

Which Channel Is That On?

A Design Model for Electronic Programme Guides.

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Abstract

The approach of this paper was to explore the Electronic Programme Guide (EPG) not as a stand-alone application but as a tool that is used in the context of watching television. Current EPGs appear to be based on style guides that propose sound guidelines for display, but do not take into consideration viewer interaction and interface issues. To address these problems, a design model for an EPG interface has been developed as a framework for designers to understand and produce EPG's with these issues in mind. The design model is based on television viewing strategies that people employ, in an attempt to increase the usability of the application. The model takes the form of a step-by-step guide. This is done in the context of three viewing levels identified in previous research. For an EPG to be successful it is recommended that it should be integrated into the viewing experience and not designed as a separate interface.

Keywords

Electronic programme guides, design model, interactive television, usability, interface, viewers, design, evaluation.

Introduction

"The main problem isn't a dearth of programming. It's finding what's on."[Mitchell, 1999]

With the advent of digital television there are the possibility of hundreds of channels and in turn thousands of programmes a user could potentially watch. Digital means choice, but choice can be confusing. A user needs to have a clear and easy use guide, menu system and navigation to avoid confusion and find programmes of interest.

Design guidelines for digital television generally exist in the form of style guides distributed by individual broadcasters to television production companies. These guides recommend font size, safe areas of the screen, and sometimes even colours. The provision of these guidelines raises the question of whether they alone are sufficient enough for design of an Electronic Programme Guide (EPG). As well as the aesthetics of designing for the television screen, there are other issues that contribute towards a successful EPG. These include design issues relating to navigation and menu systems, user input and user feedback, and information architecture.

A major challenge for digital television is that in the past the television has generally been used as a “sit back” medium. This refers to the passivity of the viewer towards the television, who would generally just change channels using the remote control, with little else to do except watch. Now with interactivity and the huge range of programming choice that digital television offers, the user may adopt a “lean forward” mentality, actively engaging in programming content and setting viewing preferences.

The approach of the paper is to explore the EPG, not as a standalone application but as a tool that is used in the context of watching television. The motivation to use the guide, the individual experience that one has with the guide, and the social environment in which television is watched, all contribute to the user experience. A design model is presented that aims to provide a framework for designers to understand and produce an EPG interface with these issues in mind. Rather than empowering people through endless choice, a well-designed EPG can empower through ease of use and provide choices that are relevant to the viewer.

The rationale for developing a model

The rationale for developing a model for an EPG revolves around the fact that the television is making the transition from a passive device to an interactive device. This is a unique challenge for designers as no other medium has made such a transition. There is an established understanding of how the television works, that is, what a viewer can expect when pressing a different number on their remote control. This has developed a level of “trust” between the viewers and the medium of television.

By introducing interactivity to the medium, designers must be cautious to maintain this trust level by designing applications that are easy to use and in accordance with the composition of television, and the expectations people already have about the medium. The EPG is a clear example of the interactivity now available, and it commands the use of different cognitive skills.

The model for design of EPG should address this transition from “sit back” to “lean forward”. However from research and theories analysed, it is proposed that the EPG should be designed to suit the “passive” viewer as much as possible. It should not detach viewers from their primary focus of watching television.

Although there are design guidelines for television display, these guidelines generally refer to presentation of content and do not go far enough in examining human behaviour and interaction with the television and remote control. EPG design should acknowledge that people have a preference for choosing information sources that require minimum effort and that do not distract from the act of watching television.

A successful EPG will benefit broadcasters by allowing viewers to watch programmes easily, but also benefits in a more subversive manner. When a viewer uses an EPG successfully, there is the opportunity for the broadcaster to be seen as “helpful and informative”, and therefore increasing the brand awareness of the broadcaster. This helps to create a stronger relationship between the broadcaster and the viewer. A successful EPG can also help to attract advertisers and therefore additional revenue streams.

By providing a model for design of EPG, the end user also benefits as they use an interface that should be intuitive and helps them to achieve their goals. This model will benefit the practice of design by adding to the small but growing area of design for interactive television.

