

Directorate General for Communications Networks, Content and Technology  
Innovation Action



ICT-687655

## **D3.2 User Interaction Design to Inform Theatre in the Home Service Trials**

Due date of deliverable: Feb 2017

Actual submission date: April 2017

Start date of project: 1 December 2015

Duration: 36 months

Lead contractor for this deliverable: **BBC**

Version: **21April 2017**

Confidentiality status: **Public**

### **Abstract**

This document describes the user interaction design and experimentation work that has informed the potential design of Theatre in the Home service experiences and specifically the subset of those features to be tested with connected audiences in private homes. Some of the design challenges and the resulting experiments may also inform future service trials in the project.

### **Target audience**

This is a public deliverable and could be read by anyone with an interest in the details of the experience designs being developed by the 2-IMMERSE project. We assume the audience is familiar with television and internet technologies. This document will be read by the Project Consortium as it implements the trials to be delivered during the project.

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### **Impressum**

Full project title: Video Communication for Networked Communities

Title of the workpackage: WP3 User Interaction Design

Document title: D3.2 User Interaction Design to Inform Theatre in the Home Service Trials

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This project is co-funded by the European Union through the ICT programme under Horizon2020

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## Executive Summary

The 2-IMMERSE project proposes to create and pilot new media services built on research and development related to the *production* of, *access* to and *engagement* with rich content across the screens of multiple devices (multi-screen experiences). New multi-screen services will merge content from broadcast and broadband sources and support new visualisations, viewpoints, data and replay facilities in addition to social network functionality such as chatting, commenting, polling etc.

The challenge can be summarised as co-producing the right content for the right screen at the right time whilst allowing a satisfying mix of control between the curation of the producer and the level of control desired by the user.

This document describes the user interaction design and experimentation work that has informed the potential design of Theatre in the Home service experiences and specifically the subset of those features to be tested with connected audiences in private homes. Some of the design challenges and the resulting experiments may also inform future service trials in this project. The methods used in WP3 include Conceptual design, trajectory mapping, surveys and lab experiments. This deliverable covers the work and the thinking that lead to the development of the service trial. It does not cover the test methodology or the results of the trial which will be covered in D4.2 from WP4.

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# 1 Introduction

This document describes the design and user research involved in developing the first in a series of four trials. The subject of each trial will be one of four service pilots (two in theatre and two sports):

- Theatre in the Home;
- MotoGP in the Home
- Theatre in Schools
- Football in a Public House or Sports Bar

For each of the four service pilots to be prototyped and tested there will be a series of UX design activities to inform their design. We intend the knowledge and design principles generated from this activity to be cumulative across the service pilot trials, iteratively feeding into the next phase from theatre in the home through to football in public venues. Some design features will be specific to individual trials such as the theatre rituals captured in the ‘Theatre in the Home’ trials and some general across trials such as multi-screen layout principles and tolerances for degrees of synchronization.

The construction of our audience and production-facing prototype services, means working alongside the low-level service architecture being developed by the technical team. These activities need to go on in parallel as they inform each other.

## 1.1 Schedule for User Experience & Trial design

A revised schedule for the Theatre in the Home service trial is described in the overall service trials plan in D1.1

At the time of writing we are running the Theatre in the Home trial to be written up in May 2017 and published as D4.2. In the preceding months design studies, lab experiments and a survey of theatre going rituals have all informed the experience design. The following section outlines those activities and their outcomes.

## 1.2 Drivers and Initial Assumptions behind the Theatre in the Home Service

### 1.2.1 Drivers

Analysis of NT Live suggests that the screening of live cinema has been a financial success (Bakshi H. and Whitby A. 2014). Learning from NT Live and testing the market for streaming live theatre into homes would seem to be a logical next step to expand the market. Providing a successful Theatre experience in the home may have significant commercial and cultural impact.

### 1.2.2 Hypotheses

- A successful Theatre in the Home experience is one that recreates theatre rituals;
- A coherent multi-devices environment can support and positively augment a Theatre in the Home experience.
- Theatre is a social experience best shared with others (by bringing remote audiences together).

## 2 Designing the User Experience

In order to guide the design of a Theatre in the Home experience we looked at the experience, practices and rituals of going to the theatre.

### 2.1 Rituals of Going to the Theatre



A small survey was carried out with 19 theatre-goers who responded to the question: “List the processes you recognise as being involved in going to the theatre”. The resulting lists (432 lines of narrative) were analysed to reveal common topics. Common activities within the theatre were

- Being social: communicating
- Accessing programme material
- Watching the performance
- Responding to the performance

Figure 1 below shows an example list from one of the respondents.

1. “I see a theatre program/advert/endorsement on twitter/instagram of a show that appeals to me.
2. I read a review.
3. I see if any of my friends want to go and see the play with me.
4. I book a ticket online.
5. I look for any other information about the play/director online.
6. I get ready.
7. I look up my route to the theatre if I am not familiar.
8. I check I have my oyster card/money/phone.
9. I leave my house.

10. I travel to the theatre.
11. I arrive at the theatre usually 5-10 minutes early.
12. I collect my ticket from the box office.
13. I get a drink at the bar.
14. I buy a program.
15. I flick through the program if I am alone or chat to whoever I am seeing the show with.
16. I look for posters around the theatre for upcoming shows that I may be interested in.
17. When I hear/see the doors are open I enter the theatre.
18. I check my ticket for my seat number.
19. I find my seat.
20. I make sure my phone is turned off/on silent.
21. I put my phone in my bag.
22. I sit and put my back on the floor, the program on my lap and hold my drink.
23. I watch the play.
24. If there is an interval I usually stay seated unless I need the toilet or another drink.
25. I will usually have to stand up and push my bag behind me when people need to squeeze past to get out.
26. I end any conversations I am involved in when the lights go down in preparation for the 2<sup>nd</sup> half.
27. I watch the second half.
28. When the play ends I clap and in exceptional circumstances stand up if the rest of the audience are standing.
29. When the actors have left the stage I put on my coat and pick up my bag.
30. I will then usually go for a drink with whomever I went to the show with to talk about the show.
31. After discussing the show and performances I go home.
32. I read the program on the journey home.
33. I arrive at home.”

