

# USER-LED INTERACTIVE TELEVISION: IDENTIFYING AND ADDRESSING SOME OF THE BARRIERS TO ACCESSIBLE INTERACTIVE TV

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## 1. Introduction

The dramatic pace of technological advances in the Television landscape does not leave its audience unaffected. Television, especially with the introduction of interactivity is directed towards new forms of communication bridging different worlds (Broadcasting and Telecommunications). In the UK particularly, 2012 is being marked as the digital switchover year after which analogue signals will no longer be broadcast. In the build up to this event the creative industries will need to compete for an ever shrinking mass audience, producing specialised products that will appeal to broad and narrow user groups.

This provides an additional impetus to look at barriers to using digital interactive media, how these can be overcome through both consumer-led production and through the application of new methods of rapid prototyping and semi-automated service creation research. The obstacles in making Digital Television more accessible to design specialists, other non-technical related professionals and ultimately users can be categorised as economic, social and technical in nature. Although all the three of these must work together and are equally important this paper will focus more on the technical aspects.

Technology in isolation cannot provide for all audience's requirements. There also needs to be creative, compelling and well-made media and services to attract people to iTV. Therefore, we are proposing a dual approach to the promotion and adoption of iTV services, firstly we are using empirical data from user groups guide the service design in addition to testing these services with the same user group. We are allowing users to dictate the services and operations of proposed interactive services. Secondly we are developing technological solutions that enable the creation of services that can take advantage of this user led data and reaction to simulations in a very efficient way but using the simulations themselves as the basis of broadcast material. In current workflows a simulation has to be translated into something suitable for broadcast by a specialist software engineer. This translation can result in both time delays and the dilution of the nuances of interaction and interface design. The system developed at Brunel as part of the INSTINCT project uses tools that are accessible by both both technical and non-technical-oriented specialists in a semi-automatic translation of simulation into broadcast service.

## **2. Project Description and Objectives**

The User-led Interactive Television (UITS) project aims at addressing several of the issues identified above by conducting a number of empirical studies and using these results within a knowledge transfer network bringing together specialists from industry, technological research, empirical user research and the users themselves. UITS is part of the Media and Moving Image component of Westfocus, a UK Government funded (HIEF2) consortia of universities in the west of London working together to promote knowledge transfer between academia and industry. In the case of UITS this involved the undertaking of a series of structured interviews with users to determine their responses and aspirations for interactive TV and using these as the basis for the development of new services. The results of this development and subsequent user testing of proposal resulted in a series of knowledge transfer events., including a seminar and a two-day training course.

## **3. Empirical Studies and Preliminary Results**

The main empirical study uses data to give a fresh perspective to a field of development often dominated by technical possibilities rather than being demand driven. The overall aim of the study is to develop knowledge of interactive television based on audience/user perspectives. The study uses a combination of methods involving interviews and observation with 20 pilot households with digital television in the London area. In total, 62 people participated in this project aged 5-50+ and considering diverse socio-economic status. The data collected includes a brief questionnaire related to media use, forty interviews, with observation memos, and visual data from the second visit, where respondents showed interactive media use. The interview data is being analysed by Nvivo- coding. The visual data has been coded according to basic patterns of use and transferred to DVD and the study has been conducted into two stages-visits focusing mainly around subscription based Digital TV service providers (two thirds with SkyDigital, one third with Telewest and NTL).

The key findings are, that first of all interactivity was regarded as a “dirty” word. Viewers associate digital interactivity with commercialisation, hidden costs, security risks, technological problems, poor customer services, and time wasting. Younger viewers were more positive than older adults, although issues concerning cost and risk were a factor in their media use. Positive associations included genre specific channels (e.g. sports, music), easy access to friends and family via online chat and mobile phones, picture/music libraries and exchange, online bargain hunting, electronic programme guides, and personalising media products. Furthermore Interactive media design should appear direct, time-saving, and non-commercial to users.

Regarding interactive functions, most of the respondents used few functions, preferring to focus on familiar functions suitable for their needs, rather than trying out a variety of functions. Within the same households, knowledge and use of functions varied considerably. Teenage children were the most comfortable with using a variety of functions, and confident in using the remote control. Women were the least confident in using the remote control. The favourite functions across all households were the electronic programme guide (EPG), multiple choices for sports, the information button, and personalising schedules.

Finally a third smaller scale study will also take place, focusing more on user interaction with a working prototype of a service scenario developed after the end of the above empirical studies, allowing for user feedback to drive the service design. This prototype will be produced in a form

that can be both taken to the houses of the original subjects of user questioning for evaluation and that can bring a sense of realism to the user interaction and user tasks.

## **4. Knowledge Transfer Events**

The empirical results of the user testing were used in the conception and delivery of the knowledge transfer events in a number of ways. Most important it provided a very useful snapshot of the real, rather than perceived or predicted relationships and aspirations users had for interactive broadcast. There are 2 main knowledge transfer events, and introductory presentation and associated breakout seminars and a two and a half day training event.

The seminar is aimed at presenting the results of an empirical research study looking at users' exploitation of interactive audio visual technology, their perceptions of it and their desires for the further development of interactive TV. Sessions regarding Digital TV technology, programme development, business models and economic implications will be also given by specialists in their fields. At the end of the workshop participants will have the opportunity of coming into small groups to brainstorm the implications of the data, discuss and exchange ideas on exploiting the potential of interactive TV services.

