The potential of visual navigation

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Abstract

The proliferation of content available in the home and increasingly sophisticated recording and delivery devices pose some interesting challenges to the consumer, programme providers and industry alike. How are viewers going to make their choices of content to watch and to archive in the future? More can be done to create navigational tools and interfaces to contribute to consumers' enjoyment of the experience of finding content, and to keep them with our content or services for longer. The industry has thirty years of experience working with text. However, Television is a very visual medium and we are very visually aware. So why do we not capitalise on this in our design processes? This paper describes a study carried out at the BBC to test various visual design features and to learn from our viewers and users in order to design compelling interfaces for the future. Twelve participants examined nine visually-led interfaces taken from television, the internet, and games. The results of this large study are highlighted in this paper.

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THE POTENTIAL OF VISUAL NAVIGATION

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ABSTRACT

The proliferation of content available in the home and increasingly sophisticated recording and delivery devices pose some interesting challenges to the consumer, programme providers and industry alike. How are viewers going to make their choices of content to watch and to archive in the future? More can be done to create navigational tools and interfaces to contribute to consumers' enjoyment of the experience of finding content, and to keep them with our content or services for longer. The industry has thirty years of experience working with text. However, Television is a very visual medium and we are very visually aware. So why do we not capitalise on this in our design processes? This paper describes a study carried out at the BBC to test various visual design features and to learn from our viewers and users in order to design compelling interfaces for the future. Twelve participants examined nine visually-led interfaces taken from television, the internet, and games. The results of this large study are highlighted in this paper.

INTRODUCTION

In the short term next-generation set-top boxes and Personal Video Recorders will provide guides to content both live and stored. In the longer term next-generation consumers are likely to have grown up with the experience both of great choice and the experience of manipulating digital media from an early age. To understand these shifts and capitalise on them the industry needs to be aware of multiple paths of media consumption and how people are going to enjoy accessing their media. Technology development in the form of delivery systems and content are becoming increasingly intertwined. Design plays the fundamental bridging role, bringing people into content and services and keeping them there. It links the point of access to the quality of the experience. So why don't we?

BACKGROUND

Creative Research & Development are particularly interested in the intersection where audience behaviour impacts on the consumption of digital media and where trends in technology development impact on our audiences. CR&D formed a Visual Navigation Group with the Navigation Group at BBC R&D to link our understanding of audiences, with our understanding of technology. Primarily we question some industry wisdom and research whether offering something more adventurous would necessarily be rejected as too difficult. Is everyone always a couch potato?

Fig. 1 - Usability Lab R&D

HISTORY

There is a long history of people experimenting with visual interfaces. But the learning from this work has not impacted on the mainstream of broadcasting. Personal Computer interfaces from Xerox Parc, Atari, Apple and others in the 70s and 80s, and the development of 3d interfaces in the 80s and 90s accelerated and improved with real-time rendering and immersive Virtual Reality. Research done for the PC is now growing in use and application in business (scenario-planning), research (simulation), education (collaborative worlds), warfare and gaming. (1) Perhaps we could transfer some of the lessons learned into the world of broadcasting.

Visually-led navigation

We are very visually aware. Our first impressions are vital and are most usually based on what we see. We have both spatial awareness and memory which helps us "see" our way back from places both real and virtual (2). Research points to differences in approach taken by men, women and children (3) (4) when it comes to performing spatial and visual/spatial tasks. How can we apply this understanding to our medium?

RESEARCH OBJECTIVES

We define navigation as the way we work to enable people who come to our content to understand what it is, how to find it, chose it and experience it in as an enjoyable, intuitive way as possible. This research is predicated upon the belief that the mode of navigation and the experience of moving between and through content, in itself will play a significant part in increasing the access to, and use of, interactive services. Also that there may be significant differences when it comes to designing for children, teenagers, women and men, not to mention access issues and cultural and ethnic differences.

Our research isolates particular features of visual navigation that people liked and disliked, and starts to define whether a more visual playful, discovery-based approach is something that could be perceived to be both enjoyable and different. While the group has researched the types of audiences who might benefit most from this approach we have not tested the interfaces against specific audience groups at this stage. This would be a much larger, but critically important next step.

Research questions

We had a list of questions we wanted to address. They were not questions we asked directly, rather we hoped to draw out the answers. Our results certainly touch on all of these areas.

1. What are the reactions observed when people try something new?
2. Do we find that having a different interface gives more enjoyment?
3. Can we see any evidence of impact on ease of use?
4. Can we see any evidence of impact on gender difference?
5. Is a more visual medium more attractive?
6. Is there any evidence of a more intuitive type of appeal when confronted with a more visual interface?
7. Does replacing a hierarchical text menu with a visually-led menu impact on experience?
8. When the task becomes more structured does the reaction change?

