).

2.3.8.3.4 - Reasons for using second screen applications ARD EPG and rbbtext

During the field trial participants mentioned several reasons for using the second screen application of rbbtext and ARD EPG. The following list gives an overview of those reasons:

- Seeing combined information on TV and tablet PC.
- Using the tablet PC as a remote control (60% stated to use the tablet PC as a remote control for ARD EPG several times up to almost daily).
- In order to hide the applications on the TV.
- e.g. to avoid interrupting the running programme (more than 50% stated that they hid rbbtext on TV several times up to almost daily – at the beginning of the study the frequencies of use were significantly lower, 60% stated that they hid the EPG on TV in order to continue watching the programme without interruption).
- Many participants stated they used the second screen function due to the presence of other people, to not disturb anyone and enable others to continue watching (48% concerning rbbtext and 47% concerning ARD EPG mentioned this reason).

2.3.8.3.5 - Future intention to use ARD EPG and rbbtext as a second screen application

The general future intention to use is very positive for both applications (87% for rbbtext and 70% for ARD EPG were willing to use the application in the future with or without tablet PC). Also the future intention regarding second screen use can be considered good, especially for rbbtext (67% were willing to connect the application also to the second screen, 47% stated this for ARD EPG). Compared to ARD EPG, rbbtext shows higher potential to be used with the second screen option. The difference in the future intention of use between rbbtext and ARD EPG might be based on the existence of competing products like TV EPGs or other EPGs. rbbtext is rather seen as an application that provides information to be read and to be browsed through, which is perceived as innovative. rbbtext is perceived as an improvement of the former teletext because it facilitates reading and browsing on the tablet PC.

The participants evaluated the application of a second screen as useful (rbbtext 80%, ARD EPG 66%). Altogether the second screen application was rated as good. Also the application of the second screen is perceived as a personally added value to most of the participants (70% for rbbtext and 57% for ARD EPG). In the future most participants are willing to be informed by the rbbtext about the weather, the news and the traffic at least several times a week. Regarding ARD EPG participants are willing to get information about a currently running programme, to use the Mediathek, to browse the programme overview of all broadcasters

and the daily programme of one broadcaster for several times a week. The results show the tendency that all activities concerning ARD EPG will be conducted on TV rather than on the tablet PC (only the search option will be rather conducted on the tablet PC, according to 53% of the participants).

2.4 - Cross-Device Resume Play - Personalised Media

2.4.1 - Introduction to the tested application and the experiment

Resume-Play is a new feature developed for the ULANC Vision IPTV system that shows users their activity data as a means of helping them manage their cross-device media consumption.

Previous research has shown that a user's own activity data does not interest them in itself. We evaluated activity data visualisation with users in FI-CONTENT and the results were that people saw no particular benefit in visualising it and editing it.

Our follow-up research question in FI-CONTENT2 has been: can we abstract away from the detail of the data and use it to present something useful to the people?

2.4.2 - Update on test objectives

The overarching test objective was to understand the habits and motivations (media/device usage and context) of users and understand their needs/wants/perceptions of a viewing history feature that could allow continuous viewing of Vision across devices.

Our hypothesis was that a personalised media experience involves three core elements: planning, customising and socialising. Conducting qualitative and quantitative testing of the Resume-Play feature would enable us to gain further insight into each of these.

Expected outcomes of this first phase of experimentation were to discover how the participants interpret and define the concept of Resume-Play, to draw up detailed requirements for the Resume-Play feature and finally to explore ideas for other potential personalised services in Vision aligned with each of the three core elements mentioned.

2.4.3 - Update on applied methods and tools for evaluation

Testing and evaluation used a combination of qualitative and quantitative research.

The qualitative research phase involved interviews and focus groups led by the BBC Research and Development team to uncover and understand habits and motivations around the use of catch up and potential use of Resume-Play. This led to a set of requirements for the test feature that was built and tested as a prototype within the Vision platform.

Eight focus groups took place in total across 25 and 26 June 2013 with five participants per group, 40 participants in total. Each focus group lasted 1½ hours, split into three thirty minute sections to firstly understand user needs, secondly explore the concept and how this would fit with users' daily routines and thirdly to consider Resume-Play use cases specifically. The format was a mixture of individual tasks and group discussion. A group analysis session took place with all research members from BBC and ULANC on 4 July 2013.

The quantitative research phase involved the analysis of usage data. The Vision platform collects statistics on virtually all aspects of its users' use. This provides an extremely rich data set which can be queried to answer specific questions and/or test hypotheses about how the system is used. Users were also asked to complete a questionnaire about their perceptions of the Resume-Play feature. Two separate questionnaires were used: the first on general TV watching habits and use and experience of the Vision system; the second to explore specific aspects of the Resume-Play feature. Further interviews and deeper qualitative studies were also carried and these are reported on in deliverable D7.7.1.

2.4.4 - Update on infrastructure requirements

2.4.4.1 - Technical infrastructure

The Vision platform is the 3rd generation IPTV platform at Lancaster University designed specifically for research and experimentation. Vision is tailor-made by researchers and developers at Lancaster University. Vision has been designed specifically for research and experimentation of new media technologies and incorporates advanced monitoring and statistical analysis.

The specific application being tested is a cross-device feature within the Vision platform. This allows users to view their history of watching TV programmes on multiple devices and to resume play from the point they stopped watching.

Although the feature has only been implemented on the Vision system, the research is applicable to other systems. The envisioned scenario was that users may be able to watch only part of a programme on their laptop or desktop computer at home and may want to resume play later on a different device, for example in periods of dead time while queuing or waiting.

2.4.4.2 - Devices, SIM cards, network

Users can log in to the IPTV system on desktop, laptop, smartphone or tablet and view their TV and radio history including any programmes part-watched and flagged for resume viewing, regardless of which device they last watched on. They can then resume play from the point at which they stopped viewing or from any other point. Suitable metadata is made available to the user about programmes displayed in this way so they can quickly identify what to watch or listen to. The user is able to delete items from their history.

2.4.4.3 - Description of content used

Vision's statistics platform is a high-availability service designed to collect, process and analyse log data relating to both user actions and content playback. Page load statistics are logged which allows for user journeys to be analysed, highlighting popular features or pages and how the user accessed them. Content playback requests are an integral component of the pause-resume functionality. Content request events are logged, as well as heartbeats every few seconds. These heartbeats log how far through a piece of content a user is and support resuming to a previously watched point. Various APIs are exposed which allow the statistics data to be mined for useful information. For example the History page is supplied with content playback data to provide a chronological list of programmes watched.

All statistics are time-stamped, associated with the user that initiated them and are stored within 2 redundant database servers. A message queue architecture was also adopted which allows the statistics infrastructure to withstand peaks of very high logs per second.

2.4.5 - Update on user recruitment and user involvement

Vision offers a production-level live and on-demand streaming service accessed by a large Living Lab user community of over 10,000 potential users.

Recruitment of users of Vision is an on-going task – we currently have over 1000 registrations although, of course, not all registered users are regular users. This recruitment activity is a “welcoming all-comers” one. Anybody with a ULANC system account is welcome to register with and use Vision. This forms the basis of the extensive usage statistics.

Questionnaire appeals were posted on the Vision system itself. The first questionnaire received 40 responses, the second 27. Each questionnaire invited interested parties to participate in follow-up interviews and other activities in return for a voucher.

2.4.6 - Report on running the additional experiments

Additional TAL experiments carried out between March 2014 and June 2014

Figure 1 - Owneship of Playstation games console

Figure above shows the results of one particular question investigating the ownership of Sony PlayStation games consoles. 27 respondents said they had access to one within the next 30 days. Informal user feedback also suggested that a big screen interface for Vision would be met with a positive response since the current implementation of Vision is not currently compatible with any big screen device! Our survey results suggested that most students had the PlayStation 3 model (the PlayStation 4 still being quite new and highly priced). Through discussions with our BBC partner colleagues we learnt that an open source framework that they had built, TV Application Layer (TAL), was compatible with the PlayStation lineup of devices and would make big screen interface development easier than rolling-our-own solution! The opportunity to develop a big screen interface also gave a fresh outlook on what features users value, and became a good example of consuming existing backend systems for a brand new user interface experience. In parallel, improvements were made to those backend APIs which improved reliability for all API consumers, not just this project.

2.4.6.1 - How Do End Users Benefit?

Users benefit from a custom made, big screen specific, user interface for the Vision service that they already know and use. Tight integration into the existing backend systems allows users to switch between using Vision on their desktop or games console/Smart TV. Development of pause-resume functionality is a big benefit to users; they can now pause content on their laptop and then resume from the exact point on their big screen device (or vice versa).

2.4.6.2 - Why was TAL used?

TV Application Layer, TAL, is an open source abstraction layer for developing big screen user interfaces. It was primarily chosen since it provides a powerful and comprehensive abstraction over the varying games consoles and Smart TV devices. Each manufactured device has it's own quirks and capabilities which TAL abstracts over so that developers can worry less about cross platform compatibility, and instead work on user benefitting features.

However, TAL is no silver bullet. Developers do still experience issues between different devices that TAL doesn't abstract over. For example, differences in supported media codec still require the development team

to re-encode video for different devices. More primitive considerations also need to be considered. For example the method of interacting with the application is limited to the lowest common denominator; the PlayStation console targeted for this Vision big screen project has a sophisticated wireless controller with various buttons that could have been used to improve the user experience. However, since these buttons are specific to the PlayStation, TAL doesn't support them. Instead, limiting the developer to the basic up/down/left/right buttons found on other devices.

TAL was the correct choice for this project, though. Since it escalated development and reduced the time taken before a prototype application could be released. A decision was made that releasing a basic interface sooner was preferable to developing a custom framework and still not have anything to show for the development time. Additionally, the use of TAL facilitated a week long sprint with BBC Future Media and Research and Development teams at MediaCity, Salford, to bootstrap the project and build a basic but working prototype that could be expanded back at Lancaster.

2.4.6.3 - Architecture

The Vision TAL interface is predominantly a single page JavaScript application (SPA) that runs within a full screen web browser on the client device. Web based languages, markup, and technologies such as HTML, JavaScript, CSS, and AJAX were chosen since they provide cross-platform compatibility, are easily updated on the server-side, and are extensible to support the required feature set for this project! TAL applications require a modern full screen web browser to be available on end user devices. Unfortunately the web browser available on the PlayStation 3 device is too old to support TAL applications. It has poor support for modern HTML5 constructs, it's JavaScript processing is buggy, and the user experience of navigating to a big screen application within a browser (with all the browser UI chrome) would be poor.

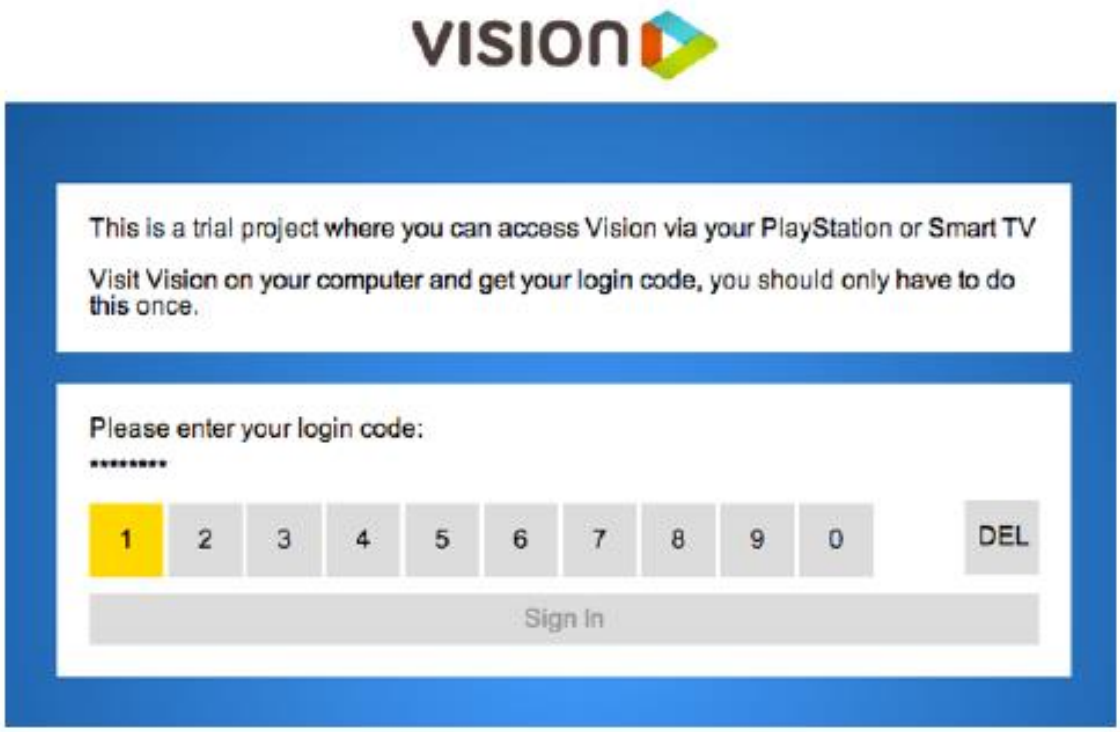


Figure 2 - Vision log-in

Ideally a light browser-wrapper application would be distributed to each television and games console manufacturer to install the prerequisite browser on end user devices. However, that is a long and expensive process that involves establishing contractual relationships with each and every manufacturer. For the

purposes of our small-scale study we decided to benefit from the pre-installed BBC iPlayer app installed on most Smart TVs and games consoles already.

Figure 3 - The Home Screen view

The BBC iPlayer app, upon load, makes a DNS query for www.bbc.co.uk, it was determined that this app would be a suitable and elegant delivery method of the Vision TAL application during the testing period. ABIND9 DNS server was commissioned that acted as a DNS server for any big screen device that wanted to access the Vision TAL application. Users simply change their DNS server IP address and then any requests for the BBC's TAL implementation of iPlayer are transparently redirected to the Vision TAL service. Users can opt out of the trial at any time and no other services on their devices are affected by the DNS server change.! The result of this is a way of deploying and accessing the Vision TAL client on a myriad of devices, from Smart TVs to the Sony PlayStation platform.

Figure 4 - VoD content playback view

The SPA consumes existing JSON APIs to retrieve data. For example, programme recommendations, trending programmes, search engine results, user history data is all retrieved as needed, ensuring the most up-to-date data is displayed to the user.

2.4.6.4 - History (Pause-resume enabled on TAL)

Figure below shows the History view. This is an important component in the offering of pause-resume functionality across the desktop and big screen version of Vision.

Figure 5 - History view showing content a user has recently watched

The History view consumes an existing API to retrieve a chronological list of programmes that the user has recently watched. Along with the typical programme artwork and metadata an additional property is requested: the last known position. This allows the UI to display an additional playback button that will preload the video player at the user's last point in the programme, regardless of the device they were using. This functionality allows a user to pause playback on one device and resume from that very same place on the big screen version of Vision.

Relative dates and times are shown to the user, along with an intelligent description of how far thorough apiece of content the user is. If they are less than 50% of the way though a programme then "x minutes watched" is displayed, otherwise "x minutes remaining" is shown.

2.4.7 - Report on Outcomes

Our hypothesis was that a personalised media experience involves three core elements: planning, customising and socialising. Our results suggest that viewing is more serendipitous and therefore the planning and customising elements of a personalised experience are less important.

Given both the opportunity to pause programmes and resume play later or to simply find programmes from one's history and resume watching these, most users chose the latter. Once users discovered they didn't have to pause in order to resume, they began to use the service in a different way. They were freed from the constraints of their constructed resume play list and could simply look at their history and pick up anything they hadn't finished viewing again.

Our conclusion is that planning and customising of the viewing experience should be deprioritised and that the next research phase should focus more on the social aspects of a personalised media platform.