Figure 1. An example list

## 2.2 Trajectories Through the Experience

A second design activity used a method and tool devised by staff and students at Nottingham University and the BBC (Pathways) based on the Trajectories concept (Benford et al 2009). Using this tool we plotted potential audience trajectories from arriving to leaving the theatre. The tool focuses on the human interactions throughout an experience and the relationships between people and content during these interactions. The session was led by and experienced producer and film maker, John Wyver whose company produces and broadcasts the Royal Shakespeare Company’s performance live in to theatres across the world.

Plotting the trajectory of the user journey identifying the people, places, devices content and services used throughout the experience.



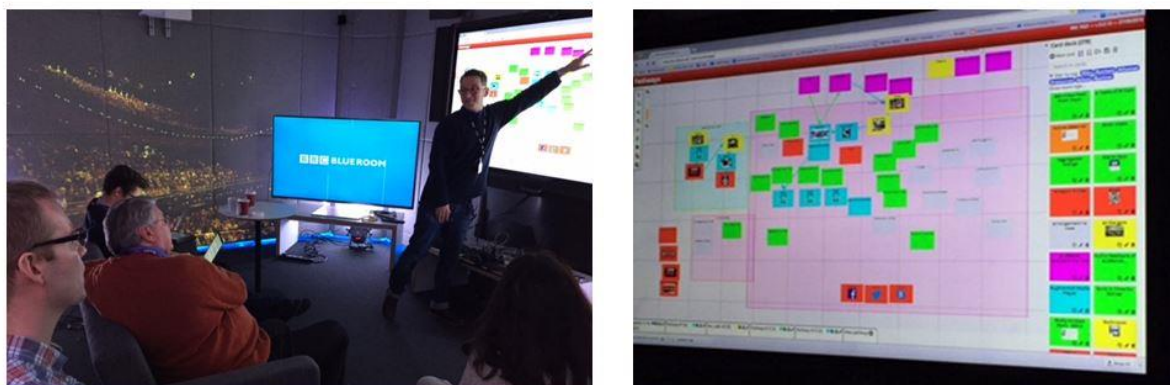


Figure 2 Pathways meeting at MCUK March 2016.

The workshop focused on the 5 stages of the theatre experience in the theatre itself. In each of these phases potential content, services and interaction modes were identified to support the needs of the audience. Potential activities and the services to support them were described (shown in figure 3 below. VC = Video Chat). Through this process we understood the timings of service delivery and the need for some services to be available only at certain time on the journey. Hence we implemented a timeline-based delivery where video-chat was only available before and after the performance and during the interval.

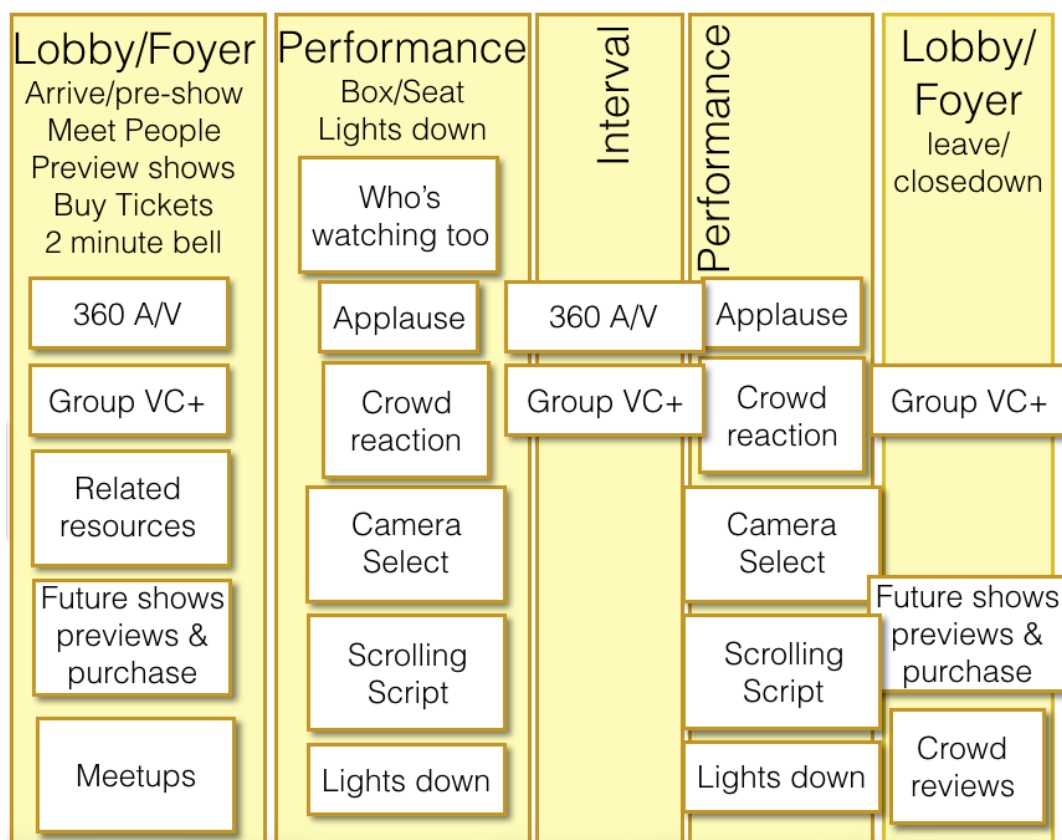


Figure 3 The timing of activities, actions and potential service delivery through a theatre experience to inform the design of Theatre in the Home.

The questions arising from this exercise included:

- What are the consequences for the architecture of the service platform?
- How many of these services can we implement in the time available?
- If not all which would be provide the biggest experimental value in terms of testing user's reactions to the design and extending the service platform?
- Can we get the content and or data to support a service (e.g. 360 capture from the theatre foyer or second camera view of the full stage)?

