Translating Principles of Web Design and Information Architecture to the Development of Interactive Television (iTV) interfaces

ABSTRACT
This paper discusses the application of information and interaction design principles to the design of iTV (Interactive TV) applications. It details the authors’ experiences of teaching a subject in Digital Information & Interaction Design as part of a postgraduate program in Interactive Multimedia. Students worked on a design project for a common client - Austar, a Subscription TV and iTV service provider in rural and regional Australia - in which they developed the information architecture and interaction for proposed new iTV applications.

The paper begins by defining iTV in relation to the Subscription TV service offered by Austar. It will also contextualise this against other forms of iTV which exist but are not yet possible within the infrastructure available in Australia.

iTV was chosen as a novel alternative to designing web interfaces. The students were more than familiar with designing for web environments. iTV presented students with a new technology which many had never experienced directly, as well as new challenges in learning about its constraints and possibilities.

Finally, the paper details the design process undertaken by the students, and the difficulties faced in their attempts to translate and apply their knowledge of HCI and web design to the development of iTV interfaces.

Author Keywords
Interactive television, information architecture principles, web design deliverables, HCI education

ACM Classification Keywords
H.5.2 [Information Interfaces and Presentation]: User Interfaces — evaluation/methodology, prototyping, user-centered design

INTRODUCTION
This paper discusses the application of information and interaction design principles to the design of iTV (Interactive TV) applications. It details the authors’ experiences of teaching a subject in Digital Information & Interaction Design as part of a postgraduate program in Interactive Multimedia. Students worked on a design project for a common client - Austar, a Subscription TV and iTV service provider in rural and regional Australia - in which they developed the information architecture and interaction for proposed new iTV applications.

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WHAT IS iTV? WHY iTV?
Austar offers Subscription TV to regional and rural Australia. For their subscription fee, subscribers have access via satellite to over a 100 digital television channels which are not available as part of the free-to-air terrestrial TV. In addition, there are Interactive TV applications accompanying the Subscription TV service, such as:

• electronic program guide (EPG), in which viewers, via their remote control are able to view upcoming programming schedules and set program reminders for each channel
• interactive radio, whereby users can choose a song from a range of music genres via their television set using their remote control
• casual games which users can play using their remote control
• box office, in which viewers can browse through pay-per-view movie information, before purchasing by phone.

Over and above these applications, viewers also have access to a number of program enhancements. Program enhancements are interactive by nature as viewers can select suitable video or text based content to obtain more information about the program. Program enhancements are available for use when the program is being broadcasted. These include:

• weather enhancement, in which users can personalise the weather application to deliver weather information for a specific postcode.
• sports active, in which viewers can select different camera angles and views of a football, tennis, cricket or basketball game. Game statistics are also available for consumption.
news active, in which views can select a news topic from an eight-screen mosaic to obtain ‘on demand’ information.

The interactive services offered by Austar represent a small sample of what is technically and ‘interactively’ possible in the realm of iTV.

Jenson (2005) categorises three forms of interactive TV:

• Enhanced TV, where services allow viewers to interact with a television show (access extra information during a broadcast)
• Personalised TV, where services allow viewer to record and pause television programs or even ‘planners’ that allow viewers to be sent reminders of when a program is due to be broadcast
• Cross Media Interaction, where services allow the viewer to use other media to participate during or after a broadcast. Including the ability to play along with a game show or choose a particular player for the camera to follow during a sporting event.

Jenson in Bird (2003) also outlines the range of forms and genres of possible iTV applications. They have been categorised in the following groups:

• Information Services:
  • News
  • Weather
  • Lifestyle and Horoscope
  • Government and Local Information
• Communication Applications
  • Email and Short Message Service
  • Chat
• Enhanced TV
  • One-way enhanced
  • Interactive Sports
  • Two-way enhanced
• Games
• T-commerce
• iTV Advertising
• Personalised TV
• Electronic Program Guides
• Personal Video Recorders
• Internet Television
• Datacasting.

THE PROCESS
Students began the design project by being briefed by the client at their Sydney headquarters. Students were able to directly experience Austar’s iTV services and interact with these via a television remote control in accordance with typical users. Austar identified the need for an interface redesign of their interactive radio application, and the design of a new push video-on-demand service.

Following this, students identified a target audience or market segment for whom they would design these services. Students selected groups such as women with children (as a new market which current iTV services do not target), students and teachers (educational institution subscribers) and older, late adopters. Undertaking their own research into these users, students produced user profiles and personas following the same process as for a web development project. Subsequently, user scenarios were written detailing typical motivations for and situations of iTV use. From there, specific tasks pertaining to the use of a particular iTV application or service were analysed and deconstructed step-by-step. These tasks were then flowcharted to streamline process flows before any attempt at visualising the interface. It is worth noting that all the abovementioned deliverables - user profiles/personas, scenarios, task analyses, flowcharts - are as relevant to web-based projects as they are to designing iTV interfaces.