2.4.8 - Summary of findings and evaluation

Many users experience technical difficulties and constraints when streaming video. These can be down to limitations in their devices (many had old laptops and did not have smart phones) or constraints from internet issues such as cut outs or lack of data allowance.

There are two main reasons users are watching programmes: to fill in time when doing other activities (e.g. eating dinner, socialising) or because they want to dedicate their time to watching (e.g. following a series). The filler programmes tend not to be returned to and are often things they have seen before.

Users will try out new content recommended by friends and will sometimes watch these just to keep up with what others are talking about. Much of the time users leave a programme in the middle due to lack of interest. Another behaviour is skipping through middle of the content to watch the end. They also often look for the main parts of a programme on YouTube.

Before the development of the test application the main mechanism Vision users employed for resuming play later was leaving tabs open and pausing. They were aware that some services offer this feature already and have expectations of the feature from these (e.g. iPlayer, Netflix, YouTube, 4OD and Sky+).

From the analysis of the questionnaire we can be confident most users understand how Resume-Play works (see Figure 10 -> second bar: showing the majority disagree, because they don't know how to pause). We can also be confident users find the Resume-Play feature useful (see Figure 10 -> third bar: below showing that no test users disagreed that the feature helps them manage their time better). However there is still some work to be done on the way the feature is enabled (see Figure 10 -> first bar: showing users aren't always taken back where they expect).

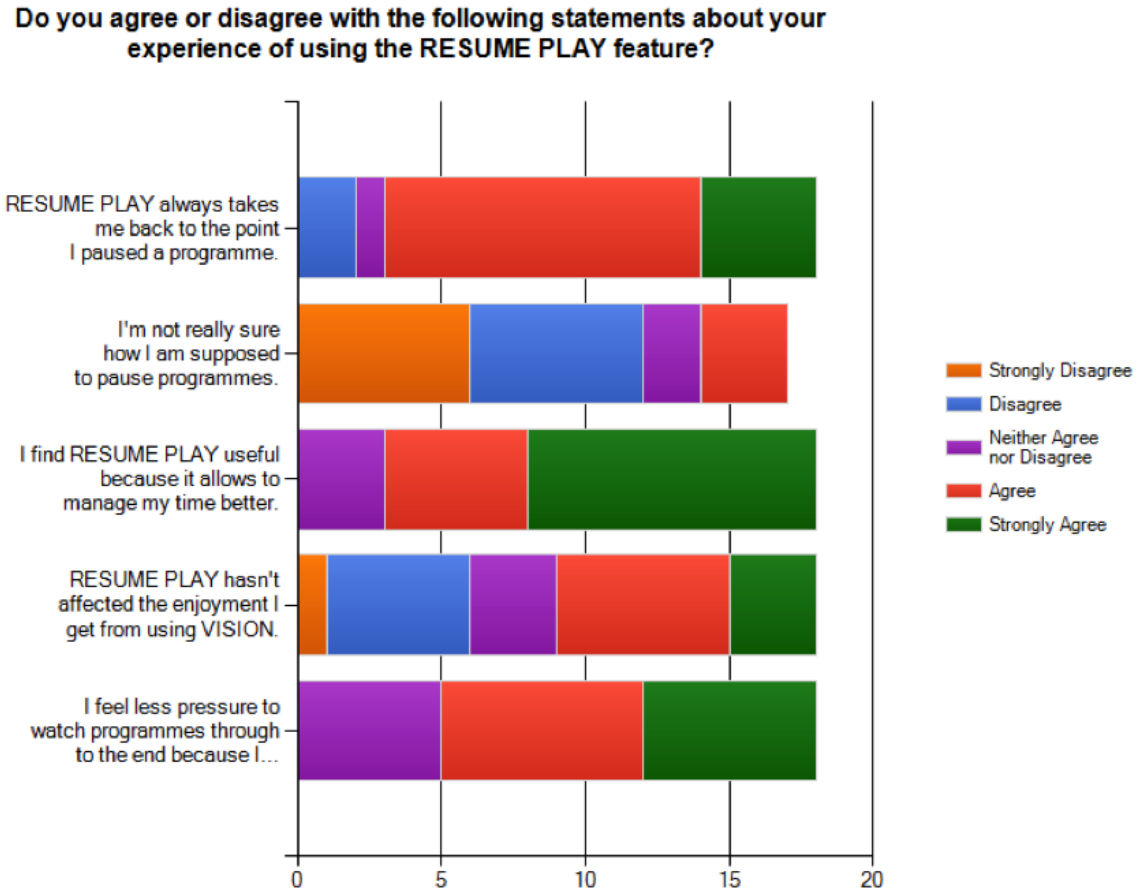


Figure 6 - Agreement or disagreement with statements about the experience

Cross device resume play wasn't perceived to be a particular benefit. Many users prefer to stay on one device (mostly laptop or desktop PC) to watch a programme and if they have the option, prefer not viewing on a mobile due to small screens and the impact on one's data allowance. Only one out of 18 users used this feature (see Figure 7).

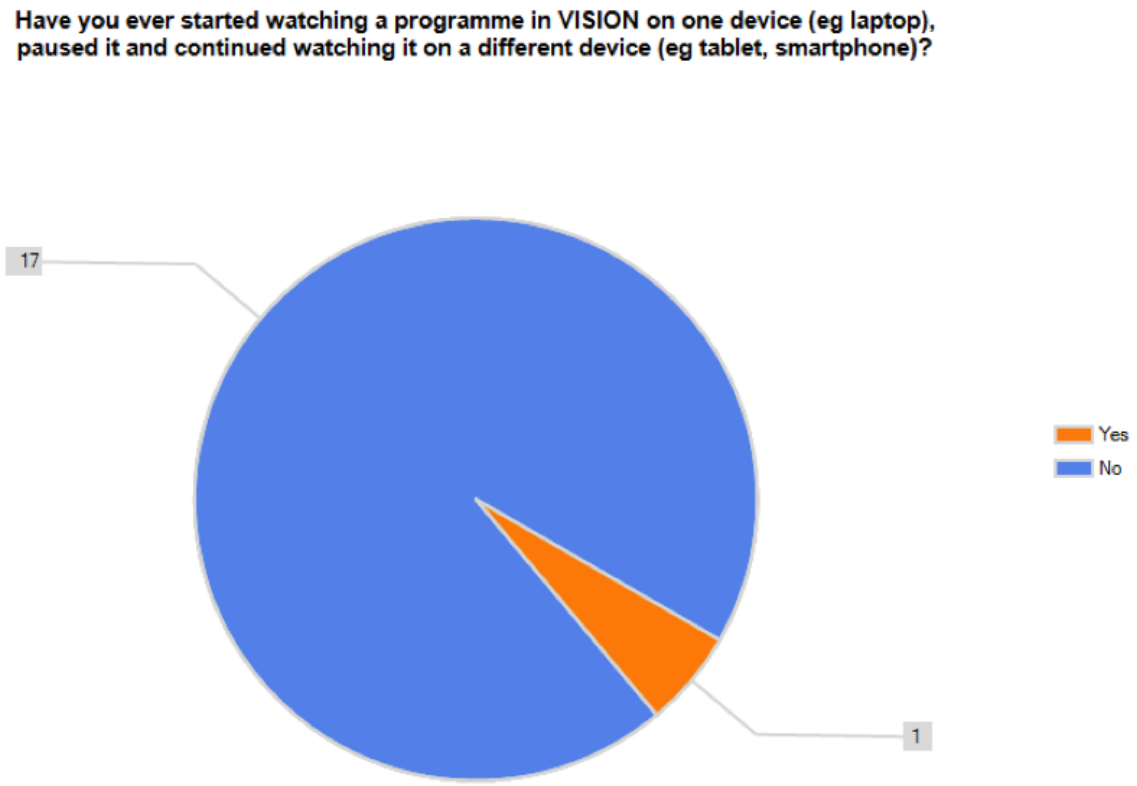


Figure 7 - Use if Resume-Play across devices

The most significant finding was that given the possibility of pausing a programme with Resume-Play most users chose not to use this, instead simply resuming play by finding a programme in their history (see Figure 8). We elaborate on this point in the conclusion below.

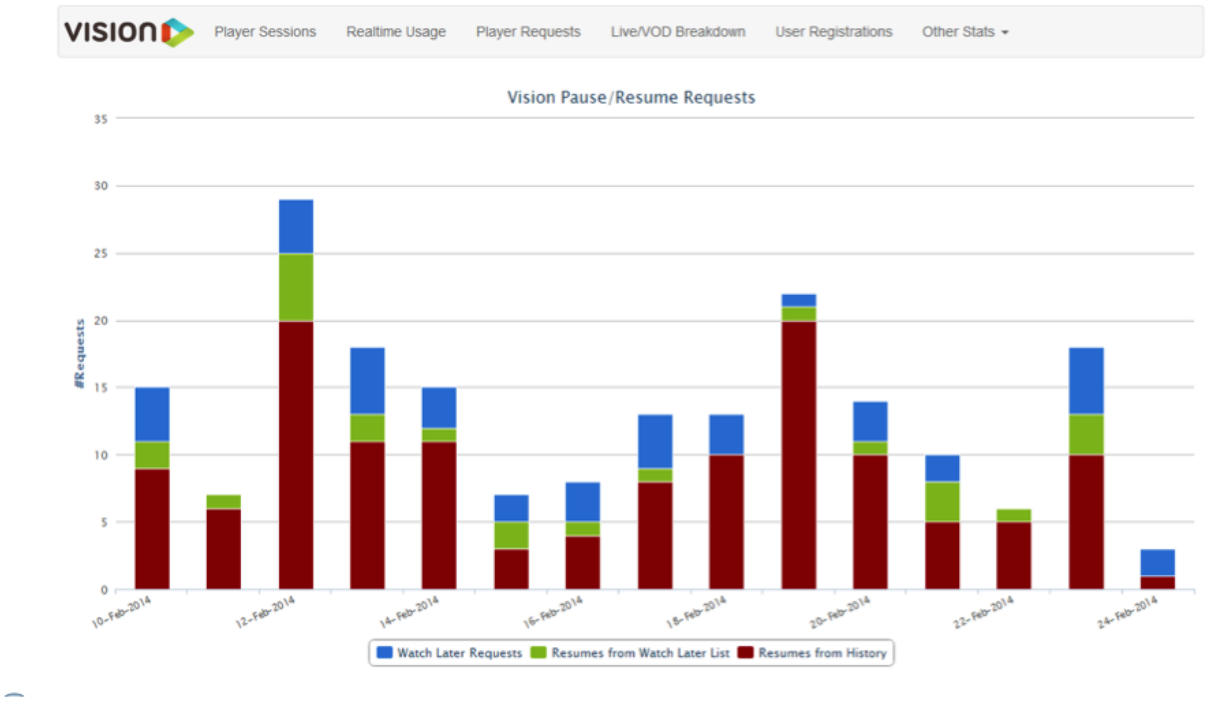


Figure 8 - Ways of using Resume-Play

2.5 - Search & Discovery App - Search and Discovery

2.5.1 - Introduction to the tested application and the experiment

The Brittany experimentation was carried out from 16th December to 10th February in Rennes and Lannion, with 18 panelists

Searching for interesting content to watch is time-consuming on the majority of commercial VoD offers. We experimented with and tested several features to help users discover new content in innovative ways.

Features include:

- An advanced search, with auto-completion
- A discovery function based on similarity. Starting from a movie a user likes, he is able to navigate inside a graph to discover other movies with common aspects, such as same actors, same director, or similar movies proposed by a content-to-content recommendation engine.
- A discovery function based on the similarity with cooking enabling movie selection by indicating multi criteria as genres, people, countries, production years
- A discovery function based on the combination of genres
- A discovery function based on a screenshot

After VoD selection on a tablet, a user is able to watch VoD on connected TV.

All functions are available from the homepage.

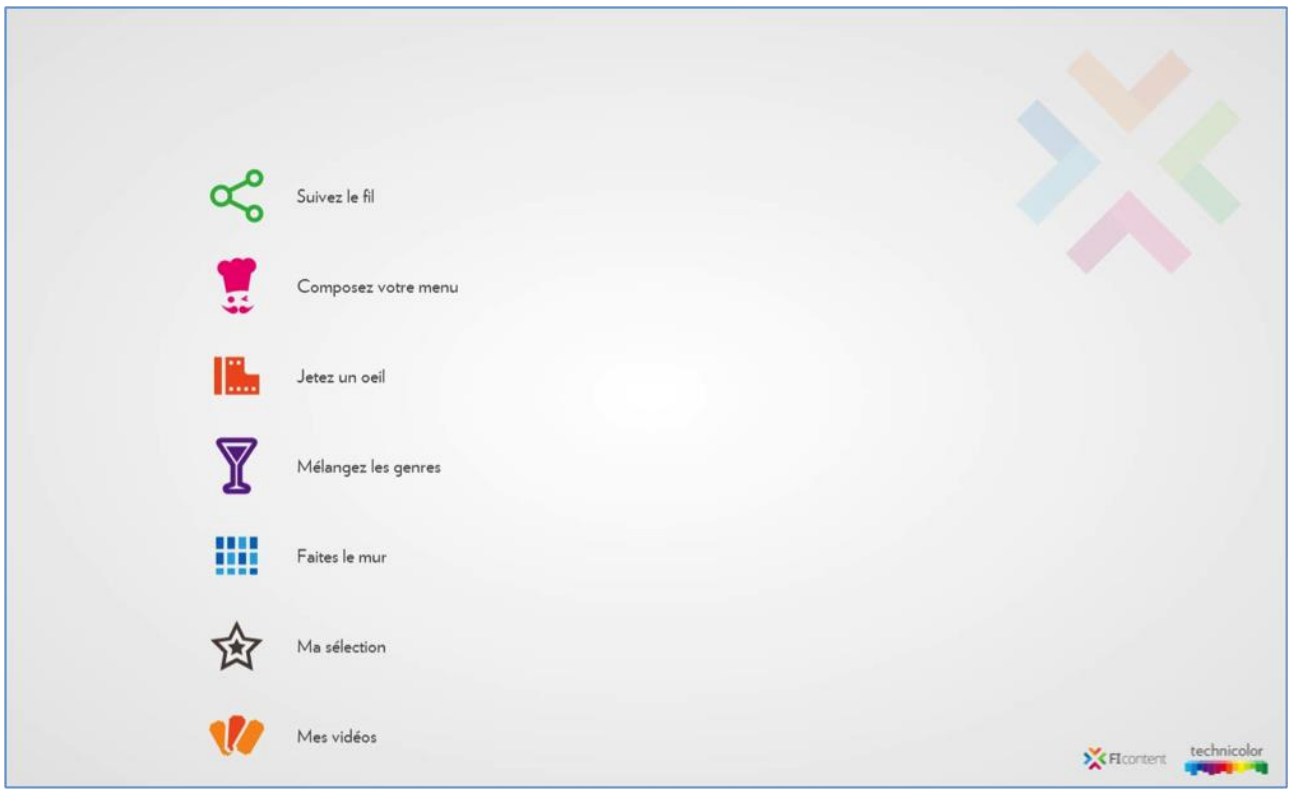


Figure 9 - Graph-based discovery function

The graph-based discovery function shows a user starting from one movie and discovering others.