## 2.3 Wire Frames: Defining the Visual Design & Interaction Design

This section outlines the design of the look and feel of the user interface and experience. The outcomes of this work aid the development of the 'Theatre in the Home' experience by visualizing components of the experience and user journeys.

Detailed wireframes and storyboards were used to:

1. Document the finer detail of the end-to-end user experience.
2. Be explicit about the functionality in each stage of the experience
3. Aid the development and prioritization of components and their availability in the trials
4. Surface requirements and details that need to be considered during the trial design, informing methods and logs by which user activities could be evaluated.

We gathered background materials to inform the design, reviewing existing apps and websites, branding (RSC website), to create initial mood-boards and graphical treatments.

### 2.3.1 Mapping key services against multiple screens/devices

To understand the logic of how the various components of the experience might fit together a map was made in the form of a grid.

Devices (columns) were mapped against services (rows), at each phase of the user journey (Figure 4). This allowed the team to have an overview of the general logic behind component availability, across all devices, at each stage of the experience. It introduced considerations of shared and personal screens and multiple services on single screens (e.g. picture in picture, integrated scrolling synchronised scripts). The earlier mapping the user journey using the trajectories tool had highlighted the need for a timeline service that orchestrated the availability of different components of the interactions during the theatre experience (e.g. the video chat facility would only be available during the pre- and post-show and the interval whereas the text chat component would be available throughout. This raises questions about the balance of curation of the experience between the different roles within the value chain. How much control and over what should each role in the value chain have and how will this change over across our 4 service pilots?

	On-Boarding	Pre-performance	1 <sup>st</sup> Part	Interval	2 <sup>nd</sup> Part	Post-performance	
Camera (directors stream)		y	y	y	y	y	
Alt Cameras			y		Y		
Synopsis (whole)	y	y	y	y	y	Y	
Synchronised Synopsis			Y		y		
Whole Script		y	y	y	y	Y	
Synchronised Script			y		y		
Video Chat	Y	y		y		y	
Text Chat	Y	y	y	y	y	Y	
Text Chat with Expert		Y		y		y	
Cast & Crew Gallery	y	y	y	y	y	Y	
Like Button / Vote			Y		y		
Data Visualisation				y		Y	
Settings (Novice / ,Veteran)		y	y	y	y	y	
Settings (Audio Description)			y		Y		
Settings (Subtitles)			y		Y		

Figure 4 Availability of components at different phases of the experience.

Mapping services to screens enabled the first wireframes to be sketched out (Figure 5).

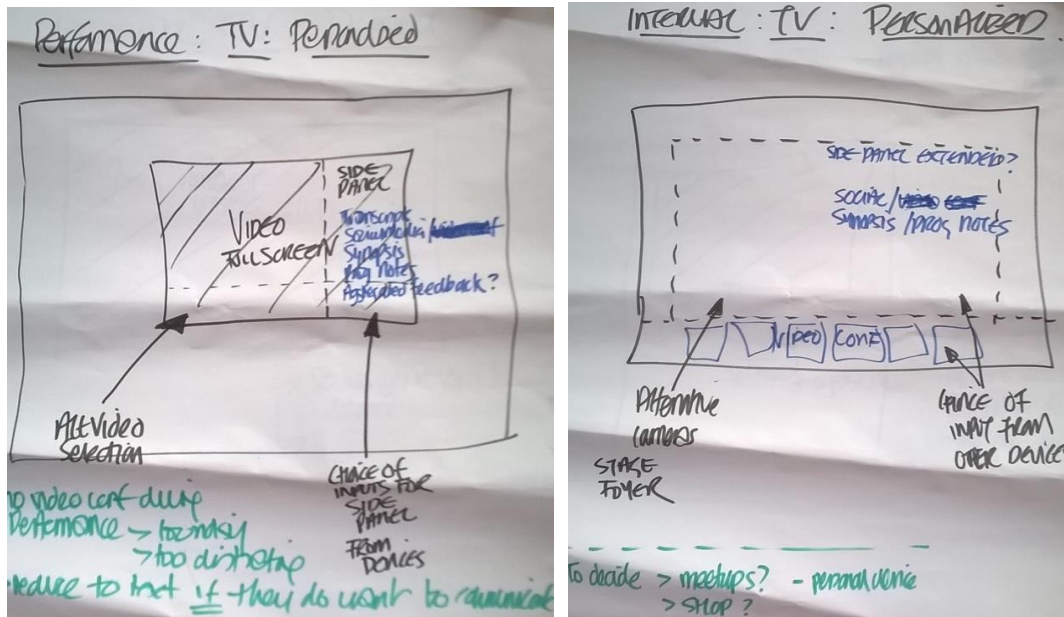


Figure 5. Shared Device (TV) During performance & in-between performances

At this stage the distinction between content and control had to be considered. Screens detail would include both control functions and content. This is not unusual for screen-based devices but in the Theatre in the Home scenario control might be distributed across devices and homes. Can one device cast to many screens? What are the policies that work best? Is it different for different services or different screens (private and shared, shared with some vs shared by all)? How are these policies enforced (through the technology or through social conventions)? Who gets to say what goes where? The producer was adamant that the play should always be in the large screen with no overlays.

## 2.4 Detailed Sketching of the Components of the Interaction

Detailed wireframe sketches were made of the key components on each device during performances, and outside performances (lobby/interval/aftershow). Design, production and technical teams met to discuss and iterated designs based on technical feasibility and perceived ease of use to create the final implementation of the system to be tested in the service trials. Feedback from trial audiences would guide us further. Figure 6 below shows a draft of the top-level menu and associated screen examples.



Figure 6. Draft wireframe of top level menu layout.

## 2.5 User Interface Design: Component Layout

A number of design questions centre around **choice and placement of content components** (with impact on the development of the layout manager/service).

- How many content components should we display on this type of screen at one time?
- How are the content components prioritised -are some components more important than others?
- Should content components appear at a fixed size or should the component/content 'containers' be adaptable?
- Should the component menu be visible all the time or should screen size dictate?
- Should the components menu be text, icon or image based?

