User Experience Design Challenges and Guidelines for Next Generation TV User Experiences

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Abstract: High fidelity TVs, powerful set-top boxes, and hi-speed Internet are all enabling new TV viewing experiences. This phenomenon has spread to not just the physical viewing experience but also to the softer side of content in terms of new content, service delivery mechanisms and also new applications such as content on demand and interactivity with media and friends. TV enthusiasts now have access to traditional television content as well as Internet content, such as online videos, email, weather, traffic, and much more. This paper is about the challenges we face as design researchers in the area of designing and deploying next generation user experiences for TV especially from an applied research standpoint.

When moderating a series of focus groups to investigate user opinion about a set of future use cases some generic problems were discovered. We were also researching to identify further opportunities for research in the next generation TV user experience design. The focus groups were conducted using scenarios which embedded certain abstract design proposals for future experiences. The findings helped the team identify some of the challenges with design of TV user experiences and some potential guidelines to address the challenges.

Key words: Human Factors, Next Generation Television, User Experience, User Centered Design, Focus Groups, TV User Interfaces

1. Introduction

High powered media PCs, advanced set-top boxes, broadband internet connections, and larger, high-resolution televisions are enabling new viewing experiences everyday [7, 8]. This phenomenon is further fuelled by increasing availability of media content. There is traditional broadcast of TV content, content on the web (usanetwork.com, abc.com, nbc.com etc.), and also user generated content. To this mixture if one adds web 2.0 phenomena as information (e.g., traffic and news) and communication (chat with social network) then the picture of a rich set of applications forms itself. Such content consumption needs have created new opportunities for innovative content delivery mechanisms and revenue models. For instance, it is not hard to foresee use cases such as this one: a news show host is providing the news of the day and the user is listening to it as well as querying the next day's weather and possibly golfing conditions on the same TV set. Also, on the other hand the TV could just be the pure entertainment device with superb audio-visual quality.

When doing a series of focus groups to validate some use cases (and to investigate further opportunities for research in the next gen TV space) we came across the below mentioned user experience related problems or challenges. Therefore this paper is about the challenges we face as design researchers especially from an applied research standpoint. Findings reported here were found to be very useful to the team when designing prototypes of next generation TV services. The focus groups were conducted utilizing some very creative scenarios which embedded abstract design proposals for future use cases. Data was analyzed using grounded theory data analysis approach and results were found to be quite informative.

2. Challenge

Our hypothesis was that next generation TV will have some form of mix of internet information and television content and hence we wanted to validate some of our new concepts. The optimal approach to proving or defending this hypothesis would be to develop a completely working prototype for users to interact with in their own homes and conduct a field study to fully understand their feelings about using this solution and their actual usage patterns. Unfortunately, this was not possible due to the time constraints of the project and the lack of infrastructure to support the types of advanced features that were conceptualized. The next best approach would have been to show the prototype in a usability lab setting; allowing them to interact with it and give their thoughts about the system. However, this was not possible due to a variety of reasons such as the prototype's lack of stability; full design of the applications was incomplete as well as there were proprietary information safety issues. With these concerns in mind we wanted to follow a user centered design and development methodology. We needed to understand how consumers generally felt about the futuristic concepts wherein Internet information and television content was delivered in an integrated way and on the same screen. It was also important to understand how they would expect such a system to behave, which features were important, what they would like to use it for, and how they saw it fitting in to their lives. Simply put, the more varied user perspectives we could collect the better it was for us in terms of the project's design deliverables. Hence focus groups were ideal for this design research.

2.1 Solution

A set of scenarios were constructed centered on the concept of mixing different content such as Internet, personal content, and traditional television programming. The resulting storyboards also focused on personalization of TV content and on the different types of Internet based content that would be relevant in a television viewing situation. Focus groups were run to gather user data. Data analysis was carried out with full team involvement (designers, user researchers and software engineers) and results were arrived at from grounds up. Later, prototypes based on these design concepts were developed and demonstrated to good reviews (internally as well as externally).