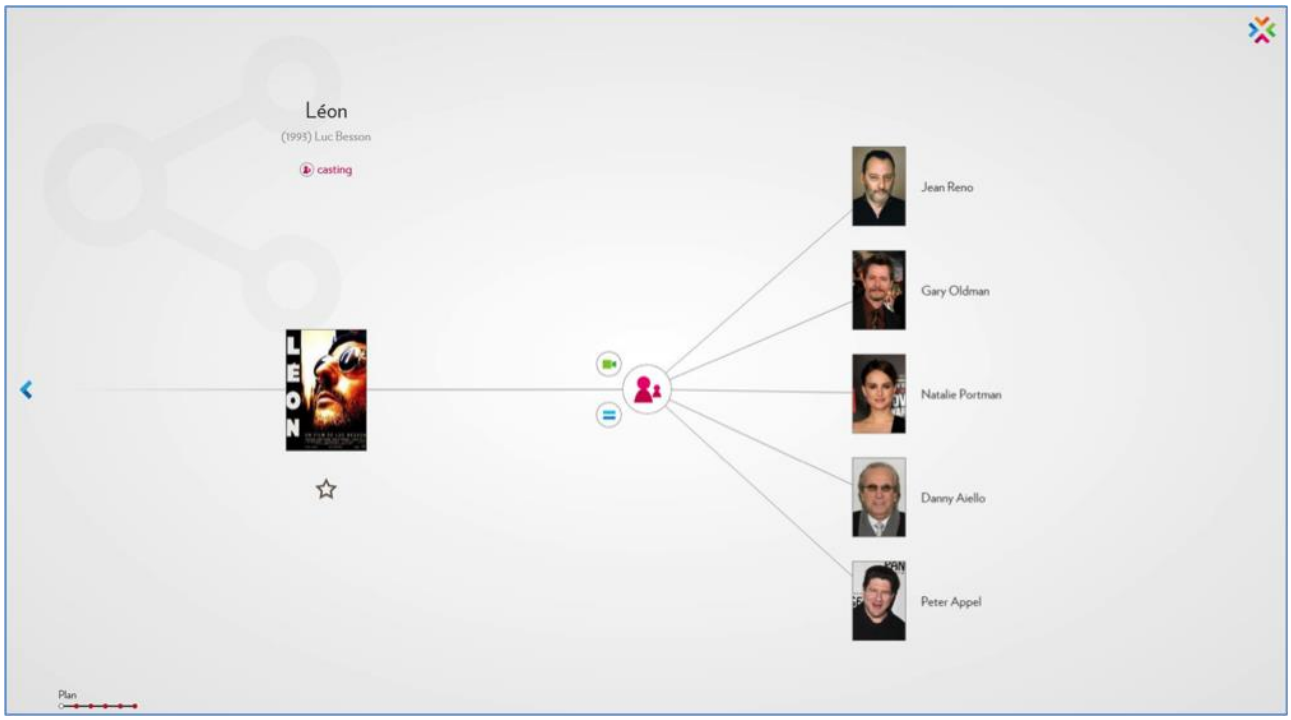


Figure 10 - Graph -based discovery function

The cooking search function (see Figure 3) enables a user to discover movies by indicating ingredients like genre, artist/director name, release date and movie duration.

Figure 11 - Cooking search

The cocktail search function (see Figure 12 and Figure 13) enables a user to discover movies by mixing “genres” of movies.

Figure 12 - Cocktail search: predefined list

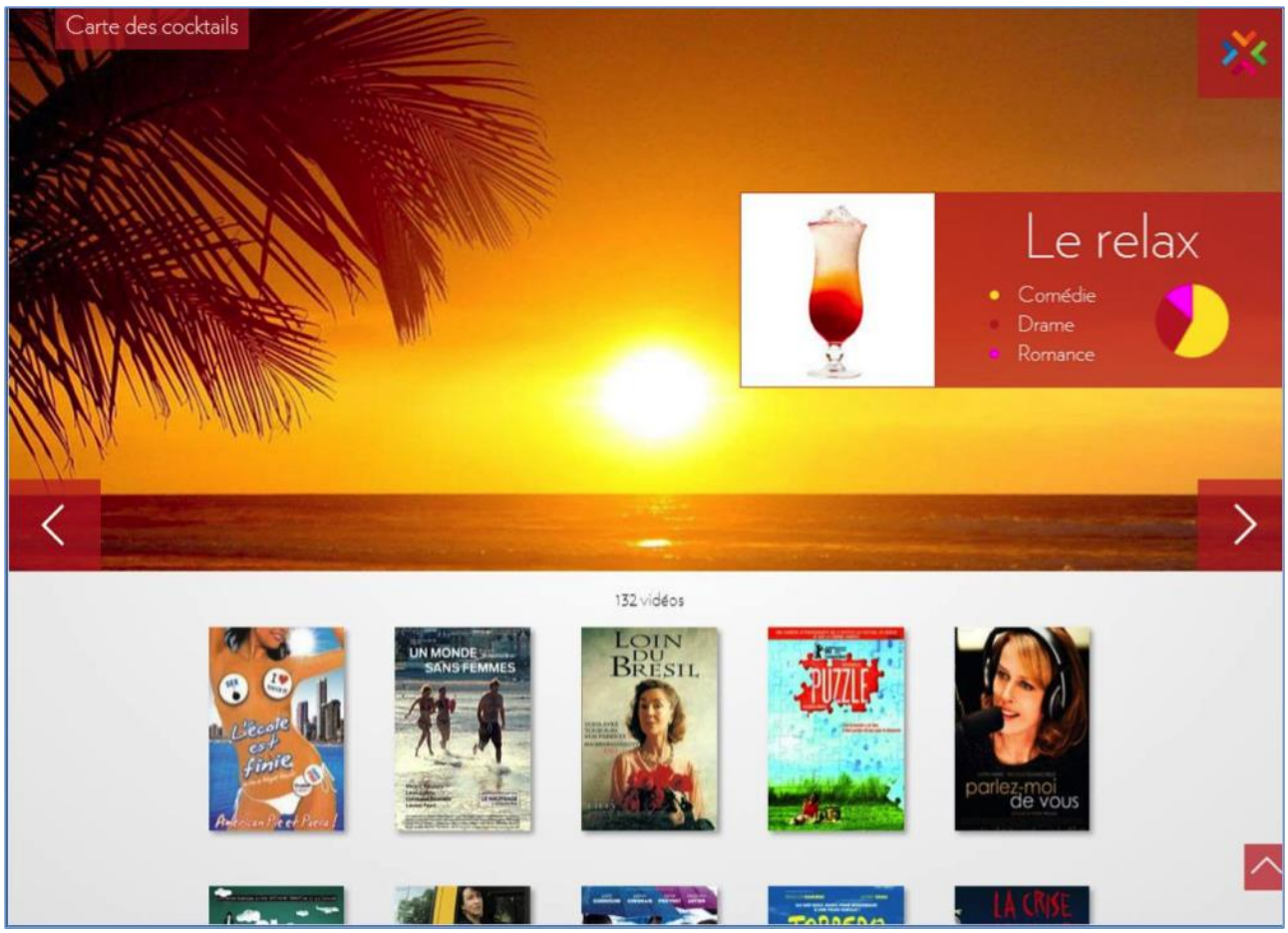


Figure 13 - Cocktail search: detail on 'Le Relax'

2.5.2 - Update on test objectives

The objective was to evaluate and discover which features are the more accepted, and the relevance of each discovery tool regarding the available content. We collected user feedback on the algorithm results and potential expectations from users regarding movie discovery. We also evaluated the mechanism to pair tablet and TV.

2.5.3 - Update on applied methods and tools for evaluation

Two methods were used for the evaluation: usage logs and an evaluation kit. Usage logs are generated by users at the platform level. Each user action is stored and can be used for analysis at a later stage. A specific kit was also been conceived to collect user feedback (see Figure 6) containing:

- 1 thank you card with the description of the artefacts constituting the probe
- 1 calendar + stickers
- 7 postcards « Mes activités » (My activities)
- 1 card « Mes Premières impressions» (My First impressions)
- 20 cards « Journal de bord » for the VoD sessions (logbooks)
- 6 conclusion cards:
- 5 for the applications and 1 for the whole service
- 1 envelope with cards « Mes coups de cœur » and « Mes coups de gueule » (have a “crush on”/ have a rant)
- 1 letter to Santa Claus Goodies

Figure 14 - Contents of kit

2.5.4 - Update on infrastructure requirements

2.5.4.1 - Technical infrastructure

Social connected TV platform was hosted on Technicolor premise. This platform hosted all search and discovery applications, search engine, content similarity Specific Enabler and VOD catalogues. The TV application was hosted on the FI Lab Cloud portal Generic Enabler.

2.5.4.2 - Devices, SIM cards, network

Experimenters mainly used their own devices, tablet and TV, and their own internet access.

2.5.4.3 - Description of content used

VOD catalogues from commercial sites offer Univers Ciné and Imineo, which have been ingested and merged on the TV Platform for the experimentation. There were about 4,500 movies available to the users.

2.5.5 - Update on user recruitment and user involvement

Targeted end users for this experiment were people from Rennes and Lannion areas.They were selected according to the following criteria:

- Adults very fond of new technologies, with a strong use of them and possessing:
- An ADSL subscription with sufficient bandwidth to watch VoD streaming
- A touch pad tablet
- A connected TV set recently acquired (less than 2 years) (Samsung or LG brand)
- With a strong interest in the use of VOD
- Very open to exploring new content

Recruitment was conducted by ImaginLab through its networks of contacts in the local authorities (Rennes Metropole, Lannion Tregor Community) which permitted us to collect 65 candidates. After a selective process, 18 of them were chosen for participating in the experiment.

2.5.6 - Report on running the additional experiments

Thanks to the usage logs we are able to analyse service usage during this period. The following figures are of interest.

Activity on the platform during the experimentation:

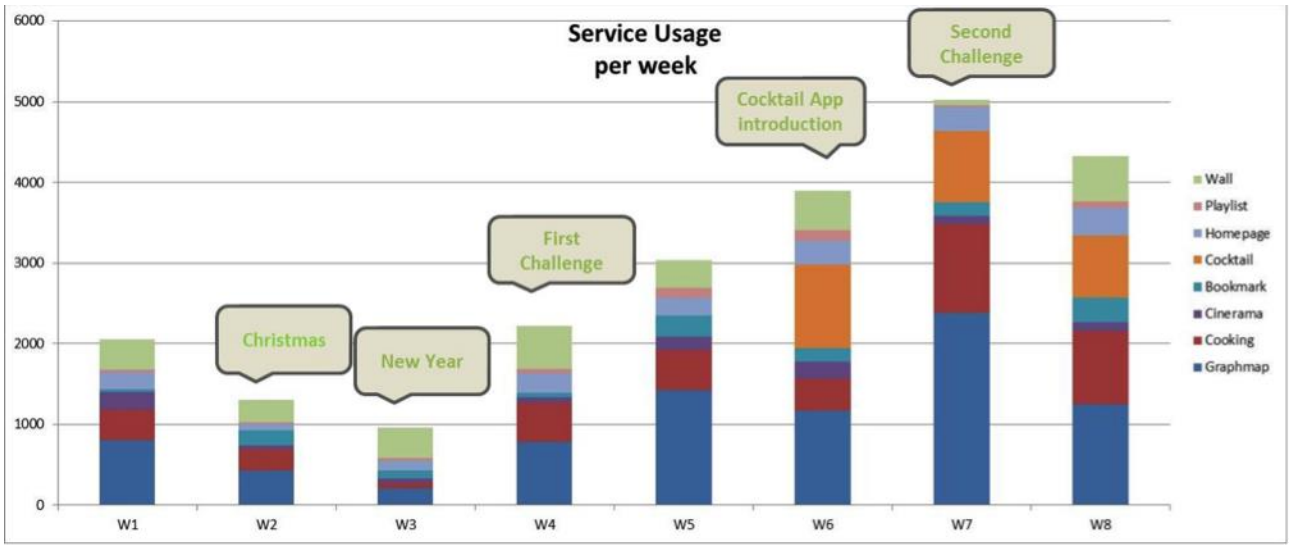


Figure 15 - Activity on the platform during the experimentation

Attractiveness of the different discovery applications:

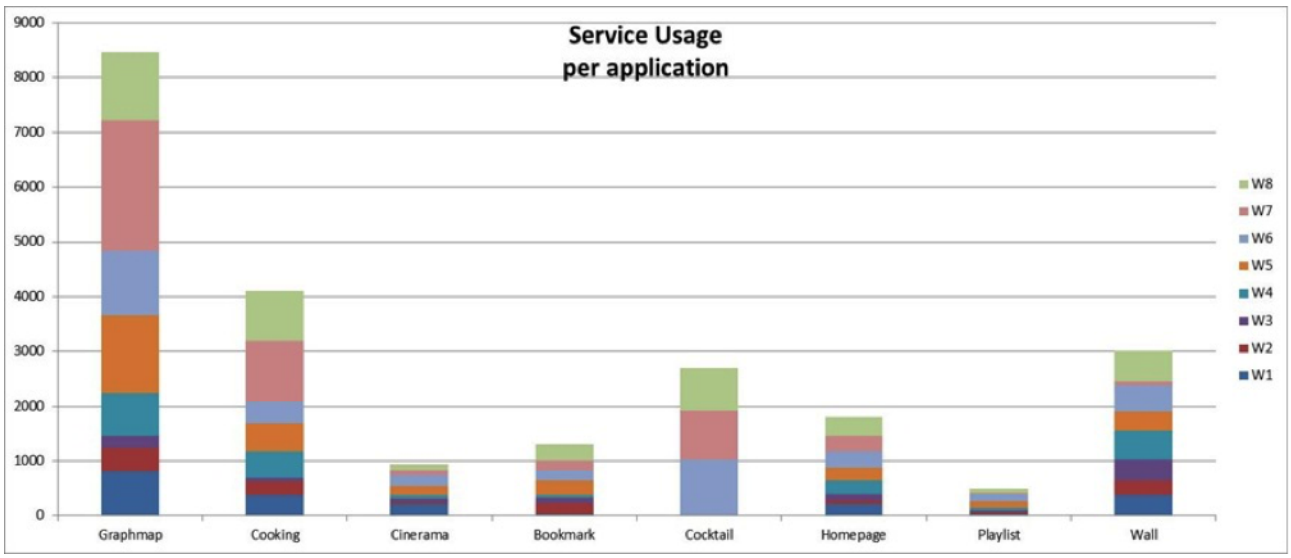


Figure 16 – Attractiveness of the different discovery applications

Origin and number of call to the movie detail, meaning user indicates some interest of the movie proposed by the application:

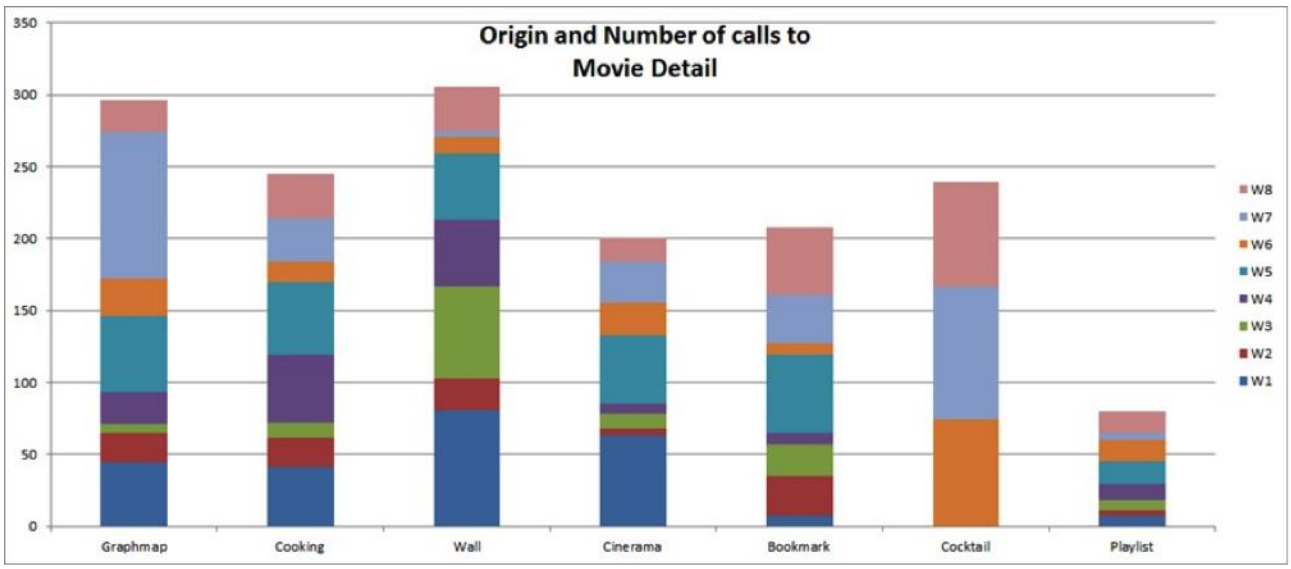


Figure 17 - Origin and number of call to the movie detail

Evaluation kit results are still under analysis. On the 18th of February 10 evaluation kits have already been collected.