These design challenges are not new to web interface developers who have to accommodate screens of different sizes from laptops to phones and Responsive Design has evolved as a set of guidelines and technologies to address these. In our situation, we are adding the complexity of coherent and synchronised multi-screen delivery and the sub-contexts implicit in the timeline service that orchestrates which interaction components/micro-services are available during the stages of the experiences and the ability of people across the value chain (producers and audiences) to customise the presentation of and engagement with the content resources and communication capabilities.

The Theatre in the Home Experience contains components to aid audience selection and viewing of content, on their individual devices and shared devices.

### 2.5.1 Watching the performance

In the layout service components that appear on all devices in containers that can be manipulated/scaled. The challenge is to understand how much this should be 'controlled' and how much should be automatic? Should we allow users or others in the value chain to 'pin' content in place making it resistant to further layout changes (e.g. "I always want the performance to be here" or "Always show me the text chat down the side of this (shared/private) device).

It seems self-evident that the performance of the play is the most important ingredient of the experience. Without it there would be no Theatre in the Home. It seems reasonable then that the producer should be able to determine and set the best location and layout for streaming of the play. A location and layout that gives the performance stream the preminent place in the constellation of devices in the home.

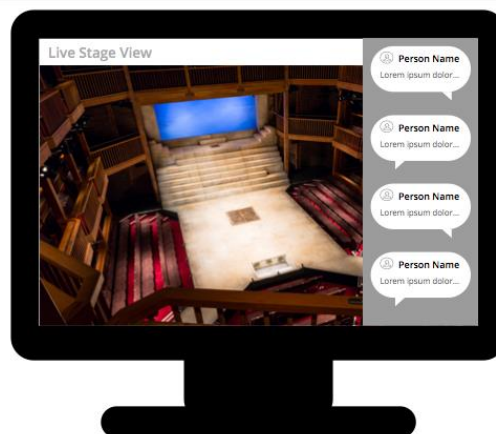


Figure 7. Shows the play is pinned to the TV screen during the performance.

In the example in Figure 8, the text chat is ‘pinned’ on the TV, so during the interval when the play may be replaced with something else the text chat will remain.

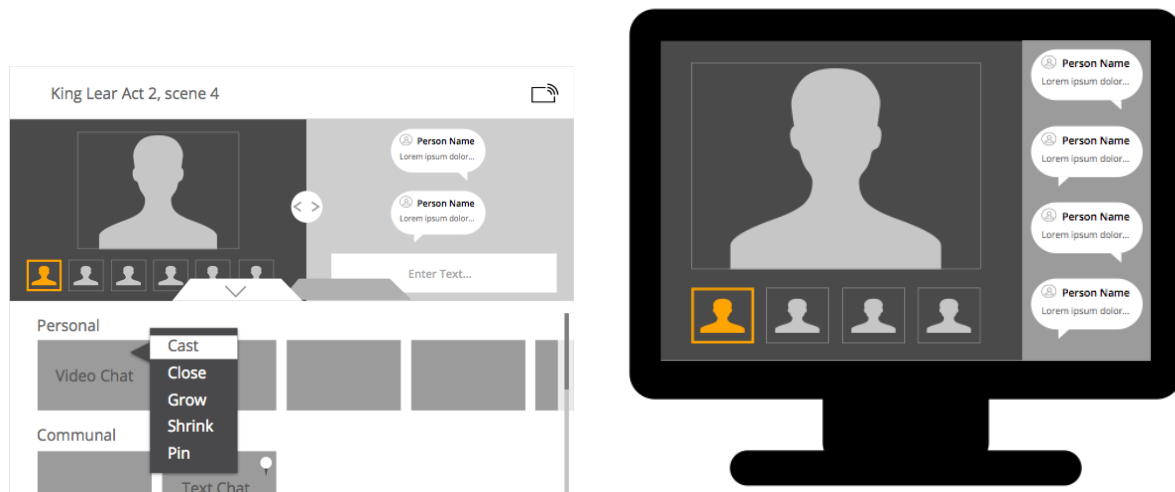


Figure 8. Text Chat is ‘pinned’ and so unaffected when another component displayed on the screen is changed.

### 2.5.2 Responding to the performance

Should we give audiences at home a ‘Like’ button to press anytime and any number of times during a performance?