3. Methodology

The research method consisted of 4 focus groups followed by a data analysis workshop. The research was carried out in January 2007 on 11th and 12th in a focus group facility in downtown Chicago, IL. Each focus group consisted of 6

participants. Participants were shown a number of storyboards depicting possible TV Tomorrow scenarios and were asked to discuss the ideas with respect to their own needs and lifestyles. Each group session lasted for 2 hours.

Table 1. Focus Group details

Focus Groups (n=4X6)	
Group 1 Young Male 20 – 35 yrs	Group 3 Young Female 20 – 35 yrs
Group 2 Old Male 36 – 50 yrs	Group 4 Old female 36 – 50 yrs

3.1 Stimulus: Use Case storyboards

Storyboards with narration were used to present the new television concepts to the consumers. Four scenarios were used ranging from television as we know today to futuristic new concepts. The concepts included "what-if" scenarios where Internet information and the television viewing experience were merged. Users were given freedom to interpret any new feature title as per their understanding and then were asked to state their position on the feature and why they said so. Following which a dynamic discussion was allowed. This allowed us to get a better understanding of what the scenario descriptions meant to our consumers and led to lot of needs analyses, discussion of pros and cons of concepts and many times lead to very creative feature suggestions and requests from consumers.
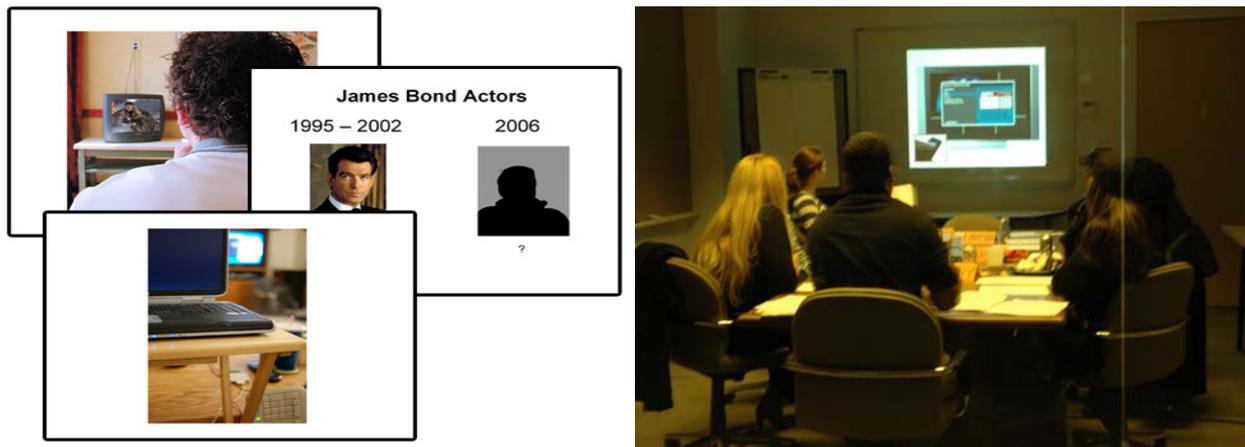

Figure 1. Use case story boards and Focus group session

4. Data Analysis

To be able to better understand the reasons behind our users' reactions and various perceptions we analyzed our qualitative data using the Affinity Diagram method which is Grounded Theory data analysis approach [3, 4]. Data analysis consisted of a three day workshop. The first day was dedicated to getting all the critical comment/incident notes

on the walls. The second day was more of a debate/critique and reassignment of notes to various buckets/clusters that were forming. These buckets of post it notes were essentially the themes that were forming among the data we had. The third day was essentially discussion on the emerging story that the data was telling and it meant in terms of next generation TV experiences.

In the end, an affinity diagram was on the walls of our research lab with all the users' comments as shown in the pictures below.