THE TEST

This specific test was designed to explore a combination of playful, exploratory and task-oriented activities. It was defined as a first phase to develop an early understanding of the basic usability of visual navigation interfaces, and the range of user reactions to these. It was also addresses various methodological issues such as the choice of evaluative techniques. We aimed to establish a baseline measure for our understanding of visual navigation interfaces in order to create a foundation for further research and implementation. This study is fundamentally an exploratory one aimed to generalise across the interfaces rather than to define and evaluate the differences between each user interface.

Twelve participants were presented with a series of nine user interfaces. Each participant started with a short period of exploration, prior to initial questions being asked. Then they were asked questions and given tasks specific to each individual UI. Participants were asked to think aloud during this period, and were encouraged and reminded to do so. In the case of participants who failed to do anything, or were obviously struggling, then this period was shortened in order to encourage interactivity.

After each UI, participants completed a questionnaire containing measures for 'fun' and 'ease of use' based on scales developed by Hassenzahl (5), along with a further ten questions that employed a 7-point Likert-style response. They were also asked to comment on which their favourite and least favourite interfaces were.

Second rate	1	2	3	4	5	6	7	Outstanding
Standard	1	2	3	4	5	6	7	Exclusive
Nondescript	1	2	3	4	5	6	7	Impressive
Ordinary	1	2	3	4	5	6	7	Unique
Conservative	1	2	3	4	5	6	7	Innovative
Dull	1	2	3	4	5	6	7	Exciting
Boring	1	2	3	4	5	6	7	Interesting

Table 1 - Items for Construct 'Hedonic Quality' (Fun)

Incomprehensible	1	2	3	4	5	6	7	Comprehensible
Obstructing	1	2	3	4	5	6	7	Supporting
Complex	1	2	3	4	5	6	7	Simple
Unpredictable	1	2	3	4	5	6	7	Predictable
Confusing	1	2	3	4	5	6	7	Clear
Shady	1	2	3	4	5	6	7	Trustworthy
Uncontrollable	1	2	3	4	5	6	7	Controllable
Strange	1	2	3	4	5	6	7	Familiar

Table 2 - Items for Construct 'Ease of Use Quality'

SETTING AND APPARATUS

The Participant Testing Laboratory at BBC R&D was used to host the tests. The laboratory was furnished to resemble a living room, though a small table with a PC was included to one side. Observations were made from behind a one-way mirror. All participants were filmed from a centrally-placed camera.

For the user interfaces on the internet a Pentium 4 Dell with G-Force Nvidia graphics card was used to run the tests. An LCD screen, mouse and keyboard were provided.

For the TV interfaces a Dell Pentium 3 running Director software was attached to a Sony 18" screen TV via a scan converter. All iTV demonstrators were presented to the participants through the TV screen, though interaction was achieved using a standard PC keyboard rather than remote control. The Zelda UI used a Nintendo 64 console with standard proprietary controller (Nintendo joypad).

PARTICIPANTS

Twelve participants were recruited from an external agency. There were five men and seven women from three age groups (18-24, 25-39, 40-50). The average age was 35.3 years. On average, participants came from a household of 3, with one child. These households contained nearly three TVs, 4 with DSAT, 4 with Cable and one with DTT. They claimed to watch between 8 and 14 hours of TV per week on average, though this was highly varied. All participants had a home computer, and all of these enabled home Internet access. Eight also had a games console. In general, their attitude to technology was positive with only 2 participants expressing a negative attitude towards technology.

Overall the participants represented a broad range of different ages and backgrounds. There was probably an above average interest in technology and the penetration of home PC and game console ownership is above the national average. This would suggest a slightly more technology aware and interested group than might be expected from a random sample. However, these participants were by no means characteristic of early adopters or other typical heavy technology groups.