What the Model will Illustrate

The model is structured around a step-by-step design process of producing an EPG interface. A style guide accompanies the model. The approach is a holistic one, taking into account all elements that make up an EPG (technology, content, display and interaction) and user research. The scope of this model is based on the analysis of the previous research and acknowledges the limitations that arise from the current digital television technology available.

This model is to be used as a framework for designing EPG and is not a specification of standards. The overall framework allows designers flexibility because content and features of EPGs vary from broadcaster to broadcaster.

Another reason why the model is not a strict set of rules is to cater for new content and features that will no doubt be introduced as time goes on. It is recommended that a style guide (refer to Appendix A) should be adhered to because television screens have technical difficulties in displaying some designs.

The Model

This model is essentially based on user behaviour. Previous research [Taylor and Harper, 2002] suggests that users have different goals depending on the time and context in which they are watching television. Therefore why not provide specific tools to match these behaviours? Three types of viewing are defined with examples in the study conducted by Taylor and Harper[2002]:

Level One:

The first level of viewing involves a low level of user engagement and planning, with the viewer prone to switch channel until something of interest is found. The focus is on what is on immediately and what is on next. Level One viewing is usually conducted immediately after work or school.

“...I will turn the television on and just flick through the channels when I come in, and probably keep it on and wander around doing whatever I’ve got to do.” (Female, West London, 45+)

Level Two:

The second level of viewing is usually done communally with programmes falling under general interest categories such as news, soaps, and game shows. These programmes are usually on every day or week and so prior knowledge of the schedule prompts a viewer to sit down and watch the programme. Level Two viewing is usually conducted mid-evening.

“I’ve got a through lounge so I always make sure that my dinner is prepared just before Eastenders comes on.” (Female, South-east London, 45+)

This observation is further supported by Gauntlett and Hill [1999] who found that television programmes, especially news and soap operas provide fixed marker points within the day’s timetable.

Level Three:

The third level of viewing shows a high level of engagement with short term planning (from a week in advance to a day) and include programmes such as documentaries, dramas, current affairs. At this time, individual preferences were important. Level Three viewing is usually conducted later in the evening.

The model outlines a step-by-step plan to producing an interface for EPG in the context of these three viewing levels. They are referred to herein as Level One, Two, and Three viewing. It should be noted that it is possible for one person to be a viewer at all levels in one day. The steps have been identified through production experience.

Step 1: Define technological boundaries.

Identify the system hardware such as the set-top box specification and authoring tools appropriate for the platform and broadcaster. The criteria for these are specific to each broadcaster.

Step 2: Identify user goals using a tiered approach.

Level One viewing goals are immediate – the user wants to watch something of interest with a minimum of effort.

Level Two viewing goals are to watch regular programmes of interest.

Level Three viewers want programmes that are of high interest to them and will want to plan ahead to avoid missing programmes.

Step 3: Define and gather content.

This model proposes that content should be appropriate to the needs of the user in the context of the three types of viewing goals identified above. For levels one and two the programme title and genre should be adequate. Extra information suitable for these levels could include the length of programme or how long is left. Level three requires in depth content. As well as the title, genre, and the length of programme, other information should be displayed such as a description and depending on whether it's a drama or film, the actors and director.

Existing content management systems must be considered as well as the processes for collecting and displaying content. A content management system should be in place to allow updates to changes in schedule. If errors occur with the programme information on a regular basis, users will be less inclined to use the EPG so it is important that the back end technology and editorial team supporting the scheduling information are of a very high standard.

Ideally, a back-end should be in place that allows immediate updates to guides in people's homes. When new information is added or updated, this triggers a download of the new information to peoples STBs or downloads regularly every 5 minutes.

Step 4: Define levels of search using a tiered approach.

The search should be specific to a user's aims. Taking into account the goals at Level One viewing, viewers could well utilise "now and next" searches.

As Level Two generally involves prior knowledge of a programming schedule there is a reduced need for a search tool. However, providing a search functionality that caters to similar tastes would support viewer interests at this time. Level Two viewing could therefore utilise a themed search.