Figure 2. Data Analysis

5. Results: User Experience Needs and Challenges

Reported here are some of the challenges that were discovered from the user data. Designers should account for these insights when designing for the next generation TV applications. The intention behind this paper is to make user experience designers aware of the potential experience pitfalls and technology adoption hurdles. The user needs/challenges are as follows:

5.1 TV ≠ anything remotely complex

'Introduce new concepts on my TV but do not dare to complicate my TV' said a user. The consumer was emphatically summarizing a feeling that many others verbalized during the discussions. The reason given was that TV has an image of being "laid back entertainment device" and that should not be tampered with. Also, we were told that TV is an "anybody-can-operate-this" kind of friendly device so do not try to change that perception. In other words, the idiot box is for relaxation and so there is no place for complex access rituals irrespective of how useful the new thing is supposed to be. This challenge is especially true for older adults who consumer a lot of content on TV. Other researchers have also confirmed this finding in other studies. Rice and Alm, found that older people are reluctant to adopt interactive TV features partially because they have more difficulties understanding and responding to implicit screen prompts of the interactive applications [6].

5.1.1 Provide access to a lot of content but…

Complexity is to be avoided not just in terms of number if features but also in terms of ease of access to content especially with the increasing amount of it. Users desired to have access to a lot of content including their personal content – self generated, recorded broadcast content, web content as well as information from internet. But despite this desire and perceivable utility value, the user interface to get there from the TV should totally be simple in terms of data organization and navigation paradigm. This problem is easily seen in the release of slew of devices in current market which seek to provide access to personal content (on personal computers) from the TV: none of which are a success. So whatever user interface is designed for accessing content, it must help users *recall* and *browse* to the location of content quickly. The user experience design must be such that it provides high perception of ease in access to content (such that all kinds of users can adopt it quickly) and also it must provide a good enough perception of being efficient. Being TV users, the expectation of navigation was that the 4-way navigation pad and the select/OK button of the remote should be sufficient. Bernhaupt et al in their 2007 research paper observed similar user needs. They were running an iTV field trial in 2004-05 in Austria [1] when they discovered similar needs from TV users.

5.1.2 The "i" & "my" revolution and TV

Despite being a shared device TV is also a personal device. Current TV paradigms do not have any personalized experiences on them but the future ones will. So any new concept that is brought in to the family room TV should adhere to this model of shared yet personal device. Participants quoted personal use of devices such as iPod from Apple Inc. and the "my" pages on most of the websites like Google, Yahoo etc... and requested that the TV should support this kind of ownership and personalization. But this request was also followed up with another one saying TV should also support a "no-login" mode where it is shared and not a private device anymore. There is a certain degree of pride of ownership and individualism involved when it comes to the interaction with your own television and content and yet there is a shared nature to family-room TV. Bernhaupt et al observed similar behaviors in their second ethnographic study in Austria [2].

5.2 10ft UI, not a 3 ft UI

There seems to be some inertia that will have to be overcome so that the new television concepts are accepted especially ones where informational content shares space with traditional TV content. This might be due to the years of existence of current model of television and content consumption. People are so used to the traditional model (one-way flow of content) that they are wary of moving on to the next generation of things wherein there will be interactivity and content choice overload. So, whatever new concept is introduced, it has to provide significant improvement over the current method of browsing for shows. Navigation paradigms should be very innovative in user experience so as to entice the user to trial the new features. Then, the performance of the experience should match up the new look and feel so that the users adopt the new features. 'TV is not a PC so the user interface for info+entertainment should be rethought' said one user summarizing the discussion for us.

5.2.1 'Getting info in simple glances is good'

When it comes to TV, no matter what information is presented, there is this presumption of obvious visibility and legibility at distance. The fact that consumers use television everyday makes them a master of it and so they presume that whatever is introduced next should be usable in the very first attempt. Minimal or no learning curve is expected for use of the "idiot" box. "Presentation is going to make it or break it…" said a user after a question on user interface. The user went on to say that information should be available in glances and not as a website page full of text because one is not on a PC but in front of a TV on a couch. Kallenbach et al., in their 2007 paper on human information processing of TV viewers [5] suggest a similar approach to presenting information on TV. They studied how users got overwhelmed due to information load in interactive TV offerings.