THE INTERFACES

The nine interfaces comprised two prototypes from the BBC for future interactive TV, six websites and one console game.
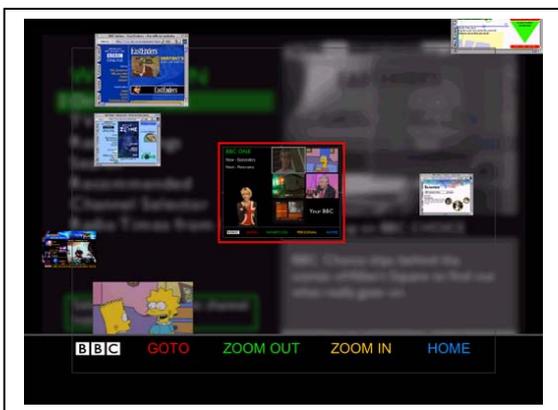

Fig. 2 - 2005 Navigator © BBC

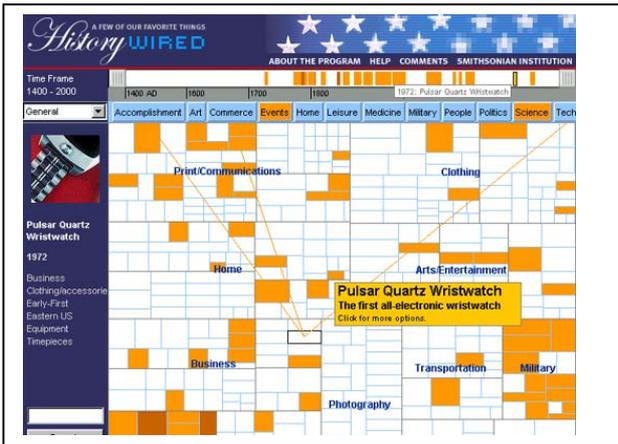Fig. 3 - Extreme Lives © BBC

Fig. 4 - History Wired © Smithsonian Institution
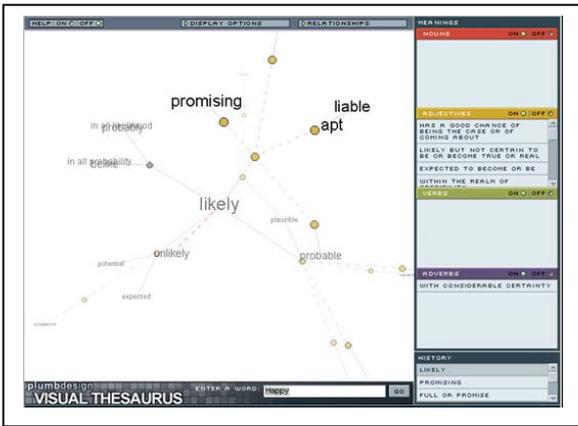

Fig. 5 - Glass Engine © IBM Research

Fig. 6 - Visual Thesaurus © Plumb Design

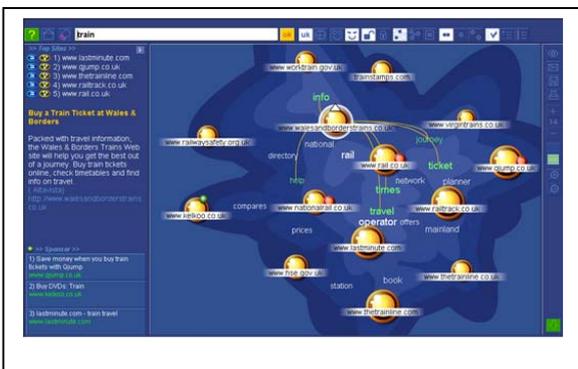Fig. 7 - Connections © British Council

Fig. 8 - Search engine © Kartoo

Fig. 9 - Jam:Tokyo-London © Airside

RESULTS

The primary interest of this study was to assess the effect of visual navigation generally, thus the choice of a broad range of distinct user interfaces. This section gives overall data across all UIs, removing where possible the effects of any specific UI.

In general, these interfaces are judged both fun and useable. Fun is rated more positively, however ease of use would be expected to increase with time. This study was an investigation into initial reactions. This is a scale of 1-7.

	Mean	*Sd.*
Fun	4.9	*1.4*
Ease of Use	4.3	*1.3*

Table 3 - Rating of Fun & Ease of Use

Fun

All the scales that make up the measurement of HQ (Hedonic Quality=Fun) were rated positively as we would hope of something that is designed to be novel and an alternative to the usual form of UI. We can conclude that Visual Navigation interfaces are fun.

Ease of Use

Visual Navigation interfaces are also useable for the novice. A mean rating of 4.3 for the ease of use is mildly positive. Only the Predictability scale falls below the neutral rating of 4 (3.9) for the UIs. It's not too surprising that something so novel should be considered unpredictable when you first try it. Overall, the mildly positive ratings of ease of use are encouraging for the future of Visual Navigation UIs, as the move from predominantly textual and non-manipulable to graphical and interactive does not appear to have come at the price of poor usability.

