
Sociability Issues for Designing Usable Mobile iTV Applications

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Abstract

The adoption of mobile iTV will depend not just from the availability of suitable technologies but mainly from the limitations related to its use. As for many other examples of personal communications technologies, several issues related to the appropriateness of use in different social contexts will have an important impact in users' acceptance of this technology. In this paper we present three mobile iTV scenarios that highlight some of the most relevant relationships between tasks, devices, interfaces and the environment that may affect and be affected by sociability. Some findings about these relationships will be described to outline how they may influence designers to create more usable mobile iTV applications.

Keywords

Sociability, mobile devices, iTV, mobile iTV scenarios

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI).

Introduction

Together with the Internet, there are two main technological breakthroughs that massively changed lifestyle in our planet in the last part of 20th Century: TV and mobile phones. The first one has strongly impact people's habits in many ways (the way people dress, speak, socialize, inform, entertain and even eat) while the second has affected the way individuals communicate among different every-day spheres (social, work and intimate). In this early stage of the 21st Century, the evolution and mixture of these technologies into mobile iTV makes us possibly envision presumably a new set of changes in people's habits and communication schemes.

By definition, *mobile iTV* provides people with a mean for complementing iTV and mobile phones from a technological viewpoint. In this logic, we hypothesize that the new technological affordances provided by mobility and interactivity of TV may also lead to interaction and socialization issues that these technologies have provided separately, in a new conveyed way. Of course, these new user performance issues will not necessarily be the sum of traditional TV and mobile phones impact on people's behavior but might be a completely new way of influencing everyday conducts.

Bringing mobility as a new dimension of interactive TV will impact on people socialization patterns in the everyday life. Applications of this technology will affect in different ways people's social sphere. Proof of it will be found in scenarios where other previous mobile technology developments have influenced personal behavior mostly by reducing interpersonal interactions in the face-to-face and occasionally augmenting them

in the remote relationships [1]. Some of these scenarios include the use of mobile games, portable dvd, mp3 players, sms messaging, etc, where the introduction of technology has an impact on the level of social interactions between people. However a main difference between those applications and mobile iTV will concern the willingness of people to interact not only with information or another user (as happens for most one-to-one communication) but also with multiple users in the same time. In this case, sociability may be probably reduced as in the previous examples within the personal sphere but may increase in a more impersonal dimension that will be available through the iTV return channel. In the following sections we will describe how sociability may be influenced by mobile iTV (and viceversa) in different public scenarios by considering the differences in users and how this may lead to identify design recommendations when developing mobile iTV applications.

Sociability & mobile iTV

The proliferation of different personal devices has drastically affected the sociability of individuals in different daily life scenarios [2]. A positive example of this is the use of the mobile phone as a tool for enhancing sociability between teenagers through the use of SMS messaging. In contrast, an example of sociability inhibitor may be identified with the use of mp3 players in public spaces (i.e. trains), isolating individuals from more interpersonal interactions. Previous work suggested that for designing personal devices it is critical to address the social interaction elements of the user experience in order to identify the "socially functional" features to include in a specific device for eliciting the users sociability and serendipity [3]. Our interest is extending the previous idea in

order to identify not only “socially functional” features in devices but also how to promote sociability by means of designing more “socially-prone” interfaces, applications and tasks competition walkthroughs.

In order to identify the characteristics of applications and interface design that may enhance sociability in mobile iTV, we propose to investigate the relationships between tasks, devices, interfaces and the environment by defining three different mobile iTV scenarios in different kinds of public spaces and contexts. The proposed scenarios explore the use of a mobile iTV device from different points of view: 1) As an extension of a larger screen (iTV in a Public Display), 2) As a receiver/transmitter of iTV in a socially impersonal environment (iTV in the train) and 3) As an i/o terminal in an emergency crisis (iTV in emergency situation).

Scenario 1 –Mobile iTV in a Public Display:

John is at the airport waiting for his plane to leave. In the meantime he is sitting close to the boarding gate together with other 40 people. There is a public display showing some iTV program about interesting sights and restaurants to visit in the destination city of John’s flight. The program is showing information about a nice restaurant he would like to go next Sunday when finishing his business trip. He takes out his iTV mobile phone for obtaining more information about the opening hours of the restaurant on Sundays. Next to him is Elena with her small cat that is flying to the same destination. She is also interested in obtaining more information about the restaurant but her main concern is whether pets are accepted or not.

The situation described in this scenario will be a very common context in the use of future mobile iTV applications. From one side, there will be public displays ubiquitously present (for example in airports) providing people with a mean for interacting with contextualized information (i.e. interesting sights at next flight’s destination). In contexts like the one described in this example, iTV should provide different people with the possibility of interacting according to their personal interests. On one side there will be the passive viewers not taking any advantage of interactivity (so just watching the presented content), while on the other, more advanced users taking into account some extended features of interactivity (like Elena and John). This means that interfaces had to be designed in a scalable way allowing people to visualize and interact in a flexible way.

The presented scenario also represents an example of the technical requirements that an iTV system will need to provide when interactivity is achieved only by means of more than one device. This means that designers should create hybrid user interfaces that may enable interaction through the use of a larger visualization mean (i.e. a public display) and a mobile input device (like a mobile phone). This kind of applications where the personal device will be the input mean and an external public screen will be the output will be frequent in the future due to the fact that on one side, mobile users prefer to use a larger display than their own and on the other, to save battery by only using their mobile device as an input tool. However, in many occasions, the expected output for each user in such kinds of applications may be different from one to other (i.e. John wanted to see opening time and Elena pet allowance). This means that in each case, there should

exist a more personalized reply that shouldn't be displayed in the public screen but preferably in the personal device for avoiding social embarrassment or privacy issues. From the technical viewpoint, allowing simultaneous user interaction through multiple i/o devices (large screens, mobile phones, PDAs, etc) implies the need of sustaining interoperability and usability practices [4]. In this context, other issues may arise including management of multiple user interactions, development of usable design models for convergent media, privacy management of personal input/output and human factors considerations about interacting with content in public domains.