5.3 Information = PC & Entertainment = TV

Users made a clear distinction on what they prefer to do with a PC versus a television. Information look-up and internet browsing were classified as PC tasks and entertainment was discussed as a television domain. So any new TV experience solution has to walk the fine line of integrating information in the TV user interface and content without coming across as an information heavy and PC-like experience.

5.3.1 PC is a tool for information search and TV is a means of relaxation

PC is said to be OK for watching video clips and movie trailers but not for complete shows and movies. Streamed movies on internet and TV shows were specially criticized for bad quality and bad viewing experience overall. Television was seen as a simple-to-use entertainment system and the opinion was that it should continue to be one. An user put it as such "…little information boxes on TV take the TV experience out of watching TV, I want to be in-the-zone not out of it…".

5.3.2 Extent of immersion in content defines entertainment

Users kind of expected us to always maintain this duality of supporting immersion in entertainment and yet support the next generation features of interactive media and social networking. Anything that took users away from the immersive experience of television watching came under heavy criticism but at the same time information like traffic, weather and appointments on TV was said to be useful in everyday life. So if the user wants to be entertained and not necessarily informed support a fully immersive entertainment experience. In other words, the first time viewing of a movie is an experience that should never be disturbed.

5.4 Attention to the social acceptance of next generation TV concepts is equally important

Social concerns were raised when future of television was discussed. All users (young, old, male and female alike) were worried about the consequences on health and lifestyle.

5.4.1 'Are we encouraging inactivity here?'

Users felt that unlimited availability of entertainment on TV will make people more sedentary. The obesity epidemic was on every person's mind. One user made the situation light by saying "As if my back side groove wasn't deep enough – now you are giving me more TV show options". Another female participant did not want to promote this from a personal standpoint saying that this will promote a more inactive society. She said "these concepts will make people more inactive. This is like McDonalds with delivery service."

5.4.2 Socializing around television

Beware designers; it is not just a TV but a socio-technical system that you are designing. Television is ideal for watching shows and movies with a group of people and hence it needs to have support for such when the new experiences are introduced. The group may consist of peers with same interests or kids or a whole family with multiple generations and multiple needs. Users used examples like group television watching during Academy Awards show, LOST/Grey's Anatomy parties and of course the Super Bowl party. Users talked about these events as annual rituals held at specific person's house every year. Hence, television should also be seen as an enabler of social bonding and group enjoyment. So next gen features could help build families, friendships and even communities. Even though it's important to support "i" and "my" aspirations of users it is equally important to support social group consumption of content over the same interface. Our study results support the findings from Bernhaupt et al [2].

6. Discussion and Design Guidelines

As mentioned in the introduction, it is not hard to foresee use cases for the next generation TV and it is not hard to hypothesize user experiences with entertaining TV, informative TV and social TV. What is hard about TV experience design is that the challenges TV space provides are complex in terms of user mental models and rapid technological changes. Hence, generic solutions in terms of UI design and navigation paradigms won't work. If we add adoption road blocks, then, the productization of any new concept looks like a prohibitive challenge. But, this is where design research and innovation in actual designs will separate the great new experience from the average one. The above challenges can be very well treated as opportunities for excellence in design work.

Design guidelines that were generated for the benefit of user experience designers are as follows:
1. Keep television interface clutter free and support immersive entertainment.
2. Strive for innovative user experiences such that utility drives people to at least trial the technology
3. Let the information presentation style be completely non-intrusive and as user customizable as possible
    a. Glance-able information pieces rather than text loaded screens
    b. Support information pull but keep information push as an opt-in choice
4. Provide for task efficiency
    a. Content location recall

      b.   Browsing ease – search is great but not for all users

5. Support individualistic aspirations of users but also provide for social consumption of content over the same device

6. TV is a socio-technical system so the design has to consider the social ramifications

      a.   Sustainable lifestyles

      b.   Family/Friendship/Community building device

7. Lastly, provide for an immersive and entertaining TV experience as nothing less would suffice.

7. Acknowledgements

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