2.5.7 - Report on Outcomes

The usage research gave to the whole team useful elements to better understand how the technologies developed into the project could be received and accepted by potential users. The main result shows that 82% of the respondents perceived the whole service as a positive one, which is quite an excellent feedback for the whole team, showing that the proposed applications are attractive, while useful and easy to use. We observed also a consistency of the user's responses in the kits, which have brought to us useful explanations about the proposed features. The preferred applications "Suivez le fil", "Composez votre menu" and "Mélangez les genres" were really appreciated by the people, who imagine with no doubt that such features could be integrated into existing VoD commercial services.

2.5.8 - Summary of findings and evaluation

As explained on the previous section, outcomes were very positive. For the next experimentation it was envisaged to integrate social discovery through group recommendation and integration of the Social Network SE.

3 - SECOND CYCLE EXPERIMENTS

3.1 - Overview on SCTV Scenarios and Experiments in 2nd exp. Cycle

Date	Site	Scenario	Application	Leading Partner
October 2014	Lancaster	Personalised Media	Vision app	ULANC, IAIS
November 2014	Berlin	Rich Content / Multiscreen Experience	Fall of the Wall app (initial tests)	FOKUS, IRT, RBB
January 2015	Lancaster	Personalized Media	Vision app	ULANC
February 2015	Berlin	Rich Content	Content Enrichment demo	FOKUS
February 2015	Berlin	Rich Content / Multiscreen Experience	Fall of the Wall app (follow-up tests)	FOKUS, IRT, RBB
February 2015	Berlin	Rich Content / Multiscreen Experience	Interactive Football Match app and Interactive Car Advertising app	FINCONS

3.1.1 - Fall of the Wall: Initial Tests

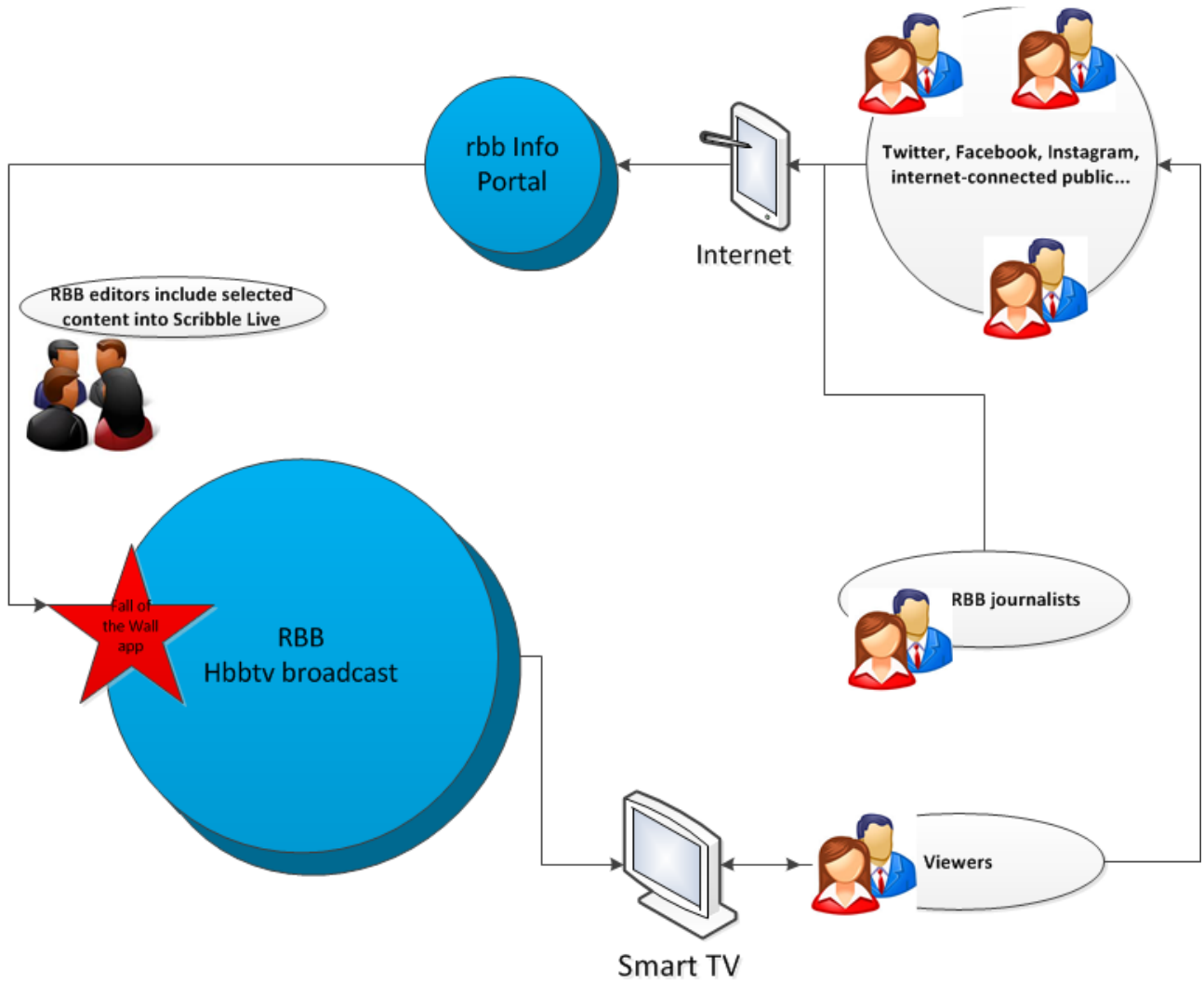


Figure 18 - Fall of the Wall app overview

3.1.1.1 - Description of tested application

Over the weekend of 8-9 November 2014, Rundfunk Berlin-Brandenburg broadcast a 25-hour long programme to mark the 25th anniversary of the fall of the Berlin Wall. Using the HbbTV Application Toolkit (HAT) technology developed within the FIC2 project, the broadcaster incorporated a live social media feed in the programme. HbbTV- Viewers equipped with HbbTV-enabled TV sets could access this additional content via the 'Fall of the Wall' application in order to interact with on-screen messaging and photos. Users were able to contribute content via social networks and/or RBB website, and RBB editors acted as moderators of the resulting blog. This application was signalled on-air on RBB television for four days, between 7th and 10th November 2014 and could be used by any RBB viewers. An on-line questionnaire was published in order to collect viewer responses.

3.1.2 - Objectives and expected outcomes

The test objectives were to gather feedback about the usability, design, effectiveness, performance and uptake of the Fall of the Wall app. Technical feedback about the app's performance on various devices was also expected. Testing was intended to support further enhancement and development of the application and its underlying technology.

3.1.2.1 - Application of user centric methods and evaluation tools

As noted above, an on-line questionnaire was published in order to collect viewer responses. This questionnaire was in operation for four days, between 7th and 10th November 2014. Via the RBB website, users were encouraged to complete the online-questionnaire. Giveaways (DVDs of a recent RBB TV programme 'Die Ostdeutschen') supported and encouraged user involvement. Leading open source web analytics platform Piwik was used to track user involvement and use of services. Methodology developed by the FIC2 project and RBB sub-contractor Youse, as used in earlier deliverables, was employed in detailing and analysing test results.

3.1.3 - Experimentation infrastructure

3.1.3.1 - Technical infrastructure

In order to access additional content in the HbbTV application, users needed an HbbTV-enabled TV set or set top box that was connected to the Internet and they needed to receive RBB television which is available via DVB-T/S/C in Berlin or Brandenburg or DVB-S/C nationwide and beyond. No further equipment was necessary.

3.1.3.2 - Experimenters, targeted end users, criteria and recruitment

Testers were recruited via reference to the app and tests during the TV broadcast, via the HbbTV Red Button service on the TV itself, via announcements made on RBB's website and social media networks. Users also indicated discovery of the app and tests via web searches. Test users were required to have access to the internet.

3.1.3.3 - Devices and SIMs cards, network

In order to contribute content to the Fall of the Wall app, users needed only an internet connected-device. They could use their social media accounts, using the #rbb25h hashtag, or post on the rbb-website.

3.1.4 - Description of content used

Content broadcast in the 25-hour-long programme combined historical footage with live material from locations around Berlin. Content in the app combined user-generated content (photos, comments and social media posts) with occasional editorial commentary.

3.1.4.1 - Logistics and support

Various means of recruitment of test users were employed. The test was advertised prior to the broadcast on the RBB website, was announced during the TV broadcast, was disseminated via RBB social networks and was also announced via the parent ARD network site.

3.1.5 - Planning and running the trial

3.1.5.1 - Report on the running of the trial

The experiment began on Friday November 7th, and ran until Monday November 10. The application and the on-line questionnaire were available for this period.

The technical performance of the application was very satisfactory and it proved to be very stable. During the course of the trial the statistics indicated in excess of 9,000 visits to the application. 46 participants responded to the on-line questionnaire.

3.1.5.2 - Data collection and ethical issues

All users were directed to Data Protection information within the app, where RBB's applicable data protection guidelines were available. Testers could choose either be anonymous or to indicate a name and email address for follow-up actions.

3.1.6 - Empirical findings and evaluation

During the four-day period of 07–10 November 2014, there were over 9000 visits to the HbbTV-App, as indicated by Piwik statistics. Due to the international nature of the event, users came from as far as South Korea and Hong Kong, and made 270 posts incorporating text and photos. Over the period of the broadcast, users made a total of 524 posts to the 'LiveBlog', which was incorporated into the Fall of the Wall app and viewable via HbbTV. The majority of posts were made during the final closing day of the celebration, and were made on average every three minutes. A significant peak in users occurred when the application was promoted by the TV presented during the on-air broadcast.

User-generated content was equally split between text and photos, with less than 1% of viewers uploading video.70% of users who viewed the blog elected chose to view it full-screen. In terms of attractiveness, the majority of users evaluated the app as very attractive. Most users evaluated the content presented by the app as 'very good'. Identified as of greatest importance by users were both background information/news about the current event and additional material accompanying the broadcast; photos were seen as more important than videos, and the user voting functionality was evaluated as unimportant.

Aspects of navigation were criticised and suggestions for improvement were made. Long load times for new posts were criticised. Users generally showed a low level of interest in the presentation of data protection information and the related functionality. 98% of viewers used their HbbTVs to access the app, the most popular manufacturer being Samsung.

Information regarding the app's performance on various devices, browsers, operating systems and versions was collected and analysed for future iterations of the app and the underlying technologies.

Selected user profile description from on-line questionnaire:

The majority of users were aged between 30 - 49. RBB's traditional audience is comprised of an older age group (50-64); users of the app were somewhat younger that the average viewer. An insignificant amount of data regarding social media habits of responders was collected; a minority described themselves as regular users of social media. A majority of users rated content presented by the app as 'very good'. The majority of users discovered the app via TV announcements; a slighter smaller number proportion discovered it via the RBB website.

3.1.7 - Outcomes

Analysis of the user statics provided factual information on how the application was used. The figures show that there was a high number (9000+) of users and that they spent time (an average of 1.5 minutes) using the application.

The results of the on-line questionnaire provided feedback about preferences regarding navigation (on-screen scrolling vs. scrolling with remote control), content (preferred types of content), performance (perceived slow loading of new posts) and appearance/intuitiveness of use. Users' criticism and feedback regarding these areas will be taken into consideration for future developments of the app and the underlying technology.

3.2 - Vision - Personalized Media

This section reports both the social annotation (commencing October 2014) and content enrichment (commencing January 2015) experiment due to their dependency. The IAIS application is integrated in ULANC Vision system as an extended feature of its social annotation module.

3.2.1 - Scenario description

3.2.1.1 - *Description of tested application*

Direct communication between users is believed to be a key feature for social TV environment. Vision enables a multi-timeline social annotation feature allowing users to give comments (up to128 characters per comment) when a programme is broadcast live. Chat messages are visible to all users who watch the same programme whilst users can like, unlike, and report any message. This creates a social space for people in different physical locations to communicate as if they are together. Even for users who tend to be passive in giving comments, the messages running along the video playback window resemble a social atmosphere as a type of "ambient noise" which vibrates the isolated TV viewing experience by individual.

Figure 19 - Social annotation user interface

Vision's social annotation feature is also unique in the way that all chat messages are captured with accurate time-codes which allows all messages to be replayed when a TV programme is played as on-demand content at a later point. By doing so, Vision not only captures the live TV content but also the live experience of the corresponding content, independent of the actual age of the content. To keep the live atmosphere more realistic, we also allow chat messages to be given during on-demand playback allowing the social atmosphere to further develop beyond the time span of live events. Furthermore, the social annotation feature is accompanied by a heat-map, which labels messages associated with the content in a timeline. The heat-map assists Vision users to efficiently navigate between "hot" social moments of on-demand content.

The IAIS Semantically Enriched Social Annotation was integrated on top of the social annotation feature in Vision. It inherited most of the user interaction functions and the statistics gathering functionalities. The system annotations are coded differently compared with user annotations in order to help users easily recognize inputs from different sources and respond accordingly.