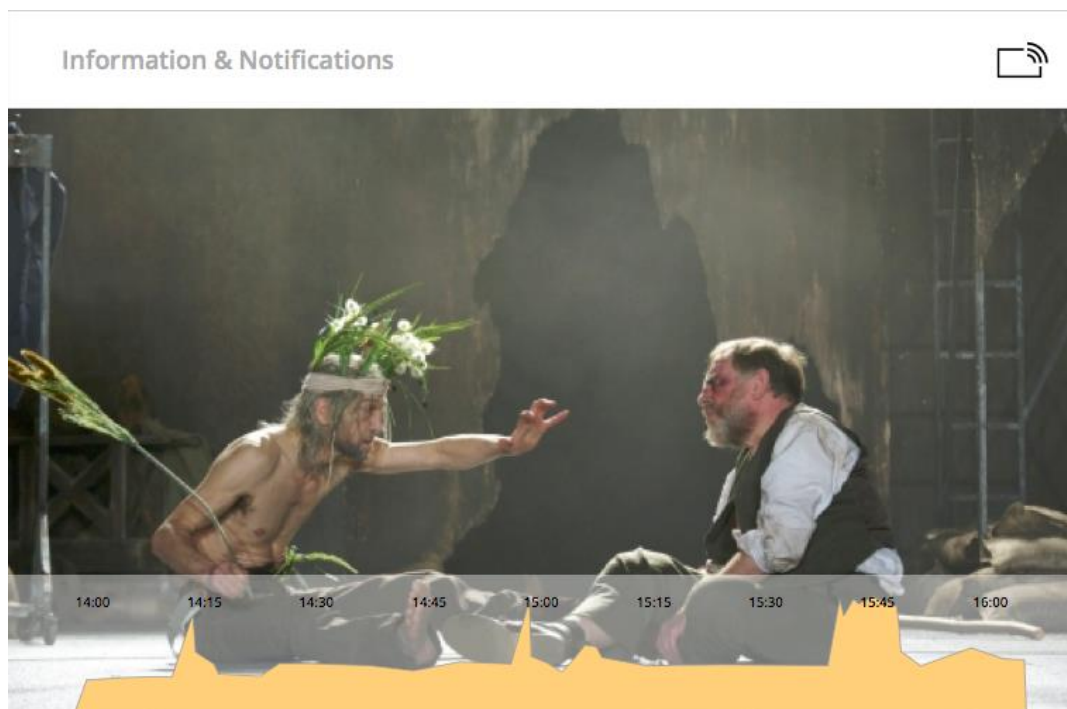


Figure 9. A visualisation of displaying summary information from use of ‘like’ buttons

An audience response button is contextual, and the challenge is to understand the context of the response. Simple time stamping could be an indicator, recording the points in the experience that interested the audience but how can we capture different emotions without overloading the interface and distracting from the performance? If we can solve this button presses are aggregated amongst all users and fed back to the production team, and other users. In a simple pilot at the Edinburgh Fringe BBC R&D distributed single button devices with opposing emotional labels (i.e. individual audience members could register only the one emotion). The performance genre was stand-up comedy. The results were promising. Some consistency was shown across audience reactions during the performance. In a previous FP7 project Galvanic-Skin Response (GSR) experiments were carried out on remote and co-present audiences to test that technology with some success (Wang C et al 2013, 2014, 2015). The challenges for Theatre in the home are: simplicity and instinctiveness of interaction – in the theatre where the actors are co-present clapping is the instinctive response (Will this be the case in homes? Is the fact that the actors can hear/see this form of appreciation key?) How would we transmit appreciation to theatre performers in a scalable way?