Questionnaire Responses

Visual Navigation interfaces also fared well in response to questionnaire. Visual Navigation interfaces were seen to be useful, useable and attractive. When questioned as to whether they would use the interface again, participants did not appear to be particularly enthusiastic. This might be due to the lack of real life motivation and a real-life task to perform using a Visual Navigation interface. If participants were faced with a real participant goal and a working visual navigation interface then this rating should move.

Comparing Participant Interfaces

As all UIs were measured using similar scales and questionnaires, some comparison is possible. As can be seen in Table 4 the UIs performed quite differently.

		Glass Engine	2005	Extreme Lives	Zelda	British Council	History Wired	Jam	Kartoo	Visual Thesaurus
Fun	**M**	4.6	4.3	5.0	4.2	4.9	5.1	5.3	5.2	5.5
	Sd	*1.6*	*1.7*	*1.3*	*1.6*	*1.2*	*1.3*	*1.5*	*1.2*	*1.2*
Ease of Use	**M**	3.7	4.0	4. 9	4.6	5.2	4.6	4.0	3.5	4.6
	Sd	*1.4*	*1.7*	*1.2*	*1.4*	*0.9*	*1.3*	*1.5*	*1.4*	*1.3*

Table 4 - Mean and Standard Deviations for Ratings of Fun and Ease of Use for all UIs

The Visual Thesaurus was rated the most Fun, with Jam, Kartoo, Extreme Lives and History Wired all being positively rated. Most striking is that all UIs are rated positively though the 2005 Interface and Zelda are fairly neutral.

The ratings of Ease of Use reveal a clear distinction between UIs. Two were rated negatively (Glass Engine, Kartoo) having a mean of 3.9 and under, 2 were neutral (2005, Jam) having a mean of 4, and the remaining 5 were positively rated, having a mean of 4.1 and over. Of these only the British Council appears to have particularly distinguished itself as usable.

Combining the Fun (HQ) and Ease of Use (EQ) scores shows some interesting differences between the UIs. The British Council, Visual Thesaurus, Extreme Lives and History Wired all appear to have been rated positively by participants, because they were both Fun *and* Usable.

Glass Engine	2005	Extreme Lives	Zelda	British Council	History Wired	Jam	Kartoo	Visual Thesaurus
8.3	8.3	9.9	8.8	10.1	9.7	9.3	8.7	10.1

Table 5 - Combined Hedonic Quality and Ease of Use scores for all UIs

CONCLUSIONS

In the introduction, eight specific research questions were asked. This early research has produced findings on most of these counts as well as pointing to where further research would be best directed.

Users consistently expressed a liking for visually manipulating and searching for information, commenting that graphical interfaces are easier, speedier, and more appealing than text-led alternatives. The most successful interfaces combined text and graphical elements; allowing users the comfort of the familiar coupled with the aesthetic appeal and intuitive understanding that visual navigation seems to confer.

In general, visual navigation interfaces were rated as both fun and usable. Fun is rated considerably more positively than ease of use, but this may be the case when unfamiliar and unusual interfaces are being tested. The more visual interface does not impact negatively on ease of use.

We looked to see if we could find differences in response to visual navigation according to gender. On two interfaces there were relatively dramatic divisions between genders, with substantially divergent ratings for fun and ease of use. Further analysis of why two particular interfaces triggered such a split is evidently required. It is also the case that men tended to rate ease of use more highly whereas women tended to rate fun more highly.

When interface-testing sessions moved from exploratory phases to explicitly task based phases, user responses to the interfaces changed. Interfaces that were heavily graphical and gave no sense of structure ceased to be viewed as fun or playful and came to be regarded as frustrating or annoying. When it came to trying to *do* something, the importance of clear structure and self-explanatory mechanisms for interaction came to the fore.

Learning from observing participants

All the interfaces had features that marked them out as "different" from the mainstream. Industry wisdom suggests that people will not try to master something new, rather they prefer to fall back on the tried and tested old ways of doing things. What, if anything, can we

tell from watching people confront nine interfaces that were mostly unfamiliar to them? The most striking thing was how prepared people were to "have a go" – before any prompting, many were off on an exploration. They did not always like what they found, but they did invariably have something to say prompted or unprompted. We have captured detailed observations which we will build upon in the prototype phase. Do we sometimes underestimate the capacities of our audiences?

Further research suggested by the findings

The future focus of research leading to prototypes will be on the means of increasing appeal and access to a broader and more varied user-base, including individuals and groups who might not have had access to or wanted access to digital services in the past. We will not only research audiences and design interfaces but we will test what may or may not be possible to achieve with the next generation set-top box.

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