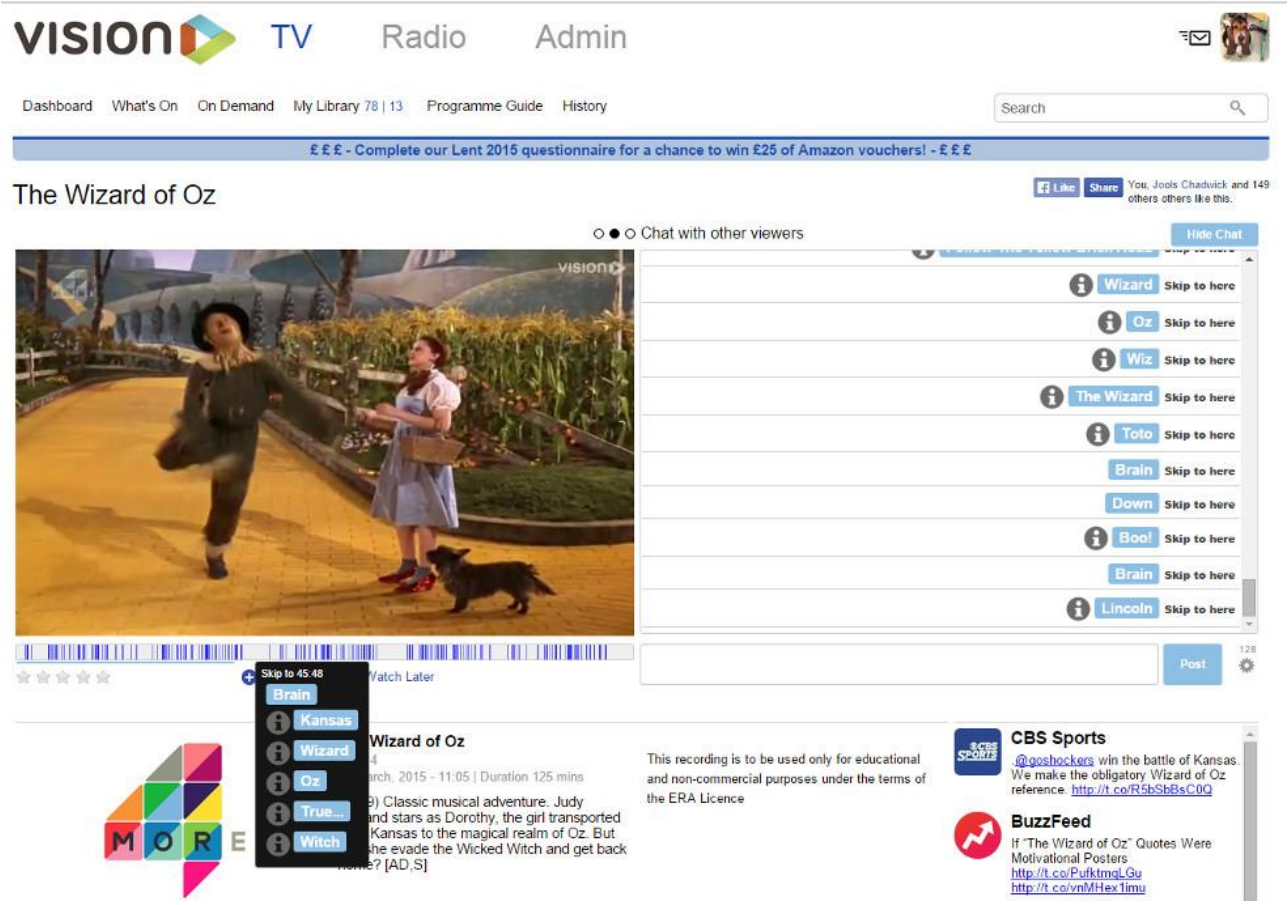


Figure 20 - Content enrichment

3.2.1.2 - Test Objectives and expected outcomes

- Enriching media with semantic links extracted from the content. Enrichment of both the content metadata for better search, and the user experience around the content such as product links, further information links, etc.
- Testing of social annotation application VideoCloud. Tests to be defined by BT. Public hosting of user generated videos that can be enriched and commented on within the video. Exemplary model of cooperation with/support of Phase 3 participants

3.2.2 - Experimentation Infrastructure

3.2.2.1 - Technical Infrastructure

We exploit the recorded TV programmes and content services offered by the Vision Social IPTV platform at Lancaster. Additional features such as subtitle extraction and annotation processing/time-stamping/ingest modules have been specifically developed by ULANC and deployed in the IPTV platform to support the experiments. In order to host third-party remote development and testing under the framework of FIC2, we also enabled a self-contained testing environment allowing FIC2 partners to easily deploy and pilot new designs using a wide spectrum of social IPTV APIs. Although the feature has only been implemented on the Vision system, the research is applicable to other systems.

3.2.2.2 - Experimenters, targeted end users, criteria and recruitment

Recruitment of users of Vision is an on-going task – we currently have nearly 2000 registrations although, of course, not all registered users are regular users. This recruitment activity is a “welcoming all-comers” one.

Anybody with a ULANC system account is welcome to register with and use Vision. This forms the basis of the extensive usage statistics.

Figure 21 - User recruitment through Vision message board

Questionnaire appeals were posted on the Vision system itself. Each questionnaire invited interested parties to participate in follow-up interviews and other activities in return for a voucher.

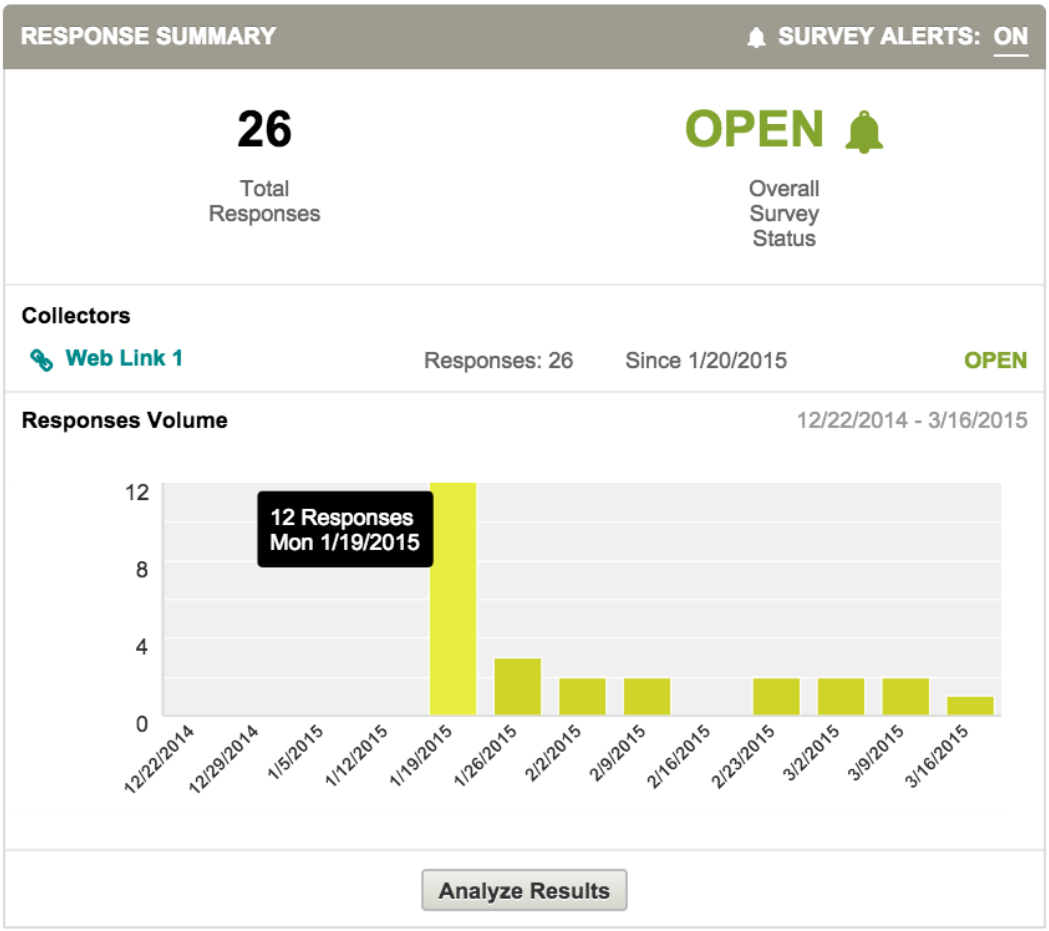


Figure 22 - User response from the questionnaire

3.2.2.3 - Devices and SIMs cards, network

Users can log in to the IPTV system on desktop, laptop, smartphone or tablet and view their TV and radio history including any programmes part-watched and flagged for resume viewing, regardless of which device they last watched on. They can then resume play from the point at which they stopped viewing or from any other point. Suitable metadata is made available to the user about programmes displayed in this way so they can quickly identify what to watch or listen to. The user is able to delete items from their history.

3.2.2.4 - Description of Data integrated

Vision's statistics platform is a high-availability service designed to collect, process and analyse log data relating to both user actions and content playback. Page load statistics are logged which allows for user journeys to be analysed, highlighting popular features or pages and how the user accessed them. Content playback requests are an integral component of the pause-resume functionality. Content request events are logged, as well as heartbeats every few seconds. These heartbeats log how far through a piece of content a user is and support resuming to a previously watched point. Various APIs are exposed which allow the statistics data to be mined for useful information. For example the History page is supplied with content playback data to provide a chronological list of programmes watched.

All statistics are time-stamped, associated with the user that initiated them and are stored within 2 redundant database servers. A message queue architecture was also adopted which allows the statistics infrastructure to withstand peaks of very high logs per second.

3.2.3 - Trial and Outcomes

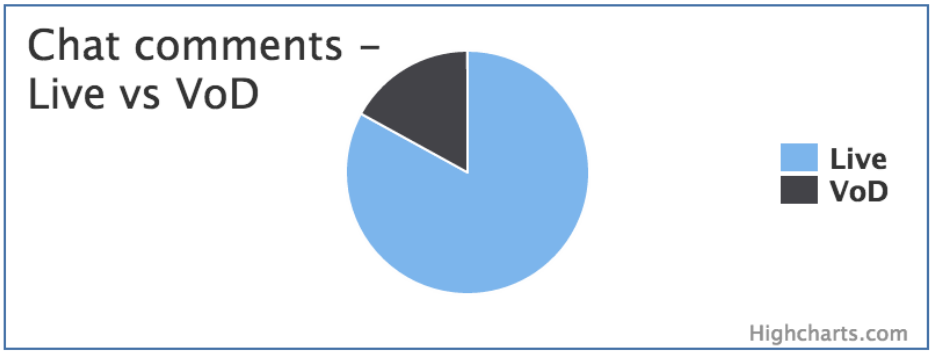
3.2.3.1 - Outcomes

The hypothesis of the experiment is that crowd-sourced social annotation and content enrichment based on contextual data would greatly improve the social experience and user engagement of conventional TV viewing activities. Compared with traditional social applications like Twitter and Facebook, the social annotation enables more interactive and engaging social narratives, which requires a good degree of synchronicity to the corresponding TV content. The feature does not only benefit live content but also enables a new level of immersiveness for the on-demand content.

From the experiment, we discovered that social annotation has been well received by the user community at Lancaster, though we observed more social interactions on the types of content that would have been socially popular in the first place. Most annotated TV programmes such as the *Eurovision Song Contest* and the *Great British Bake Off* are also popular in social media. This suggests that the social annotation feature could improve the social experience of the socially popular content rather than transforming the a piece of content from unpopular to popular.

View data for the last:

1 Year



Programme	Genre	Air Date	Comments	Details
Eurovision Song Contest 2014	Entertainment	10 May, 20:00	151	Show
The Great British Bake Off	Undefined	20 Aug, 20:00	136	Show
Mega Piranha	Undefined	20 May, 22:50	89	Show
Countdown	Undefined	02 Apr, 14:40	57	Show
FIFA World Cup 2014 Live:...	Undefined	20 Jun, 19:30	17	Show

Figure 23 - Social annotation feature tested by Vision user base on various TV programmes

We also noticed that the social annotations are often led by a number of enthusiastic users. Although we offer a very easy to use UX design that anyone can quickly pick up for annotation, a content would always need a number of drivers to cold-start the social interactions. A conversation usually starts between merely two or three users, followed by more viewers joining the group by taking certain side of the discussion. We also noticed that heated arguments between a small number of viewers may have the negative impact that discourages more users to take part in the social interaction.

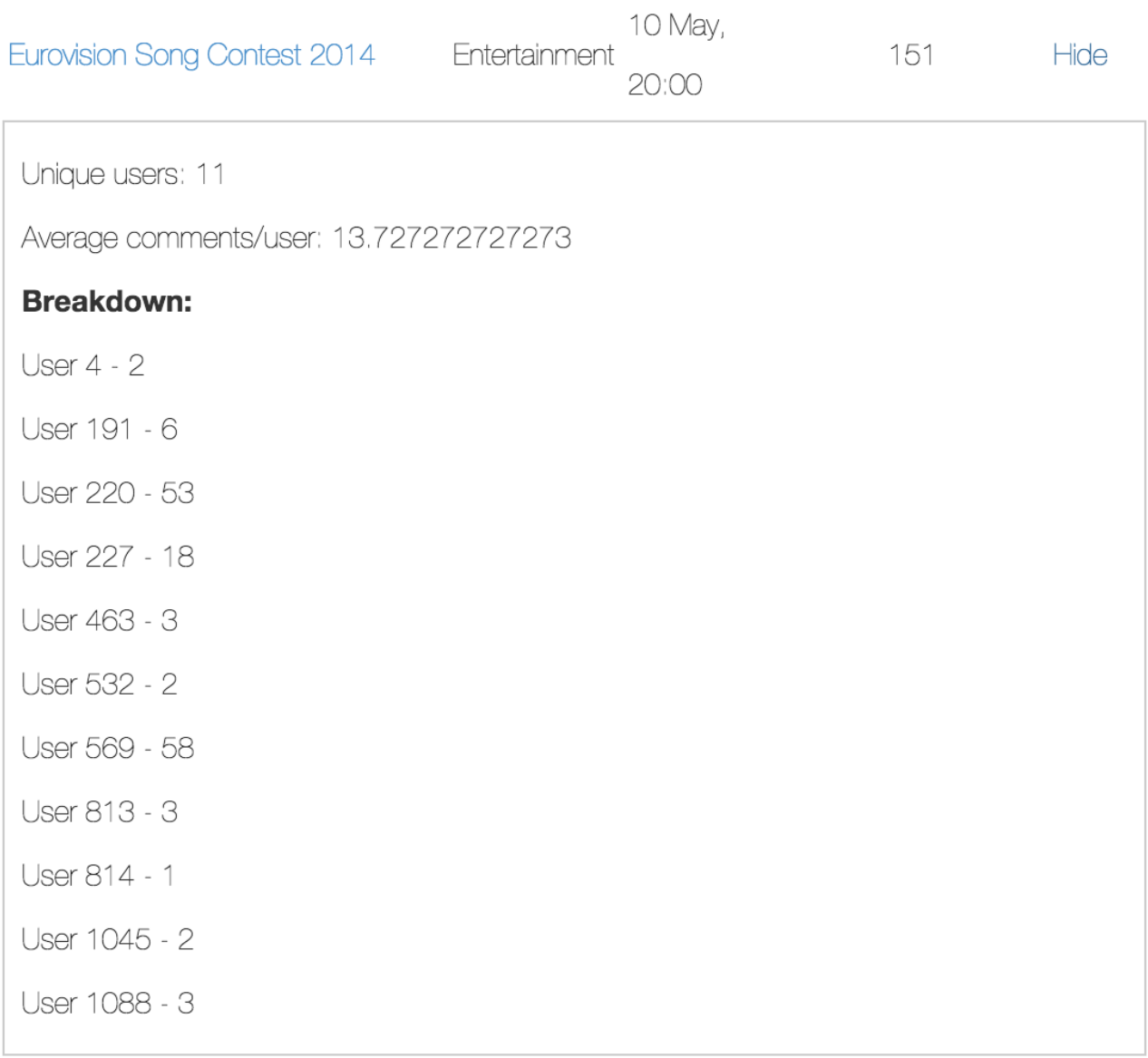


Figure 24 - Breakdown view of User activity report

Within a TV programme, some sections of the content attract more annotations than other sections. The heatmap perfectly illustrates such observation. It is worth investigating how such time-coded social heatmap can be exploited for improved content discovery, recommendation, and advertisement in future work.