Level Two & especially Level Three could benefit from personalisation – the system recommends programmes based on previous viewing. This type of passive "search" fits in well with the inactive nature of television watching.

Level Two viewing automatic searches could bring up programmes of a similar genre that are on at a similar time, whereas Level Three automatic searches could bring up programmes of interest that share actors/directors with programmes of previous viewings and would be for anytime between that night's schedule to the following weeks schedule.

Overall, options to search at all levels should be made available at any time because user behaviour varies with individuals and can never be a hundred per cent predicted. These options should not interfere with basic usage.

Step 5: Map out information architecture.

The aim of this step is to identify the shortest, simplest routes in getting a viewer to achieve their goals. The map would highlight exit and entry points to the various sections of the guide, the level of content the user is viewing and how many screens the viewer has to pass through the get the information they seek.

This step might draw attention to the need for "separate" guides depending on the user goals. Level 1 viewing appears to benefit most from a Now / Next approach where a text box appears on top of what is currently being viewed. Because of the depth of information required in Level 3 viewing a full screen guide is more suitable. However care must be taken to avoid too many interfaces that involve further learning for the viewer. Multiple interfaces could be effective if navigation is kept consistent, for example, using the same buttons for moving between channels whether a viewer is looking at a Level 1 or a Level 3 interface.

Step 6: Identify elements for each screen.

This step is essential for allocating limited screen space in an appropriate manner. Elements can be divided into two groups: essential and function specific. Essential elements include global navigation tools such as an exit button, a back up one level button, and a help button. As these are elements that are extremely important for navigation and would be used frequently, they should be made available as buttons to be used directly from the remote control.

To maintain the viewing experience, an area of the screen where the current channel can be viewed should be visible. Branding and possibly advertising would be seen as essential elements as well. Function specific elements are up to the discretion of the designer and the feature s/he is designing around. For example, the what's on now and next functionality would demand an easy way to navigate through what's on now and next not only on the current channel but on other channels.

Elements would then be divided into those that can be designed in the graphics layer and those that are part of the video layer.

Elements on screen should maintain consistency with other services and with remote functions. For example, the same exit button on the remote is used for the EPG as is used to exit other services. There should be a direct correspondence between on-screen elements and the design of the remote control (colour of buttons, symbols etc).

Step 7: Design on-screen visuals

Once elements have been decided on, design work can then begin on the visual appearance of the screen. Important first decisions before design begins are: decide on resolution and method for producing graphics to this resolution, identify safe area for screen, decide on colour palette within range that is compatible for the broadcaster. Horizontal scrolling should be avoided for ease of use. (Specific detail is given within the style guide in Appendix A.)

Step 8: Build working prototype, test and evaluate.

The prototype is a combination of the information architecture, element identification and design of the elements being programmed to the appropriate technological standard identified in step one. Testing on hardware such as the set-top box and various television monitors (including black and white) should be conducted and any technical bugs ironed out.

Test download speed using the set-top box the EPG will be produced for. Unlike using the web, when watching the television, users are used to getting instantaneous feedback: the programme appears the instant a remote control button is pressed. Television applications and services, in particular the EPG, need to meet this standard as closely as possible. Only then should the prototype go to user testing. Users should vary in age and ability to get the most accurate results possible.

In regards to evaluation, the prototype would benefit from assessment using Serco Usability Services general usability guidelines for EPG's [Serco, 2002]. The EPG interface should also be evaluated using heuristics developed for interactive television: interference, intrusiveness and applicability [Lamont and Ali, 2000] (refer to Appendix B).

Use of Model for Evaluation Purposes

As well as using this model as a precursor to designing an EPG, designers can also apply it as an evaluation tool to determine whether current services consider the three levels of viewing.

In this context, here are examples of Sky's EPG functionality and their relation to the viewing levels.

Now and Next functionality recommended to cater for Level One viewing can be seen working in Sky's Search & Scan banner (Figure 1). The design of this functionality means that the user does not have to exert much effort to change programmes.