### 2.5.3 Accessing programme material

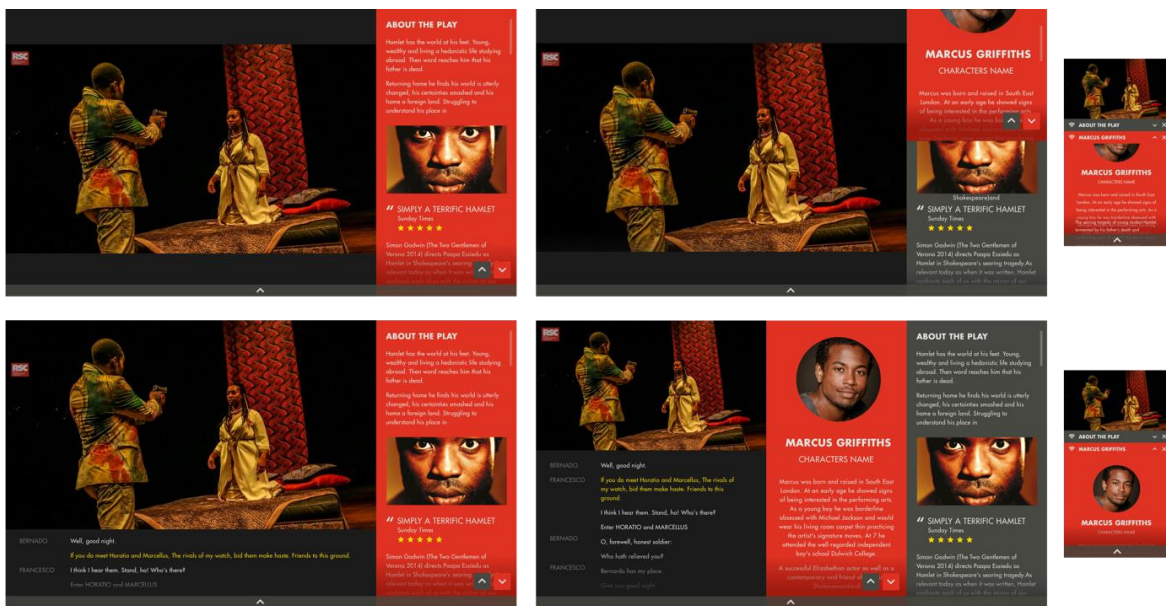


Figure 10. Treatment for Articles & Script



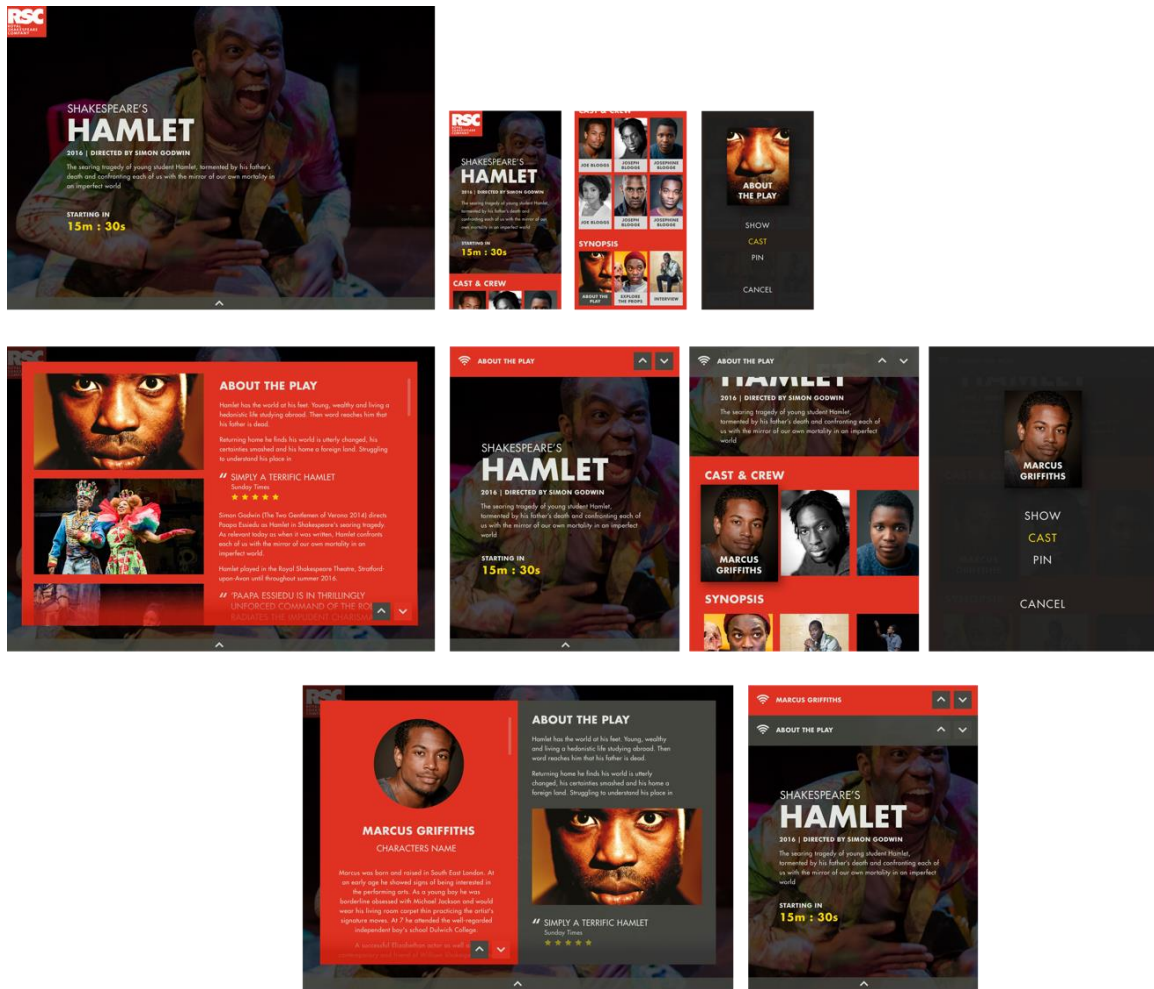


Figure 11. Treatment for Cast & Overview Information

### 2.5.4 Being social (Communication)

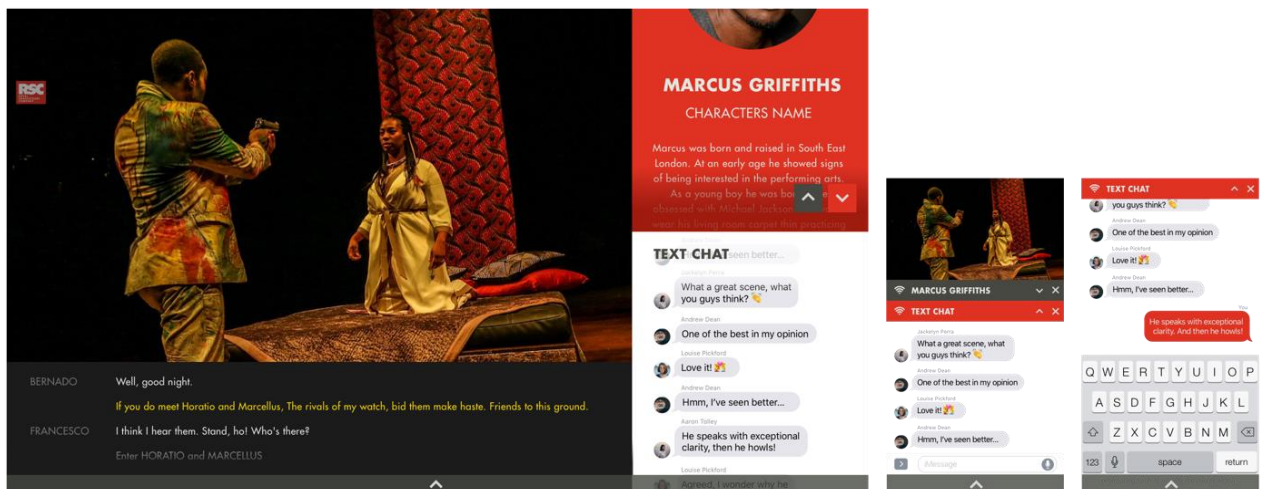


Figure 12. Treatment for Text Chat.