Students began the process of developing their iTV interface designs using storyboarding, wireframing and paper prototyping techniques as per for web-based designs. This involved initial rudimentary iterations using sketches and Post-It notes, before progressing to walkthroughs with more refined paper-based prototypes, then producing screen-based electronic prototypes. A key resource used throughout this interface design process was the Nielsen/Norman Group’s Paper Prototyping DVD: while the methods and tools described were illustrated using web sites, and device-based interactions, they could also be extrapolated for iTV interface design.

Students were also required to demonstrate the relationship between specific user tasks and iTV functions by developing an overall information architecture blueprint showing structure and hierarchy of screens, as well as a complementary content inventory listing the information displayed on each screen. Again, these were equivalent to the deliverables that can be expected in a web development environment.

THE HURDLES
The transition from producing deliverables for the more familiar environment of the web to developing equivalent ones for iTV was straightforward for most students. The greatest difficulty students encountered was understanding the experiential differences between web and iTV consumption.

The dominance of usability concerns and discourse in web development meant that students tended to approach the design of iTV applications in a predominantly utilitarian way. iTV represented a valuable antidote to ‘usability is king’ principles of web development. Students were forced to consider interaction with iTV as the design of a holistic user experience, rather than just a series of tasks to be achieved as quickly and efficiently as possible. As opposed to many web information seeking
experiences, iTV user experiences are quite often immersed within broadcast content, existing as enhancements to ‘lean back’ programming. Students needed to consider information architecture solutions that allow broadcast programs to be monitored in the background. iTV research has shown that users are willing to invest time in learning new applications and services, and will persist if the interface is not intuitive (Chorianopoulos 2005), in stark contrast to Nielsen’s (2000) recommendation that web sites must have ‘zero learning time or die’. Comprehending such differences has, in turn, altered students’ approach to web design in terms of giving primacy to experiential and emotional factors of online interaction as much as to usability considerations. Apart from the experiential differences between web and iTV interactions, students also had to grapple with the informational differences: that is, there are more limitations in the design of information for viewing on a television screen; compared with the amount and format of information that can be accommodated on a computer screen.

Another key challenge for the students was understanding the constraints of interaction with a television remote control and its impact on navigation. There was a tendency for students to revert to interface designs which were ‘web-like’ in their assumptions of mouse and keyboard interaction. Students had to be consistently reminded that there are only three main types of remote control interaction:

- numbers
- up / down / left / right
- colour buttons.

These navigational constraints (including not being able to search as in a web environment) were not initially fully understood by students as they designed information structures for iTV. Some students produced early web-like deep structures that would be difficult for iTV users to navigate to using only a remote control. More successful structures were developed by students who were able contextualise use of the remote in relation to ‘paging up and down, left and right’, navigating to ‘next’ screens, or using number or colour keys to directly access available options. Some students included ‘click’ or ‘rollover’ actions only possible by a mouse in a web environment in early prototypes.

It was helpful equating the possibilities of interaction with, for example, how a user might navigate the menu of a DVD. Alternatively, it was suggested that students should design as if users could only use the small portion of a computer keyboard which is usually located on the right hand side, consisting only of numbers and arrow keys.

Another challenge came in adopting the traditional deliverables and techniques of information architecture for iTV. In relation to site structure, traditional methods of site map representation did not adequately represent the flow of screens and ‘overlays’ that could be made possible by iTV. The authors adopted an approach suggested by Peters (2002) who in describing information architecture deliverables for iTV suggests:

‘As a new medium, interactive TV (iTV) allows the user to access and navigate information in a different way. In order to clearly illustrate such an experience, the information architecture deliverables demonstrate a more cinematic approach to mapping out the user experience. For example, a “site map” is not an appropriate document – because it is not really a “site”. On the other hand, a “process flow” provides a similar function while not constraining the experience to a particular hierarchy.’

Based on the Peters (2002) approach, students were required to produce a ‘process flow blueprint’ and a corresponding content map spreadsheet that documented content on each screen as well as navigational elements. These two interlinked deliverables would also correspond to more detailed ‘wireframe screenshots’ with the same numerical system.

When developing user personas and scenarios students needed to be reminded that iTV is quite often a shared experience enjoyed by groups in contrast to web experiences that are more often individualised and personal. Kuniavsky (2004) discusses the usefulness of developing group personas for entertainment environments, specifically amusement parks, where there may be shared family or ‘gang’ needs, goals and motivations similar to those of a shared iTV environment. Students were encouraged to consider extending their persona development to accommodate group personas and scenarios where appropriate.

CONCLUSIONS

The authors’ experiences demonstrate that there can be benefits to teaching Digital Information & Interaction Design principles to students using an unfamiliar technology such as iTV. It was found that the techniques and tools of web development could be easily translated and adapted for the design of iTV interfaces. Therefore, this may also be applied in the future to other technologies, new and emerging, for which students have never designed.

Introducing students to a technology with which they were not familiar, iTV, was a valuable in providing new learning challenges. Students could not rely on their extant knowledge about designing for the web. Rather, there were fundamental differences in the consumption of web and iTV which had to be considered, such as the prevailing task-oriented utilitarian approach to designing for the former, in contrast to the accepted experiential and emotional nature of iTV interaction. Comparison of these environments also lead students to think about alternatives to designing for the web which move beyond just prioritising usability, by balancing these with the more abstract and affective concerns of user experience design.
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