Figure 1: Now & Next Functionality – Sky’s Search & Scan banner



Activated by pressing the select button on the Sky remote control, this screen shows what is now and next on the channel being watched. Using the left and right arrow keys the user can search through other channels to show what is now and next, without changing channel.

As discussed earlier, Level Two viewing would benefit from a themed search to find similar programmes in the genre of interest, for example, other game shows, news etc. Sky cater for this level of viewing by providing genre searches (Figure 2).

Figure 2: Search by Theme – Sky’s Genre Listing



Activated by pressing TV Guide button on the Sky remote control, this screen shows genre listings. A genre is chosen using the up & down arrows.

The theme grid shows all listings for the current day and next seven days. Genres are broken down into subgenres, for example Entertainment is broken down into Comedy, Drama etc.

Level Three viewers would be more likely to use a grid or list format as personal preferences & high levels of engagement dictate usage at this level. Figure 3 shows an example of Sky’s grid.

Figure 3: Full listings – Sky’s Programme Grid



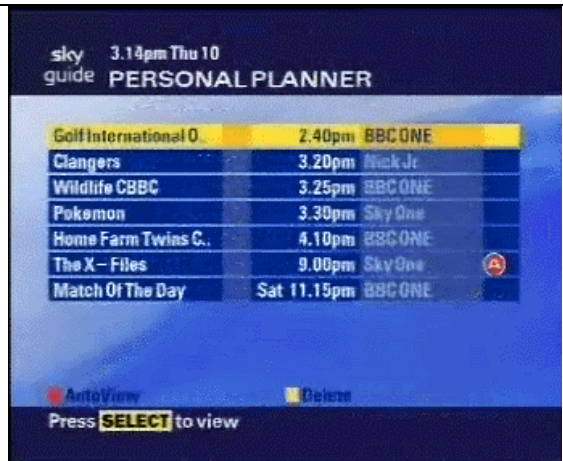
Activated by pressing TV Guide button on the Sky remote control, then the 'All Channels' option, this screen shows the programme grid.

The limitation with an on-screen programme guide becomes evident with full listings: limited screen space does not allow the user to quickly glance across a week’s programming in the same way a print guide does.

Sky does provide brief information on each programme, but as yet there is no option to search for films/programmes by its meta-content such as actors, directors, theme of documentary etc.

Sky’s personal planner (Figure 4) caters for Levels Two & Three viewing with their reminders and automatic start options available for programmes of interest. A series link allows the next episode in a series being watched to be recorded.

Figure 4: Personalisation – Sky’s Personal Planner



Activated by pressing TV Guide button on the Sky remote control, then the 'Personal Planner' option, this screen shows the planner.

Conclusion

This paper has presented recommendations for designing an EPG interface. It was inclusive of user research, technical limitations and existing guidelines for digital television. These recommendations were structured in the form of a model. The model was primarily aimed at designers and programmers for use as a reference when designing EPGs.

The main implication for EPG design is that viewers have a preference for choosing information sources that require minimum effort. They do not want to be distracted from the act of watching television. Television *viewers* are more passive in action and prefer to be given information, in contrast with computer *users* who are active and instruct. The objective for EPG designers should be to maintain the sense of ease and passivity that accompanies television watching, not to change viewers into users.

The television is part of a consumer electronics world that is populated by a type of user whose demographics, skills and goals differ significantly from those of computer users. It is primarily for this reason that the model has been developed in line with researched viewing behaviour.

Where applicable, stages in the design process are applied to match each of the levels of effort exerted by the user. For example, when the designer reaches the stage of defining content for the EPG, the model recommends content for each level of viewing. A Level One viewer would need the minimum amount of content necessary for making a decision. This should include the programme title, genre and length. Level Three viewers would benefit from being shown more in depth content such as plot description, actors and director.

A limitation of this model is its limited applicability to daytime & weekend viewing. People view programmes which they would not have watched on weekdays when time was more limited [Gauntlett and Hill, 1999]. Further research could explore whether viewing on weekends is preplanned or less structured. Another aspect of research could investigate whether the tools used to plan programmes vary with gender and age

The underlying digital television technology differs in ways that greatly influence interface design strategy. Existing style guidelines provide good examples of display rules and take into account the limitations of designing for the television screen. For designers' reference a style guide is presented that supplements the model. The design criteria for this guide are based on the principles of ease of navigation and clear functionality.