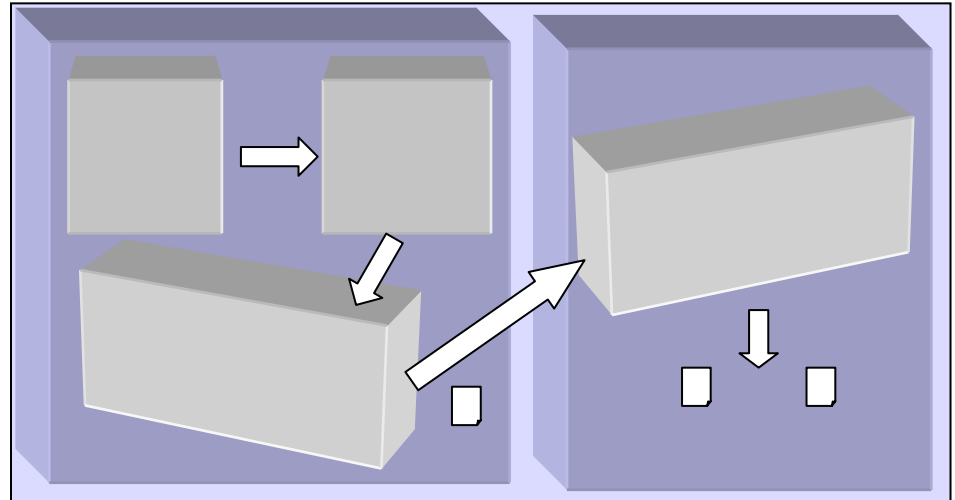
This is followed by a two day workshop will focus on methods for the creation of interactive TV services and applications as well as their underlying user interfaces (UI). This workshop is aimed at disseminating the innovative work completed at Brunel University that allows for the rapid-prototyping of services but crucially the semi-automatic translation of these prototypes into working broadcast services and promote the establishment of networks of contacts spreading beyond those already involved with iTV including digital media designers, interactive media developers, broadcasters, producers and directors. While on one level this could be seen as an introductory workshop, the nature of the technology demystifies the process of creating effective services quickly with active involvement of the participants in the design and development of a real iTV service scenario, and is equally valuable suited to well established professionals.

The main goal of these events is focused on drawing together large institutions with a significant portfolio of interactive TV activity, in terms of research and development and industrial application with smaller design agencies, which are very adept at the creation of interactive media but may not necessarily have had a great deal of experience of Interactive TV service creation directly.

## **5. Prototyping and Service Creation Tools.**

It is unfortunate but presently, Digital TV design tends to be technology-led rather than design-led. Development of Digital TV services is a very difficult task indeed and it usually demands the involvement of a variety of specialists. Although a number of specialists should be involved in the design and implementation stages this is often not the case. One of the biggest challenges in the creation of iTV applications-services is to hand over the user interface design, especially when designing for embedded systems, to people who have the expertise in designing UIs as opposed to those who know how to program the DTV system application. However the highly complicated technical and programming-centred nature of DTV service creation does not allow much room for the involvement of HCI design, user interface and media specialists in all the stages of the DTV service production.

Brunel University has made an effort to make the technology more transparent to the digital media and design community by producing a suite of tools that semi-automates the process of creating DTV services and by enabling experts to design user interfaces employing popular commercial graphical design authoring packages, such as Macromedia Director.



The solution is based on a three-stage UI production process, with the user interface design being divided into a two-tier solution. Mimicking the two main components of an application (front-end and back-end), the graphical part of the UI (front-end) is being produced independently from the actual application functionality that lies behind the UI (back-end).

Taking an overview, the first stage, is where the designer creates the graphical elements (components) of the UI using a commercial graphical design tool such as Adobe Illustrator, Photoshop or any other similar tools (see Figure 1). These graphical components are then exported as bitmap graphics. In the next stage these graphics are imported into the Macromedia Director authoring package to create and simulate the user interface layout, content (text, internet pages and snippets of audio and video). The User Interface Generation Tool then parses the Director file and outputs an XML description of the UI design. These two stages are entirely concerned with the graphical components of the user interface and therefore are responsible for the front-end.

The next and last stage deals with the back-end. The Application Generation Tool lists a number of DTV application functionality components/behaviours (e.g. play a video clip, launch a web browser, etc). This is a library of pre-made functionality behaviours that are written by software engineers and imported into the tool. Although the tool is focused around the European MHP<sup>1</sup> open standard it can very easily be extended to support various other formats for both set-top boxes and embedded terminals. From this list the designer is able to select the profile for the specified type of terminal, platform and middleware and then, in a drag and drop manner, map the relevant functionality to a specified UI component. This information is then saved onto the XML file (linking a selected UI component with the specific functionality) so that when the process has been finished the Tool exports the modified XML description of the user interface plus the DTV application that makes the DTV service. The tool is also able to transform the XML into an HTML format, so that the user interface can be also displayed in the end-user terminal or set-top box as a series of HTML pages as well.

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<sup>1</sup> MHP: the Multimedia Home Platform defines a generic interface between interactive digital applications and the terminals on which those applications execute. <http://www.mhp.org/>

## **6. Conclusion**

Digital Television is already in people's houses, and in the UK, soon all houses. This does not however ensure high penetration rates and user satisfaction. People involved with the creation of DTV services should reach out more to their audiences and listen to them and adopt a more user-led approach. Furthermore iTV specialists from different fields need to come together to discuss and collaborate more on Digital Television issues. UITS project has been drafted to contribute towards the above by conducting several empirical studies, and organising a number of events that promote both a user-led approach but crucially also a technological strategy that assists in the effective, efficient production of broadcast services. Finally Digital TV shareholders need to start thinking about the barriers to using digital media and come up with solutions in making the technology more transparent for usage by non-technical staff as well to ensure more creative, compelling, user-friendly and accessible Digital TV services.