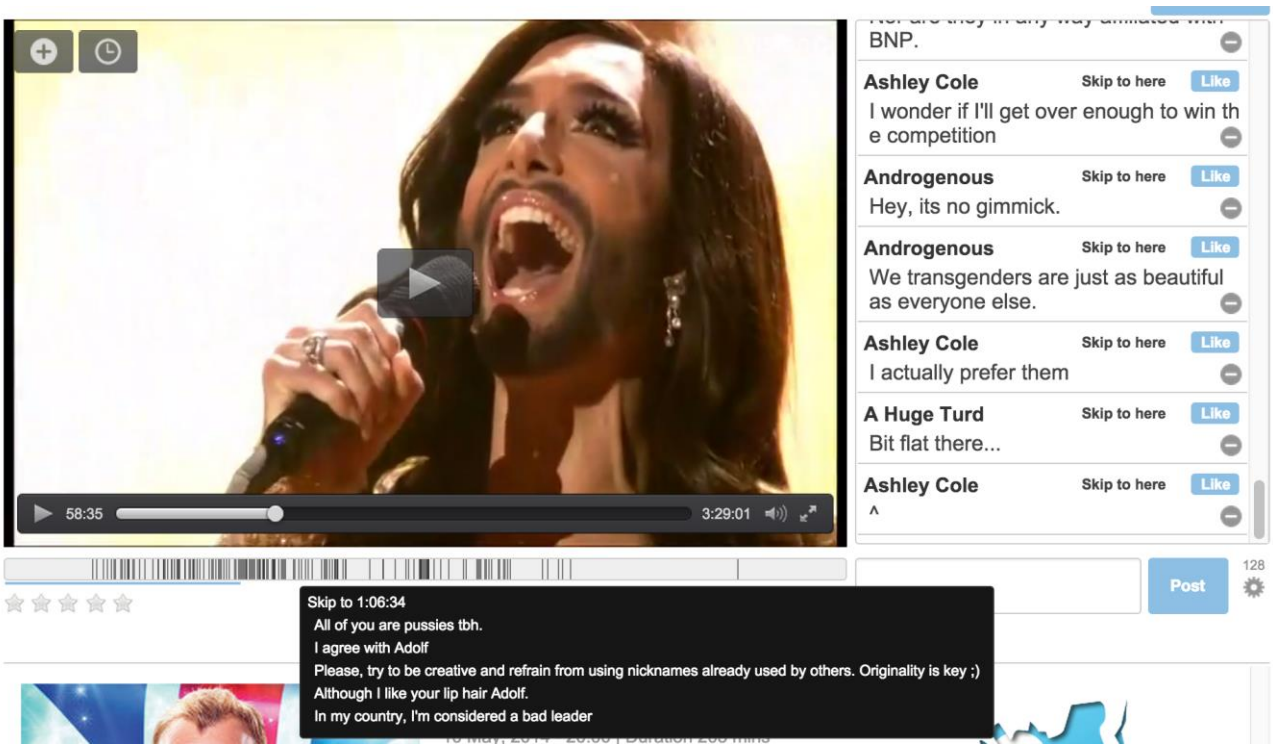


Figure 25 - User activity pattern in social annotation feature

Overall, social annotation can greatly enrich the viewing experience of TV content, especially when the annotation feature is tightly integrated with the content service itself (rather than offered as a parallel service like Twitter). The performance of the feature seems to be determined by the type of viewers and the characteristics of the content. We also believe that the crowd-sourced data gathered from such social feature, with the help of social analysis and machine learning techniques, could show great values in the longer term.

comment_id	programme_id	user_id	secs_from_start THIS IS IN TENTHS OF A SEC	keyphrase	uri	types	created_at
1	28965b2b2fc5e2d114e7f357b360cfacc7935127	1320	588	Behaviour Therapy	http://dbpedia.org/resource/Behaviour_therapy		2015-03-11 14:19:41
2	28965b2b2fc5e2d114e7f357b360cfacc7935127	1320	1320	Dog	http://dbpedia.org/resource/Dog	DBpedia:Species DBpedia:Eukaryote DBpedia:Animal D...	2015-03-11 14:19:41
3	28965b2b2fc5e2d114e7f357b360cfacc7935127	1320	1419	Mother's Day	http://dbpedia.org/resource/Mother's_Day	DBpedia:Holiday	2015-03-11 14:19:41
4	28965b2b2fc5e2d114e7f357b360cfacc7935127	1320	2290	Red Bee Media	http://dbpedia.org/resource/Red_Bee_Media	DBpedia:Agent Schema:Organization DBpedia:Organisa...	2015-03-11 14:19:41
5	28965b2b2fc5e2d114e7f357b360cfacc7935127	1320	3427	Magic	http://dbpedia.org/resource/Magic_(paranormal)		2015-03-11 14:19:41
6	28965b2b2fc5e2d114e7f357b360cfacc7935127	1320	3456	Mozzarella	http://dbpedia.org/resource/Mozzarella		2015-03-11 14:19:41
7	28965b2b2fc5e2d114e7f357b360cfacc7935127	1320	3486	Rhubarb	http://dbpedia.org/resource/Rhubarb	DBpedia:Species DBpedia:Eukaryote DBpedia:Plant	2015-03-11 14:19:41
8	28965b2b2fc5e2d114e7f357b360cfacc7935127	1320	3629	Squid	http://dbpedia.org/resource/Squid		2015-03-11 14:19:41
9	28965b2b2fc5e2d114e7f357b360cfacc7935127	1320	3871	Chickpeas	http://dbpedia.org/resource/Chickpea	DBpedia:Species DBpedia:Eukaryote DBpedia:Plant	2015-03-11 14:19:41
10	28965b2b2fc5e2d114e7f357b360cfacc7935127	1320	3872	Almonds	http://dbpedia.org/resource/Almond	DBpedia:Species DBpedia:Eukaryote DBpedia:Plant	2015-03-11 14:19:41
11	28965b2b2fc5e2d114e7f357b360cfacc7935127	1320	4343	Squid	http://dbpedia.org/resource/Squid		2015-03-11 14:19:41
12	28965b2b2fc5e2d114e7f357b360cfacc7935127	1320	4538	Olive Oil	http://dbpedia.org/resource/Olive_oil		2015-03-11 14:19:41
13	28965b2b2fc5e2d114e7f357b360cfacc7935127	1320	4821	Chickpeas	http://dbpedia.org/resource/Chickpea	DBpedia:Species DBpedia:Eukaryote DBpedia:Plant	2015-03-11 14:19:41
14	28965b2b2fc5e2d114e7f357b360cfacc7935127	1320	4844	Fat	http://dbpedia.org/resource/Vegetable_oil		2015-03-11 14:19:41
15	28965b2b2fc5e2d114e7f357b360cfacc7935127	1320	4845	Clove	http://dbpedia.org/resource/Clove	DBpedia:Species DBpedia:Eukaryote DBpedia:Plant	2015-03-11 14:19:41
16	28965b2b2fc5e2d114e7f357b360cfacc7935127	1320	5039	Lemon	http://dbpedia.org/resource/Lemon	DBpedia:Species DBpedia:Eukaryote DBpedia:Plant	2015-03-11 14:19:41
17	28965b2b2fc5e2d114e7f357b360cfacc7935127	1320	5173	Olive Oil	http://dbpedia.org/resource/Olive_oil		2015-03-11 14:19:41
18	28965b2b2fc5e2d114e7f357b360cfacc7935127	1320	5292	Cumin	http://dbpedia.org/resource/Cumin	DBpedia:Species DBpedia:Eukaryote DBpedia:Plant	2015-03-11 14:19:41
19	28965b2b2fc5e2d114e7f357b360cfacc7935127	1320	5421	Hummus	http://dbpedia.org/resource/Hummus	DBpedia:Food	2015-03-11 14:19:41

Figure 26 - Automated content enrichment (Database view of IAIS annotation data)

The Semantically Enriched Social Annotation from IAIS is believed to be a great complement to the user annotation, especially when the type of content does not encourage user-to-user interaction.

3.3 - Fall of the Wall: Follow-up Tests

3.3.1 - Description of tested application

Following the on-air trials of the Fall of the Wall application in November 2014, an additional usability trial of the application was conducted on 19/20 February 2015. Following the feedback on usability issues reported by users in the first trial, a second version of the application with a modified navigation theme was offered during this test.

Figure 27 - Fall of the Wall follow-up testing

3.3.2 - Objectives and expected outcomes

The objective of this test was to reveal usability problems and to comparatively test an updated version of the navigation theme against the one implemented in the on-air trials.

3.3.2.1 - Application of user centric methods and evaluation tools

Use cases were defined. User observation and think-aloud methods were used to gather quick, honest feedback on the usability of the app and on the users' expectations. Following the use cases, the testers were asked a number of questions to be answered on a 1-6 scale followed by some open questions and the short version (10 items) of the standardised AttrakDiff questionnaire.

To be able to compare the two different navigation themes, this test procedure was repeated with the respective other version of the application. The version to be tested first was changed for every alternate tester.

3.3.3 - Experimentation infrastructure

3.3.3.1 - Technical infrastructure

All technical equipment was provided by RBB. Tests were conducted on a TV connected to an HbbTV DVB satellite receiver (Inverto Volksbox). Devices were connected to the Internet using the RBB infrastructure.

3.3.3.2 - Experimenters, targeted end users, criteria and recruitment

Users were recruited via RBB's existing tester database. An incentive of €20 per head was paid.

3.3.3.3 - Devices and SIMs cards, network

All devices and network connection were provided by RBB using RBB infrastructure.

3.3.3.4 - Description of content used

To simulate the situation of the live broadcast a 30 minutes video stream of the live broadcast from November 9th 2014 was used. In addition, to feed the social media stream, a new blog, populated with users' and editors' posts from the original blog, was set up and integrated.

3.3.3.5 - Logistics and support

The usability tests took place on 19/02/2015 and 20/02/2015 in the offices of RBB in August-Bebel-Str. 68, Potsdam, Germany.

Every tester received an introduction to the tests procedure and the equipment and applications to be used. Application-specific questions by testers were answered by the interviewer where applicable. Eight testers (two dropped out at the last minute) were accompanied by two RBB personnel, one of whom carried out the moderation of the tests while the other took minutes.

Tests were conducted sequentially and lasted for one hour per tester.

3.3.4 - Planning and running the trial

3.3.4.1 - Report on the running of the trial

After the on-air trials, a second navigation theme was developed for the Fall of the Wall application, which only uses the arrow keys for navigation.

3.3.4.2 - Data collection and ethical issues

Data was collected anonymously, and no ethical issues were involved. Testers were informed of the purpose and use to which data collected would be put.

3.3.4.3 - Empirical findings and evaluation

The general outcome of the usability trials indicated that most users were able to intuitively use the applications without further introduction or help. Both navigation themes were judged 'fairly good' with most users (6/8) favouring the navigation theme 1, which navigates using the arrow-up/down buttons. Only 2 users favoured theme 2, using only the arrow keys on the remote control for navigation. However, from the numerical evaluation of the questionnaire, both applications were received in a similar manner, with only a slight preference towards version 1.

With an average of 4.5 (on a scale 1-6), users' perception of their instant understanding of the usability of version 1 of the application was described as 'quite good' and slightly better than results for version 2 (4.0). In combination with the perceived achievement of objectives of 5.0 (v. 1) and 4.38 (v. 2) this leads to the conclusion that usability was acceptable for both versions but version 1 was slightly favoured.

3.3.5 - Outcomes

The outcomes indicate that generally the application was quite easy to understand but that still it is a challenge to build navigation themes that are intuitively understood by every user and that fulfil all requirements of the application. In this case the main challenges in developing a navigation theme for TV usage are: to using only arrow keys and ok-button on the remote control for main navigation, displaying all information of the web blog on a TV screen without disturbing the live broadcasts too much while still displaying all other information e.g. texts big enough to be read in a normal TV viewing distance. Users'

criticism and feedback regarding these areas will be taken into consideration for future developments of the app and the underlying technology.

3.4 - Interactive Football Match Application and Interactive Car Advertising Application

3.4.1 - Description of tested application

The applications, implemented by Fincons and developed within FI-CONTENT project, provide to the end user a multi-interactive experience based on Second Screen and Content Enrichment Frameworks. The applications is compliant with Content Enrichment on HbbTV. Objects in the video are "enriched" with further information which was displayed on the second screen when they will be available. The user can visualize the content extending it. The Content Enrichment on HbbTV app uses the Content Enrichment SE.

The Interactive Football Match Application allows users watch a sport event on TV, such as a Football Match, to use their second-screen devices to socialise with their friends, by sharing enriched content (such as screen captures from the match, with their comments) with other connected users, either on their second-screen or their social networks.

The Application also allows retrieval of additional contents about the match directly on the users' devices (i.e. players' profiles, statistics, etc...).

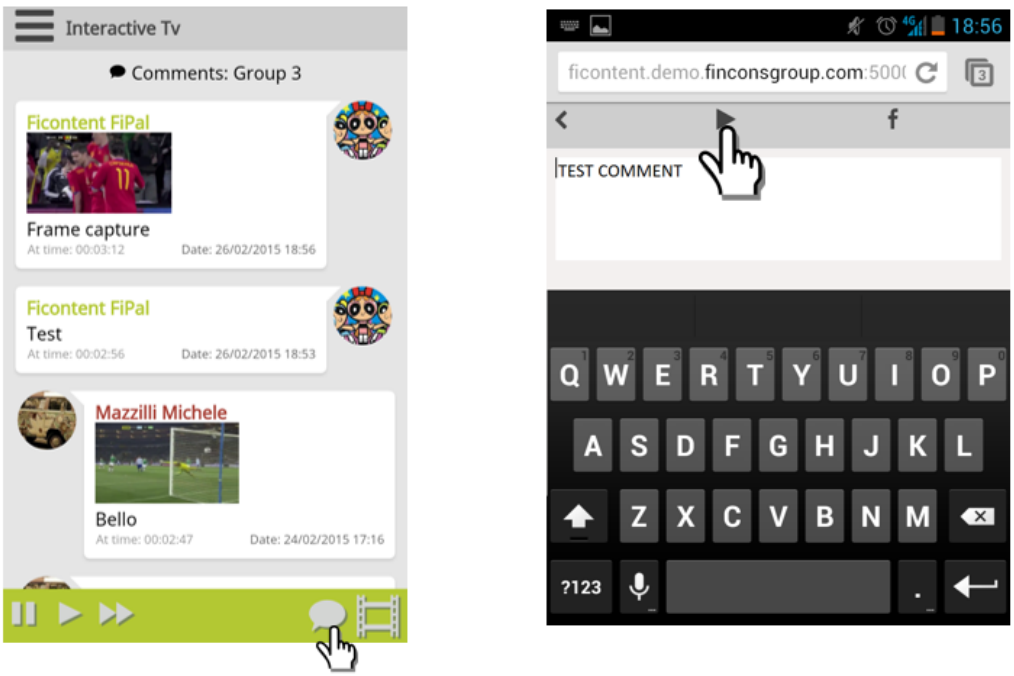


Figure 28 - Interaction interface

Figure 29 - TV display interface

The applications supported the interactive advertising scenario, in both devices there is a banner that notify to the user that was present an advertising enrich content. In this way the user can visualize the extended advertising content and share it with the Social Network.

Figure 30 - Second screen interaction via social media

3.4.2 - Test objectives and expected outcomes

The goal was the testing of the functionality of the two applications, running simultaneously on the two devices (Smart TV and Mobile Device). The objective of the trial was to evaluate the integration with the frameworks (Second Screen and Content Enrichment) by running tests under realistic circumstances. Real users were be able to test the two applications at home under real conditions. The expected outcome of the trials was feedback regarding the general usability of the app and the presentation of interactive elements on the TV screen and on the Second Device that can be used in future applications in the commercial area. We also have collected the results on the technical performance of the Application that run on the second device and on Smart TV HbbTV compliant.

The tests were designed to be 'friendly' user tests to be conducted under realistic circumstances. During the in housing test we have identified some usability issues that were been resolved and we have improved and developed some additional services, in this way it was possible to deliver a complete solution for the official testing phase in Berlin. The objective of the test was to validate the applications based on standard HbbTV devices.

We have evaluated the technical performance of the app on a range of HbbTV-enabled devices from various manufacturers (software: IOS, Android. Different screen size). We have improved the user experience in terms of interacting with objects on the TV screen using a remote control as interaction device, based on the collected feedbacks from the internal testers. The expected outcome of the trails was a positive feedback regarding the general usability of the app and the presentation of interactive elements on the TV screen. We

also received a good results on the technical performance of the Content Enrichment and Second Screen frameworks on HbbTV devices.

A further objective was to gather feedback on the user experience in terms of interacting with objects on the TV screen, using a remote control as an interaction device, and on the second device, using the tapping.

3.4.3 - Applied methods and tools for evaluation

User observation and think aloud methods were used to gather quick, honest feedback on the usability of the app and the users' expectations. The purpose of the trial was to gather feedback to inform further development work on the application. In fact new enhancements were been introduced in the final version of the applications.