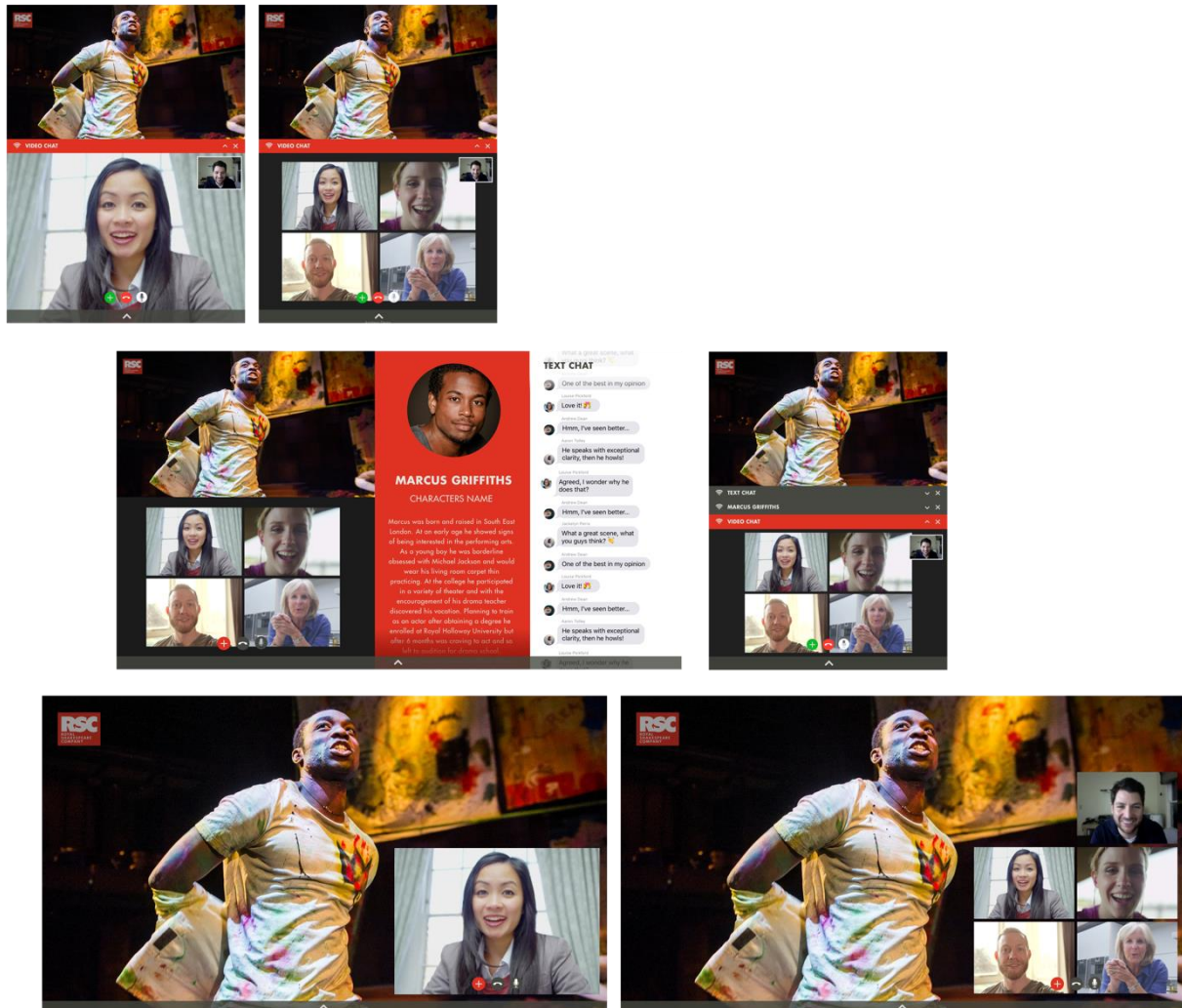


Figure 13. Treatment for Video Chat.

## 2.6 The Composition of the Theatre in the Home Experience

The aim of the work in the sections above was to explore and inform the design of the Theatre in the Home service trial. The aim of the trial is to provide a sufficient probe to test our hypotheses.

In sections 1.2 and 2.1 we introduced our hypotheses and trial design questions arising from the design explorations.

Hypotheses:

- A successful Theatre in the Home experience is one that recreates theatre rituals;
- A coherent multi-devices environment can support and positively augment a Theatre in the Home experience.
- Theatre is a social experience best shared with others (by bringing remote audiences together).

Trial design questions:

- What are the consequences for the architecture of the Multi-Screen service platform?
- How many of these services can we implement in the time available?
- If not all, which would be provide the biggest experimental value in terms of testing user's reactions to the design and extending the service platform?
- Can we get the content and or data to support a service (e.g. 360 capture from the theatre foyer or second camera view of the full stage)?

The system we have built for the Theatre in the Home service trial has informed the 2Immerse service platform (D2.2, D2.3) and we have implemented most of the features we have explored through the design research described above with the exception of an alternative wide angle, whole stage view from the back of the theatre; a live 360 degree view of the lobby and a 'like' button. We did not include the wide angle or the 360 degree lobby because the content was not available for Hamlet (the RSC play to which we had access to for the trials). Similarly, the capture of 360 degree content was not possible in the lobby of the theatre. The challenges of devising a simple and instinctive way to register audience responses within and across homes during a performance and the challenge of representing the aggregation of such responses to the performers in the theatre was beyond our time means for the first trial. We decided to probe the need for this through post trial interview.

To test our hypotheses it was important to include: the video-chat service connecting homes; and content synchronised and coherent with the performance of the play that could be viewed across devices; and timings and features of theatre ritual. Timings were realized through the orchestration of interaction components through the timeline service of the 2Immerse service platform. Theatre-style notifications to take your seats, the enforced quiet during the performance and availability of background material with a similar look and fell of an augmented program were all aimed at recreating theatre rituals.

Finally and most importantly, "The play's the thing" (Hamlet Act 2 Scene 2) and the presentation of the play was pinned to the largest screen in the home – the TV. The producer was adamant that this should be so.

D3.1 describes the user testing carried out on synchronization, specifically to achieve the scrolling script capability and the development and testing of the integrated video-chat capability.

The final component list for the Theatre in the Home trial was:

- The broadcast of the play
- Synopsis of the play
- Synchronised scrolling script
- Integrated and timed Video chat
- Text messaging
- RSC Background material (supporting)
- Notifications (timing & point in play)

D4.2 will present the details, methods, results and conclusions from the Theatre in the Home trial. This document has described the work and the thinking leading up to the design of this service trial.

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## Appendix I Audience Questions for Theatre in Home trial

Data will be collected from the trials through a post-trial questionnaire (on-line) and a follow-up post trial interview. Data Analytics from interactions during the trial will also be collected. Below is a draft of the questions from the questionnaire and the interview script. The questionnaire asked position their answer between on a scale two extreme views, yes/no or a selection of responses. Interview questions were more open ended and qualitative. The final edits of the questions and details will be included in the method and results sections of D4.2 The questions here are a draft and included here to give an idea of the themes and style of questions.