Print guides remain strong competition for EPGs because of user familiarity. As digital television becomes more prevalent, more people will become exposed to EPGs. If EPGs are to succeed, then they should be designed in accordance with how people currently behave. This would enable them to be accepted more easily and might also then be designed to lead users towards new forms of viewing in a gradual way [Taylor and Harper, 2002]. This line of thinking is echoed by Schatzberger [2002] who proposes that the physical design of the EPG should be organic in nature, giving it the ability to grow with user's interactions.

It is up to designers to further the application by keeping in mind other issues apart from colours and fonts such as the motivation to use the guide, the individual's experience and the social environment in which television is watched.

The EPG should be designed with the aim of true integration with the act of television watching in mind. The ultimate goal for the EPG would be to emulate channel surfing in its use as a natural, automatic part of watching television.

This research and model has significance for the wider design and development of digital television applications. Applications should be designed with usability as a priority rather than interactivity. Instead of trying to make television users "lean forward" with new applications, perhaps designers should be aiming for navigation and concepts that fit in with current television watching behaviour which is more laid back.

To gain a better understanding of human behaviour related to television watching, further questions that should be investigated include: What are the criteria one uses when searching for a programme? What are the criteria one chooses to watch a programme? How far ahead do people plan their viewing? Morning / daytime television watching – is this similar to coming home, mid evening or later evening viewing? To what degree do people want / use personalisation of content?

Nielsen [2001] is quoted as saying "digital television is a solution in search of a problem". With the spawning of many more television channels that digital bandwidth allows, it has become apparent that finding out what is on amongst the "dearth of programming" is the problem. A well-designed, viewer-oriented EPG is the solution.

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Appendices

Appendix A: Style Guide

Where defining specific measurements, the scope of this style guide is limited to the dominant television standard in Europe known as Phase Alternating Line (PAL).

Overall

- Dialogue – use polite, easy to understand, conversational language, avoid computer language
- Elements that are close together, share similarities in shape, colour and size, and are enclosed by lines suggest to the user that they are related.
- Try to achieve a balance between large, legible text, and enough information on-screen to minimise scrolling.

Resolution

- Define appropriate resolution. The resolution for PAL is 720 x 1280.

Area

- Design within safe area pertinent to broadcaster. The safe area for PAL is 592 x 480.
- Keep text and information about 45 – 50 pixels away from edge
- Design for 16:9 aspect ratio

Font

- Use fonts 18 points and above depending on font style. (See appendix D for examples of fonts currently used on screen.)
- Use sans-serif fonts, aiming for 3 pixels in thickness to reduce flickering on screen
- Use uppercase sparingly as it is slower to read than mixed case.

Graphics

- Test graphics on television monitors - check for flicker of graphics.
- Judge when it is more efficient to include images as bitmaps rather than hard-coding pixels directly to the STB.
- Adjust graphics for horizontal distortion by resizing to eighty-nine per cent before exporting to STB or alternatively create graphics at 809x576, then resize to 720 x 576.
- Use non anti-aliasing on graphics.

Colour

- For PAL, limit RGB colour values to between 16 – 236

- Be wary of flicker of certain combinations adjacent to each other: black & white, red & blue, yellow & purple, red & green, blue and yellow, green & blue
- Define a colour palette within the RGB range and be sure that all graphics and text conform to this palette. Consider corporate identity elements, variations of icons, buttons and text.

Appendix B : Interactive Television Heuristics [Lamont and Ali, 2000]

Lamont and Ali [2000] developed three heuristics to be used specifically to rate the content of applications for interactive television. These are: *interference*, *intrusiveness* and *applicability*.

- Interference is the degree to which the interactive content obscures the content of the show itself.
- Intrusiveness is the ability to interact with the interactive content while still being fully engaged in the TV show.
- Applicability is the degree to which the interactive content is related to the content of the show itself.