The tests were been defined in order to verify and check the application for a period of two/three days and it was requested to the testers to complete a questionnaire after each test in order to evaluate the application and verify that the functional requirements, described in the deliverables, are been correctly achieved.

Tests are designed in order to provide to the tester a complete overview of the main implemented functionalities. Testers were been involved in a questionnaire at the end of the testing period in order to evaluate the applications; the collected results were analysed in order to define the improvements for the next implementations.

3.4.4 - Experimentation infrastructure

3.4.4.1 - Technical infrastructure (> D7.1.2)

The tests were conducted in the Fincons Hybrid TV Lab. All testers were provided with an HbbTV-enabled TV or Set Top Box and a tablet. Various combinations of devices were tested:

- Panasonic Viera Smart TV TX-42AS650E
- USB-2 VHF/UHF Modulator – DekTek DTU-215

Supported SmartphoneApple

- iphone 6 1334x750 pixel 4,7"
- iphone 6 plus 1920x1080 pixel 5,5"
- Iphone 5 1136x640 4"
- Iphone 4 960x640 pixel 3,5"

Android

- Samsung S5 1080x1920 5.1"
- Samsung S5 mini 720 x 1280 pixels 4,5"
- Samsung S4 1920 x 1080 pixel 5"
- Samsung S3 1280 x 720 pixels 4.8"
- Samsung S3 Mini 480 X 800 pixels 4"
- Lg G3 2560 x 1440 5.5"
- HTC one S 960 x 540 4.3"

Supported Tablet

- iPad Air 2048×1536 9,7"
- iPad mini 1024x768 7,9"
- Samsung Galaxy Tab 10.1v 1280 x 800 pixels 10.1"
- Samsung Galaxy Tab 71024 x 600 7"

Use of IRT 2nd screen framework

3.4.4.2 - Experimenters, targeted end users, criteria and recruitment

The targeted end users of the app are TV viewers. For the trials, we recruited five colleagues from Fincons – Vimercate office and three internal experts, that are been involved in the project, to test the application. Selection criteria included a minimum familiarity with Second Screen devices.

A technically-aware testers were selected, aged between 25 and 64, with experience of internet use, who owned a smart phone and who were familiar with tablet use. Testers have used a set of Facebook accounts (with tester role) in order to evaluate the Social Sharing feature, this was a technical constraint, in order to use a public Facebook account and visualize the posts, associated to FiContent Project, the applications need to be evaluated and approved by Facebook team.

Because the trial was internal to FiContent project in order to test the applications Fincons team has provided a set of 10 tester FB accounts that are enabled to access to the application through an external network.

3.4.4.3 - Devices and SIMs cards, network

The TV sets were connected to the internet via the Fincons WiFi and / or wired ethernet connection, as well as equipped with DVB input signal generated by DTU-215 Modulator. The second screen devices were connected to the internet via the Wi-Fi.

3.4.4.4 - Description of content used

The Fincons HbbTV application is signalled via the RBB DVB-T channel and is independent of the broadcast content. Contents for the test were produced especially for the test and is related to the football match scenario, the video content, used for the test, is copyright free. For test purposes we used a video of Champions League scenes (used only for demonstrative scope and for this reason) and enriched this with content from Wikipedia.

3.4.4.5 - Logistics and support

The internal tests were conducted between 23 February and 6 March 2015 in the pre-test environment, that was built in Fincons, and the official test will be execute in the Berlin at the end of April 2015.Every tester received an introduction to the tests procedure and the equipment and applications to be used. For technical issues Fincons staff was present in order to support in case of technical issues. Tests were been conducted sequentially and covered 30 minutes for each one.

3.4.5 - Planning and running the trial

General points:

- All testers have used the second screen functionality using a mobile device
- Most testers felt relaxed during use of the application and were satisfied.
- Most testers were generally impressed with the application.
- The majority of testers achieved their goals in using the application.
- The majority of testers found use of the application intuitive.
- No technical issue of the devices

3.4.5.1 - Empirical findings and evaluation

The following paragraph give an overview of the main results of the survey and the focus group conducted during the internal experimentation phase. The results of the survey are divided into three blocks:

- summary of the findings associated to the used framework solutions
- usability and user experience
- technical issues which occurred during the field trial

The evaluation report made the following observations associated to the used SE (a summary included here with more detailed appendices available as part of D7.3.2 after the Berlin Experimentation Site):

3.4.5.1.1 - Summary of the findings SE

In the following table a list of the issues, identified during the test phase, is reported. In particular the results were analysed according to the used Frameworks (Second Screen and Content Enrichment).

Application	Use Case	Issues identified	Proposed Solution/s	Outcome
Interactive Football Match Application	Scenario 1 Video selection from Catalogue and Device Connection	Option to start connection process needs to be more evident	• Highlight the lateral menu in order to suggest the step sequence that the user needs to executed in order to launch the app • Increase the font in the navigation panel on left corner in the Smart TV	Will be considered in future releases of applications using the framework
Interactive Football Match Application	Scenario 1 Video selection from Catalogue and Device Connection	In the connection process after the QC recognition the connection is not established between the device and the Smart TV. For this reason it is necessary retry the connection step	• Improve the second screen main functionality • Introduce an acknowledge notification system in order to manage the connection process between the device. Connection Status Management	Technical issue will be addressed in next release of the Second Screen Framework
Interactive Football Match Application	Scenario 1 Video selection from Catalogue and Device Connection	In the tagging tool it is necessary to increase the video dimension that can be upload (ie. Video HD)	• Solve technical issue	Technical issue will be addressed in next release of the Content Enrichment Framework
Interactive Football Match Application	Scenario 3 Augmented Content Visualization Remote Player Control	Erase and rewind of video on TV is not always recognised as it was started from the second device	• Improve on-screen communications; give option where the video should be played	Will be considered in the next release of the application

Figure 31 - Issues raised during testing

3.4.5.1.2 - Usability and user experience results

During the entire field trial usability problems were collected and analysed. Functionalities/aspects described as ‘very good and excellent’:

- General design
- Video Catalogue and group selection
- Chat functionality
- Well-designed Smart TV functionality
- Comment focus
- FB connection and post
- Easy connection between the device
- Consult event and group information

- Navigation on the comment chat on the second device

Features which users requested:

- faster connection process between tablet and TV
- faster capture frame
- improvement of the enlightening for the enriched contents
- possibility to change the group

Although several smaller usability problems occurred during the field trial the participants rated the user experience (which means the overall evaluation of usage) of both applications as very good. The intuitive usage of second screen and the smart TV functionality was predominantly rated as positive, which indicates a logical and intuitive operability. Especially the clarity and the logical operability were rated as distinctive characteristics of Smart TV.

The operability of Second Device was experienced as being rather effortless, memorable and intuitive. For this reason the user experience of both applications was assessed as being above average to very good (90%).

The user experience can also be located higher than the benchmark of other comparable web applications (native associated to the Smart TV). Only little optimization would be needed to serve an excellent user experience (for details please consider the paragraph: Outcomes and conclusion).

Moreover the test showed a good response from the testers that will suggest the applications if there will be available on the market. The main results are reported in the following dashboards

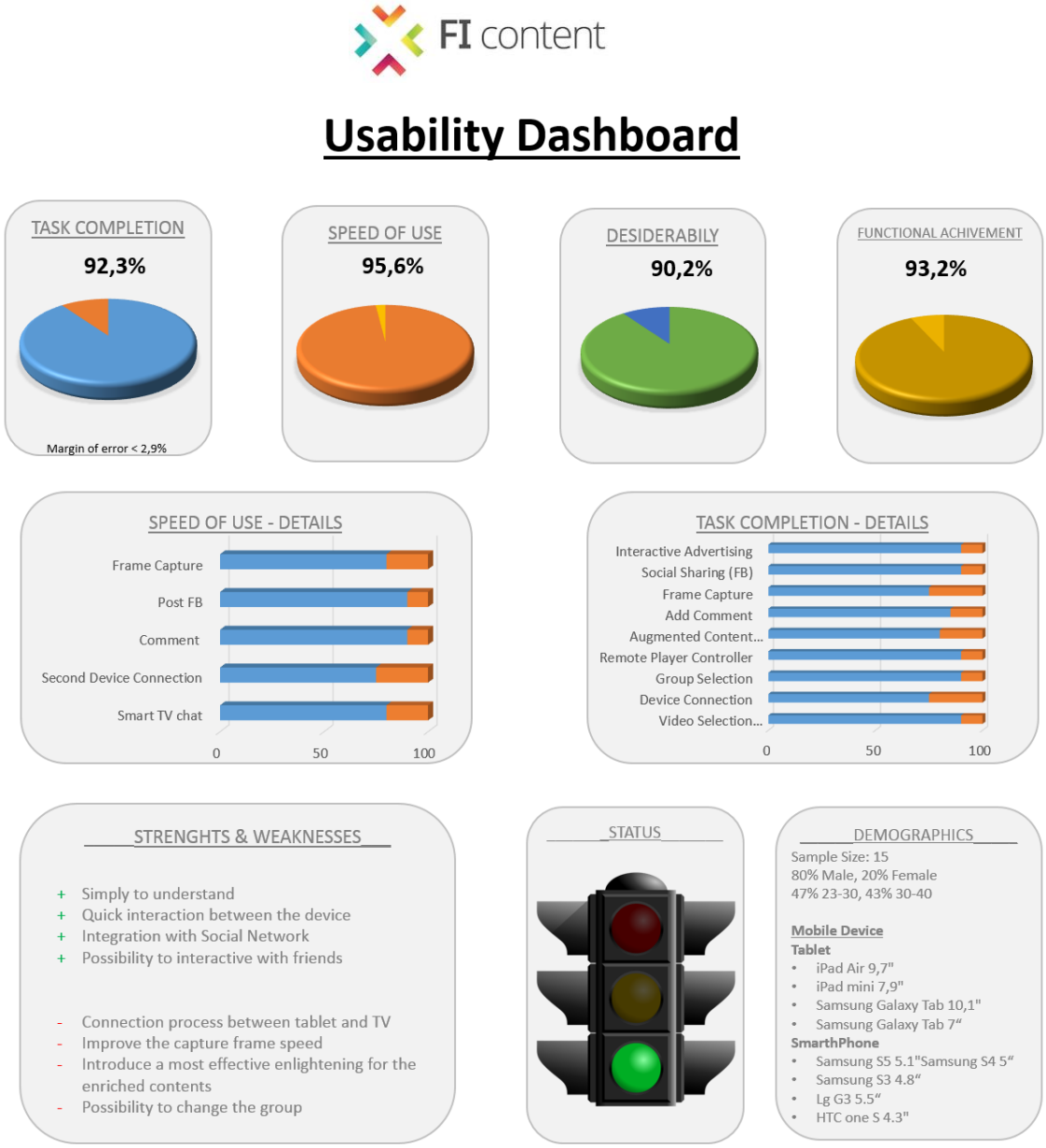


Figure 32 - Dashboard results

3.4.5.1.3 - Design Results

The Smart TV design was rated very positive, in particular the interaction between the smart TV and remote controller was evaluated with an high percentage (89%), it is simple to connect the two devices thanks to the Functionality menu that suggests the actions in order to launch the applications.

The chat and the possibility to focus a selected comment and return to the time instance in which the comment was generated was really appreciated (94%). A good rating was achieved for the simplicity of understanding, the best-designed layout and facility to access to the main functionalities (85%). The two solutions were considered for 90% attractive, professional and versatile; they represents a good solution of integration between different technologies (Smart TV and Smartphone/tablet).

The UI of the Second Screen application was rated positively (88%), it is simple to manage the comment section and visualize the list of comments. The testers have appreciated with a good rating (90%) the group selection and the user information on the right side of the application and chat feature. A good value was obtained for the colour choice (94%). The comment creation and the capture frame form have retrieved a good evaluation (83%), the same result was obtain for the comment share and post on the FB wall. The

enriched contents (advertising or extra data associated to the event) have achieved a good response about the UI and the data representation. The tester results for the design feature is represented in the following graph:

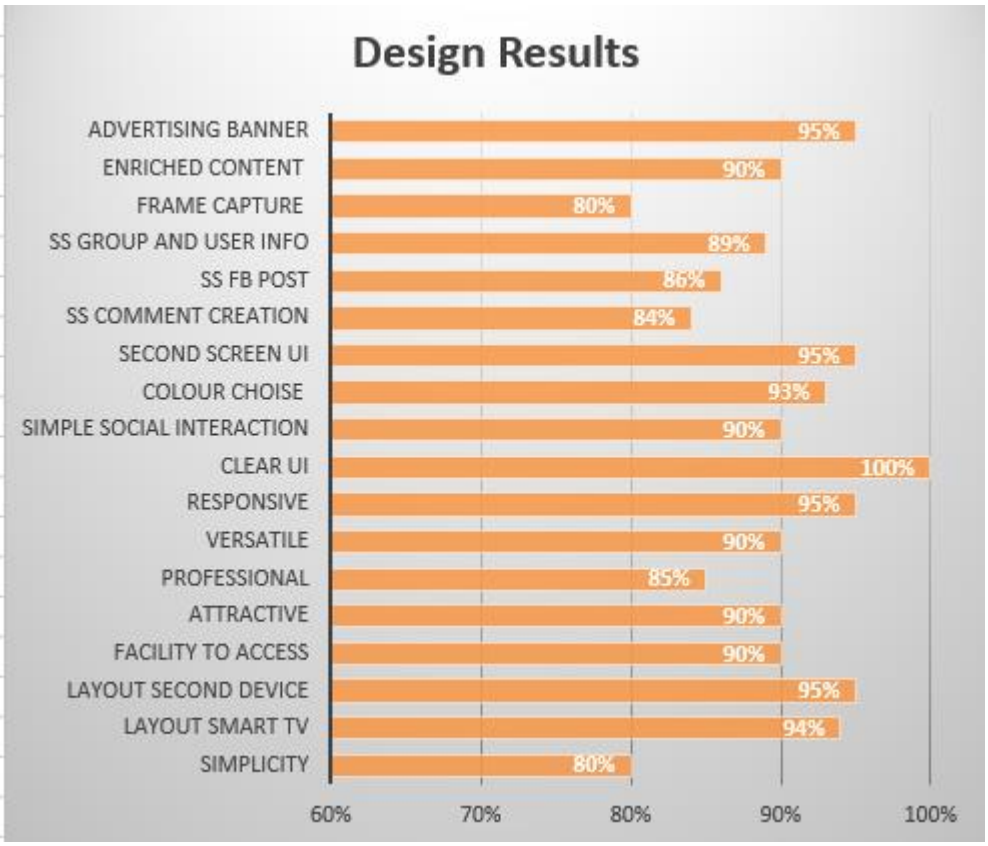


Figure 33 - Design results

3.4.6 - Technical issues which occurred during the field trial

The following list summarizes all technical problems mentioned by test persons during the field trial:

- Disruption of connection between tablet and TV (minimum bandwidth required)
- The Second Screen is not able to notify to second device or to the Smart TV that the connection is successfully executed. It is not present an acknowledge system
- The Content Enrichment Framework is not able to support video hd too long (issue related to the maximum size)
- Difficulties connecting the tablet/mobile smartphone, in this case the QR code recognition was executed by the real connection between the two devices was not achieved for this reason the testers needed to re-execute the QR recognition process.

3.4.7 - Outcomes and conclusion

The scenarios were correctly tested and the functional requirements were achieved. We suppose to use the applications in order to provide to the end user a multi-interactive experience using the mobile technologies associated to the smart TV features. We plan to develop the possibility to associate more users to the same event in the same Smart TV (depends on the Second Screen Framework SE implementation).We have collected a good rating from the testers about the main functionalities. These applications offer an interactive multi-screen content experience, making use of the FI-CONTENT APIs of the TV platform, thus contributing at their validation.