### I.1 Post-Trial Questionnaire

#### I.1.1 General experience

How much did you enjoy the performance?  
I did not enjoy it / I enjoyed it very much

How much did you feel absorbed in the performance?  
I was not absorbed / I was totally absorbed

Did you feel an emotional response to the play?  
Not at all / I felt a strong emotional response to the play

How quick or slow did time seem to pass?  
Time seemed to pass very Slowly / Time seemed to pass very quickly

How easy did you find it to follow the plot?  
Could not follow it / It was very easy to follow

Based on the event, I would recommend this experience to other people  
Would not recommend / I would definitely recommend

How much do you think it was like going to the theatre?  
Not at all like attending the Theatre / As good as attending the theatre

After the play, I wanted to talk to people about what I'd seen  
Not at all / Very much

I could relate to, or feel a bond with the performers  
I could not relate at all / I felt a strong bond with the performers

Are you more likely to go to the theatre after seeing this?  
Yes / No

Are you more likely to go to a cinema screening of theatre?  
Yes / No

Are you more likely to watch future broadcasts of Theatre in the Home?  
Yes / No

#### I.1.2 Feature feedback

Please indicate by selecting from the list below, which features you used during the experience, and of these features you used, could you please indicate how easy they were to use, and how useful they were on impacting on your experience.

Feature

- Synopsis of the play
- Scrolling script
- Alternative camera view
- Video chat
- Text messaging
- Background material (supporting)
- Notifications (timing & point in play)

Of the features you used, how easy to use were they?

Synopsis of the play

Impossible to use / Easy to use

Scrolling script

Impossible to use / Easy to use

Video Chat

Impossible to use / Easy to use

Text Messaging

Impossible to use / Easy to use

Background Material (supporting)

Impossible to use / Easy to use

Notifications (timing & point in play)

Impossible to use / Easy to use

Of the features you used, how useful were they?

Synopsis of Play

Not at all useful / Indispensable

Scrolling Script

Not at all useful / Indispensable

Video Chat

Not at all useful / Indispensable

Text Messaging

Not at all useful / Indispensable

Background content available

Not at all useful / Indispensable

Notifications (Play starting, timing & point in play)

Not at all useful / Indispensable

Other (please specify)

Were there any features you wanted to use, but gave up on, and if so, why?

- No, I didn't give up on any
- They didn't work correctly
- Were too complicated
- Interfered with watching the play
- I never use things like this
- I didn't understand the instructions

Other (please specify)

### **I.1.3 Adopting rituals of theatre**

Did you find it useful for the video chat to automatically shut down during the performance?  
No really annoying / Yes Very useful

Do you think phasing the availability of the video chat made you more absorbed in the performance?  
No it did not / I felt more absorbed

If the performance was broadcast live, do you think you would enjoy it more if you could feedback your responses to the actors? (e.g. applaud/like/laugh)  
No not at all / Yes very much

### **I.1.4 Multi-screens**

How much did having content available on more than one screen enhance your experience?  
Not at all / Very much  
How easy was it to make use of content presented across your TV/Phone/Tablet  
Not very easy / Very easy

### **I.1.5 Value of sharing the experience**

Would you prefer the video chat function to be available all the time?  
Yes / No

How much was the experience enhanced by watching the performance with friends and family from another home?  
Not at all / Greatly enhanced my enjoyment of the experience

### **I.1.6 Selecting on which device to receive content**

Would you prefer the video chat to be available on the TV (at the side of the play) or separate on a screen (phone or tablet)?

- TV
- Tablet
- Phone

Would you like to be able to decide what content gets where? (E.g. what goes on the TV, what

goes on the phone or the tablet).  
Yes / No

## **I.2 Post-Trial Interview Themes**

### **I.2.1 Ease of use**

- How did you like the layout of the interface on the second screen?
- Were all the components on the screen useful and easy to use?
- Would you like to be able to change positioning of where things are located on the wireframe/UI?

### **I.2.2 Look & feel**

- Did you like the appearance of the interface?
- Does this look like other apps that you use?

### **I.2.3 Multiscreen**

- Do you have any regular TV protocols, and if so did you follow them in this scenario?
- How did you find it having another screen whilst watching the television?
- Was it practical to have to follow two screen inputs at the same time?
- Did you find yourself distracted with content happening on the second screen?
- Where there any occasions where you attended to the second screen to either if check content had appeared, say something etc.
- Did you forget there was a second screen available at any point during the performance?

### **I.2.4 Engagement**

- Which features of this experience contributed most to the development of an experience that is positive differentiated over just watching television with a twitter feed
- What features of the experience enhanced this experience?
- What features do you feel detracted from the experience compared to just watching TV, if any?

### **I.2.5 Rituals**

- Did you notice any similarity from this experience to a visit to the theatre?
- What did you think about the bell?
- Did you notice this occur to call for the end of the interval?
- Was this a useful prompt in your opinion (if noticed)/would it have been more useful if this signal were made clearer?

### **I.2.6 Applause**

- How did you feel at the end of the performance?
- Did you find yourself voicing an opinion about the performance?
- At the end of the performance did you feel an impulse to clap?



### D3.2 User Interaction Design for Theatre in the Home Trials

- Would you like to have been able to make your response to the performance be more widely recognised?
- In what way would you like it to be shared?

#### **I.2.7 Phasing**

- Did you notice the video chat was only available at certain times of the production?
- Were there instances where you went to use a feature (such as video chat) and subsequently realised it was not available?
- Did you like the fact that the video chat was automatically phased in and out?
- Was this useful?
- Would you have preferred to decide this yourself?
- Would you rather have all the components available all the time?

#### **I.2.8 Mediation and the curation of components and content**

- What did you think of the positioning of the different content available?
- Do you have any observations of the overall content that you were exposed to, such as availability and appearance of images and sounds?
- Would you have liked to decide the position of the content at your disposal?

#### **I.2.9 Attention and automation**

- did you find your attention was being pulled to different devices at any point?
- Did you feel in control of where you were looking and what content you were engaging with?

#### **I.2.10 Social interaction**

- What is your opinion on the video chat feature?
- What is your normal method of interaction with other people, do you normally text, video message, to phone call?
- Would you have preferred to be able to choose how you interacted with the other house?/would you have preferred “alternative communication method”?
- Would you like different text functionality available at different points in the performance?
- Do you think the video chat made it feel more social?
- Did the experience feel more or less social than watching television?