The selected approach and applications offer high exploitation potentials to FINCONS, in line with its business strategy for the Media market and with possible adoption to its Digital Video Framework, while at the same time contributing to increase the exploitation potential and visibility of the whole FI-CONTENT project. We plan to further develop the multi-screen application using content enrichment and the Second Screen Framework SE, which will be used as the basis of further experiments in the second cycle.

On the Second Device application the key buttons should be enlarged in order to give to the possibility to the user to tap the correct functionalities. It will be necessary to improve the capture frame functionality in order to speed up the process and give the possibility to the user to stop and return back on the main menu. The testers have requested the feature “Change groups” in order to give them more flexibility during the streaming video. In this way the tester can change group, associated to the same event, without restart the application.

In the next release a sound notification will be inserted in case of availability of a new enriched content or in presence of a advertising banner. In order to simplify the launch of the application and improve the user interaction it will be necessary to simply and underline the left menu. In the next release it will be possible to improve the button disposition for the comment and the FB post and the comment sorting.

3.5 - Experiments due in latter part of the second cycle

Date	Site	Scenario	Application	Leading Partner
March 2015	Lancaster	Rich Content	VideoCloud	BitTubes
April 2015	Berlin	Rich Content / Multiscreen Experience	Interactive Football Match	FINCONS
April 2015	Berlin	Personalized Media / Multiscreen Experience	Interactive Car Advertising	FINCONS
May 2015	Berlin	Rich Content	VideoCloud	BitTubes

3.5.1 - Video Cloud - Rich Content

Two experiments are planned, one in Lancaster and one Berlin.

3.5.1.1 - Lancaster Experiment

- **What:** UX- and AB-Testing of social annotation application (in-video comments)
- **How:** Qualitative supervised tests and interviews and quantitative test with a publicly available player integrated into VISION as an alternative to their default player
- **When:** March 23-27, 2015
- **Enablers:** Content Enrichment
- **Who:** End-user testing with ULANC students
- **Expected outcome:** Knowledge gained on what makes viewers become participants, investigation of barriers to interaction.

3.5.1.2 - Berlin Experiment

- **What:** UX-Testing of Video-Sync-module in B2C-environment (virtual living room)
- **How:** Qualitative, supervised tests and interviews
- **When:** May 26-29, 2015
- **Enablers:** Content Enrichment, TAL
- **Who:** End-user testing with participants selected by FOKUS
- **Expected outcome:** Knowledge gain on current obstacles for wide-range user adoption and possible business models.

3.5.2 - Interactive Football Match Application and Interactive Car Advertising Application

3.5.2.1 - Berlin Experiment

Fincons has planned one experiment in Berlin.

- **What:** Interactive Football Match and Interactive Advertising Applications
- **How:** Qualitative, supervised tests and interviews
- **When:** April, 2015
- **Enablers:** Content Enrichment, Second Screen Framework
- **Who:** End-user testing with participants selected by FOKUS
- **Expected outcome:** Test of the application functionalities, running simultaneously on the two devices (Smart TV and Mobile Device) in order to evaluate the integration with the frameworks (Second Screen and Content Enrichment) by running tests under realistic circumstances.

4 - SUMMARY AND CONCLUSION

4.1.1 - Scenario 1 + 2 - Rich Content & Multi-Screen Experience

Testing of the ARD-EPG and *rbbtext* in the first testing cycle led to the inclusion of FIC2 technologies as part of RBB's regular broadcasting activities. Subsequent testing of the Fall of the Wall app in the second cycle led to inclusion of this technology in a specific RBB broadcast, and interest had been recently expressed by the ARD in further use of this technology. Tests of the Audio Mining SE are currently under analysis and will be reported in D7.3.2 in M27, as will results of continuing tests conducted by Open Call partners.

4.1.2 - Scenario 3 - Personalised Media

The platform preparation and user feedback analysis conducted in the first experiment cycle has led us through fruitful activities together with IAIS and BitTubes in three themes including cross-device resume play, TAL SE-based smartTV/game console application, and interactive social annotation/content enrichment. The bespoke statistics service enabled in Vision IPTV platform captured a large amount of user activity data and key system KPIs, which enables us to better understand user behaviours and trends of user preference in personalised media under different contexts. The companion qualitative studies will be reported in corresponding WP7 deliverables.

4.1.3 - Scenario 4 - Search and Discovery

Testing of the Search and Discovery scenario in the first experiment involved trials of a suite of new features to help users discover new video on demand (VoD) content in innovative ways. For this second experimentation it was envisaged to add social discovery through group recommendation and to integrate the Social Network SE. However, Search and Discovery was cancelled by TRDF, who opted to withdraw from all research work in November 2014.

5 - ANNEXES

5.1 - Fall of the Wall - initial tests questionnaire

FIC2 – WP2 RBB **'Fall of the Wall' app – initial tests - Nov 7-10 2014**	
Auswertung zur Umfrage MauerApp	**Fall of the Wall app user test results**
Teilnehmer: 46	Participants: 46
Geschlecht angegeben: 20, davon 6 weiblich und 14 männlich	Gender (when given): 6 female, 14 male
Alter angegeben: 22	Age (when given): 22
davon 14-29: 4,	aged 14-29: 4
30-49: 10,	aged 30-49: 10
50-64: 6,	aged 50-64: 6,
≥ 65:2	Over 65:2
1: Nutzen Sie selbst aktiv soziale Netzwerke (Facebook, Twitter)? [Mehrfachauswahl]	1: Do you use social media (Facebook, Twitter, etc.)? (multiple choice)
Facebook	Facebook
Ja: 14	Yes: 14
Nein: 17	No: 17
Keine Antwort: 15	No response: 15
Twitter:	Twitter:
Ja: 8	Ja: 8
Nein: 23	Nein: 23
Keine Antwort:15	Keine Antwort:15
Überblick:	**Overview:**
Datenerhebung in diesem Bereich sehr gering	An insignificant amount of information about use of social media was collected
Nutzung von sozialen Netzwerken überwiegend im Alter von 14-29 und 30-49. Nicht-Nutzung betrifft alle Alters-Kategorie	Social media users are primarily in the 14-29 and 30-49 range. Non-users are seen in all age groups.
Insgesamt nutzen mehr Personen Facebook unabhängig von Twitter. Nur zwei Personen nutzen Twitter aber kein Facebook	More users use Facebook independently from Twitter. 2 people use Twitter but not Facebook.

2: Nutzen Sie die Online-Angebote des Rundfunks Berlin-Brandenburg? (rbb-online.de)	2: Do you use the Rundfunk Berlin-Brandenburg (rbb-online.de) website?
Ja: 20	Yes: 20
Nein: 5	No: 5
Keine Antwort: 21	No response: 21
3: Wie sind Sie auf die Social TV-App zum Mauerfall-Jubiläum aufmerksam geworden? [Mehrfachauswahl]	3: How did you discover the Fall of the Wall app? (multiple responses possible)

	JA	NEIN
Hinweise im Fernsehprogramm	11	12
Soziale Netzwerke	3	20
HbbTV Angebote (Red Button)	7	17
www.rbb-online.de	9	14
www.ard-digital.de	3	20

	Yes	No
TV programme announcement	11	12
Social networks	3	20
HbbTV (Red Button)	7	17
Web: www.rbb-online.de	9	14
Web: www.ard-digital.de	3	20

Sonstiges: Infomail, Google	Other sources: info email, Google search
Überblick:	**Overview:**
Insgesamt sind die Personen am meisten durch das Fernsehprogramm aufmerksam geworden. Über andere Kanäle eher wenig.	Most discovery of the app took place via the RBB TV broadcast.
4: Bitte schätzen Sie ein, wie viele Minuten Sie sie Anwendung bereits genutzt haben.	4: For how long did you use the App?
< 5: 2	< 5: 2
5-15: 5	5-15: 5
16-30: 5	16-30: 5
>30: 7	>30: 7
5: An welchen Tagen haben Sie die Social TV-App gestartet [Mehrfachauswahl]	5: On which days did you use the app?
Freitag, 7.11.:10	Friday, 7.11: 10
Samstag, 8.11.:9	Saturday, 8.11: 9
Sonntag, 9.11.: 11	Sunday, 9.11: 11
Montag, 10.11.: 4	Monday, 10.11: 4
Überblick:	**Overview:**
Wenn die App genutzt wurde, dann im Durchschnitt etwa länger als 15 Minuten	The average length of use of the app was a little over 15 mins
4 Personen haben angegeben die App von Freitag bis Sonntag genutzt zu haben, sonst ist eine Mehrfachnutzung der App selten gewesen	4 users used the app for the whole broadcast period between Friday-Sunday; the majority of users did not use the app more than once.
6: In der Anwendung können Sie Beiträge aus dem LiveBlog auswählen und diese vergrößert über dem	6: In the app, it was possible to select the LiveBlog and view it on the main screen. Did you use this

Fernsehbild anzeigen lassen. Haben Sie die Funktion genutzt?	function?
Ja: 14	Yes: 14
Nein, ich habe auch nicht danach gesucht: 5	No, I didn't look for this function: 5
Nein, ich habe die Funktion nicht gefunden: 1	No, I didn't find this function: 1
7: Wenn ja, wie attraktiv war diese Funktion des LiveBlogs für Sie?	7: If you used this function, how attractive did you find it?
(1= sehr attraktiv, 5 = gar nicht attraktiv)	(1= very attractive, 5 = not at all attractive)
1.: 2 Personen	1: 2 people
2.: 4 Personen	2: 4 people
3.: 5 Personen	3: 5 people
4.: 1 Person*	4: 1 Person*
5.: 1 Person**	5: 1 Person**
*angegebene Mängel: Schwierige Menüführung, z B muss ich Pfeile zum hoch oder runterscrollen bestätigen, habe aber immer den Impuls, die Pfeile auf der Tastatur zu drücken.	* criticism: difficult menu navigation, i.e. scrolling with arrow bar whereas I wanted to use the keyboard to scroll
** keine Mängel angegeben	** no criticism
8: In der Anwendung können Sie die Erklärung zum Datenschutz auswählen. Haben Sie die Funktion genutzt?	8: Did you use the data protection function?
Ja: 8	Yes: 8
Nein, ich habe auch nicht danach gesucht: 10	No, I didn't look for this function: 10
Nein, ich habe die Funktion nicht gefunden: 2	No, I didn't find this function: 2
Überblick:	**Overview:**
Insgesamt ein geringeres Interesse an der Datenschutzerklärung. 8 Personen geben an, die Datenschutzerklärung „genutzt" (=gelesen???) zu haben	Generally, there was a low level of interest in data protection information. 8 users indicated that they had at least read the data information.
9: Stellen Sie sich vor, Sie könnten selbst bestimmen, welche Informationen in so einem LiveBlog zu sehen sind. Für wie wichtig halten Sie persönlich folgende Inhalte? (1= sehr wichtig; 5= sehr unwichtig)	9: If you could select the content of the LiveBlog, what would you include? Please assess the relevance of the following types of content (1=very important, 5= not at all important)

	1	2	3	4	5
Redaktionelle Hintergrundinformationen zum aktuellen Event	6	8	4	1	
Redaktionelle Informationen zu aktuellen Ereignissen	8	6	3	1	1
Nachrichten aus sozialen Netzwerken	3	5	7	1	3
Videos aus sozialen	2	2	6	4	5

	1	2	3	4	5
Editorial background info about the event	6	8	4	1	
Editorial info about the actual event itself	8	6	3	1	1
Social media	3	5	7	1	3

Netzwerken					
Fotos aus sozialen Netzwerken	5	6	5	1	2
Teilnahme an Abstimmungen	0	5	6	3	5

messages					
Social media video	2	2	6	4	5
Social media photos	5	6	5	1	2
Voting	0	5	6	3	5

10: Wie würden Sie die Anwendung als Ganzes benoten (1 = sehr gut, 5 = mangelhaft)	10: Please assess the app (1=very good, 5=not good at all)
Note 1: 7	1: 7
Note 2: 5	2: 5
Note 3: 5	3: 5
Note 4: 2	4: 2
Kommentare:	Comments:
„App schwer zu finden am TV, Info, wie man selber aktiv posten kann fehlt“	„App hard to find on the TV, user instructions re: posting were missing
„App ist noch zu sehr Einbahnstraße für Konsumenten“	“App is still a ‚one-way street‘ for consumers”
„Bedienung für Normalverbraucher nicht unbedingt intuitiv - aber nutzen die so eine App überhaupt?“	“Operation of the app is not so intuitive – do people use this kind of app at all?”
11: Wie gut hat Ihnen die Gestaltung, das Aussehen gefallen- (1 = sehr gut, 5 = mangelhaft)	11: How did you find the appearance of the app (1 = very good, 5 = not at all good)
Note 1: 7	1: 7
Note 2: 6	2: 6
Note 3: 5	3: 5
12: Wie fanden Sie die Inhalte- (1 = sehr gut, 5 = mangelhaft)	12: How did you find the content presented by the app (1 = very good, 5 = not at all good)
Note 1: 7	1: 7
Note 2: 4	2: 4
Note 3: 4	3: 4
Note 4: 4	4: 4
Überblick:	**Overview:**
Insgesamt ist die App von den meisten Personen insgesamt zwischen 1-2 benotet worden	Most users gave an evaluation mark of between 1 and 2
Die meisten Personen haben den LiveBlog genutzt.	Most users used the LiveBlog function
Am wichtigsten sind redaktionelle Hintergrundinformationen zu aktuellen Event und zu aktuellen Ereignissen, danach Nachrichten und Fotos aus sozialen Netzwerken	Most important content for users: background and news about the current event; then news and photos from social networks
Fotos werden als wichtiger als Videos empfunden	Photos were evaluated as more important than videos
Teilnahme an Abstimmungen spielt eine eher untergeordnete Rolle	Participation in voting was evaluated as unimportant
Positive Eindrücke:	**Positive aspects:**

„Fotos / Fotos und Videos von Social Media Nutzern“	Photos and videos from social network users
„dass die Applikation programmbegleitend / geframed nutzbar ist“	„The fact that the app presents material which accompanies the broadcast programme
„Gleichzeitig Fernsehen zu können und das Feedback der sozialen Netzwerken verfolge zu können / Individuelle Eindrücke von Nutzern / Twittermeldungen aus aller Welt“	„The possibility of following social network activity from around the world while watching the broadcast
Negative Eindrücke:	**Negative impressions:**
„die langen Ladezeiten der neuen Posts / Aktualisierung des Blogs dauerte zu lange	“long loading of new posts and blog refresh”
„dass die Auf- und Herunter-Pfeiltasten auf dem Bildschirm anzuwählen sind, und nicht auf der eigenen Fernbedienung	“the navigation arrows were on the TV screen and not on the remote control”
„Schwierige Menüführung, z B muss ich Pfeile zum hoch oder runterscrollen bestätigen, habe aber immer den Impuls, die Pfeile auf der Tastatur zu drücken.	“difficult menu navigation, i.e. scrolling with arrow bar whereas I wanted to use the keyboard to scroll”
„App schwer zu finden am TV, Info, wie man selber aktiv posten kann fehlt	“Hard to find info via the TV screen about how to post”
„zu selten neue Einträge im Blog, nur alle paar Minuten mal was Neues! :(	“New posts appeared too slowly, only every few minutes was there something new”
Verbesserungsvorschläge:	**Suggestions for improvement**
Auf- und Ab-Pfeiltasten von der Fernbedienung abfangen und gleich zur Navigation der Bloginhalte nutzbar machen	Activate the up/down arrows on the remote control for navigational use, make the Blog content navigable
App ist noch zu sehr Einbahnstrasse für Konsumenten, Bedienung für Normalverbraucher nicht unbedingt intuitiv - aber nutzen die so eine App überhaupt?	Operation of the app is not intuitive.