Concerning sociability issues, the previous scenario opens space for questioning about how interaction design should be done in order to simultaneously provide useful information to all users. For example, the amount of privileges and control that a specific user might have while browsing in a public display (i.e. the conflicts originated when all the personal output may be presented in the public terminal rather than in the personal device); how to manage conflict when different users want to visualize different content in the public display (voting options), how to switch interaction from the personal device to the public display (i.e. management of i/o content), how to manage collaboration with multiple users, etc.

Scenario 2 –Mobile iTV on the train

Mark who is 25 years old is coming back from his parent's home in the countryside to the city for presenting an exam tomorrow. He is reading a book

about physics and is trying to understand a difficult theory about atomic fusion. He is on a train in a 6 people cabin. With him are Peter and James who are 15 and 17 respectively and are watching MTV in their respective mobile iTV terminals (each terminal configured in a personal and different way). Peter has a headphone, Jim doesn't. They are brothers and are accompanied by their parents. MTV is transmitting a program where the audience interactively cooperates to select the notes of a tune and produce music for a song. Peter and Jim are discussing between them about the best notes before making an input to their devices. Mark can not concentrate in his reading. Peter and James parents occasionally comment and ask something to their sons.

Since in mobile communications many applications are inherently "personal", their use usually affects some social behaviors. In situations like the one described in this scenario (reduced environments and simultaneous spaces of interaction) people and devices interaction may affect and intensify the social relations among individuals [5]. In particular, in this example there are several spaces of interaction affected by the use of the mobile iTV device:

(a) one of the spaces of interaction is the one described between Peter, James and the TV program (cooperative design using the mobile iTV);

(b) the second space of interaction is the one established independently by Peter and James with their device (individually);

(c) the third space of interaction involving the use of the mobile iTV is defined by the switching between each brother's interaction with their device and the conversation with their parents. One last social relationship affected by the use of the mobile iTV

device is the one between Mark who is trying to concentrate and Jim's device that doesn't have a headphone and is producing noise.

In this example, positively and negatively different social spaces can be affected by means of the use of mobile iTV in a public space. Positive socialization occurs during the tune creation in the MTV program where Peter and Jim collaborate together with all the people interacting with the iTV. In this case, the use of iTV in general, and mobile iTV in particular, represents an enhancement in sociability into a broader dimension of community collaboration. The third space of interaction affected in this example (brothers use of the mobile iTV and switching to parents conversation), permits to observe that there might be interesting design considerations for allowing users to establish other social relationships while using their devices (i.e. as when talking to other people locally while having a phone conversation). The example presents an aspect that negatively affects sociability (in the case of not using a headphone and disturbing a third party because of that). In this case, similar social practices apply as with other existing mobile devices (computer games, mobile phones, mp3, etc).

Scenario 3 – Mobile iTV in Emergency Situation

A terrorist attack shocked the city yesterday's morning. Several bombs simultaneously exploded in different metro stations. The population is still looking for missing people. The local TV broadcaster is transmitting pictures of people received as MMS messages from their relatives and is asking the population to use their iTV and mobile iTV return channel to give feedback

about the shown pictures. The broadcaster also opened chat spaces for people to discuss and help each other in identification and localization of relatives. People are reacting fast to this request.

This scenario shows a situation where mobility in interactive TV may bring benefit to a community while augmenting sociability between users of technology. The motivations behind the use of technology are fundamental for the success of applications (like in this example) but the availability of the correct means of interaction in an opportunistic way is crucial for satisfying users regardless of the triggering motivations. One important consideration that this scenario raises is the need for creating content production tools that allow very fast development of interactive applications as the ones described in the example. The rapid prototyping of applications should be flexible enough to adapt either to fixed and mobile iTV systems. Another important topic introduced by this example concerns the management of the validity of the information provided by users. In a situation like the one described above, it might be critical to implement mechanisms for certifying that the information coming from users is not incorrect (as a product of an intentional or unintentional action of the sender) and – if possible – where the information comes from. Of course this may raise an issue about privacy management as an important consideration. Sociability issues in an application like the one described in this scenario are present in several ways and may open space to several questions: How to manage massive and very proactive input that may be probably contradictory? How to design applications to encourage only accurate and not misleading input? How

to enable very fast interactions that stimulate highly sociable participation?

Discussion - designing for sociability

From the previous scenarios, it is clear that the use of mobile iTV applications in public places will originate a set of concerns involving sociability in different ways. In each one of the described scenarios, there are various considerations affecting sociability originated by the relationships between the intended tasks to be completed, the devices to be used, the user interfaces and the specific public environment where the application is defined. Sensitive aspects affecting sociability identified in the previous scenarios are:

Privacy – The three scenarios presented privacy issues at different levels as a sociability-sensitive aspect. In each case, privacy issues are related in a strong way with the user interfaces and the design of interaction. One main finding is that privacy management should consider how to control the user's input/output information while interacting with other distributed devices (like displays or other users) in order to maintain confidentiality for the single user while providing her with accurate personalized information. Another issue refers to the privacy requirements of the identity and user profile that may be obtained from the analysis of the return channel (i.e. for marketing applications, user preferences identification, etc.)

Collaboration – Design for collaboration in mobile iTV applications may adopt lessons learned from other fields such as collaborative work or collaborative games. In these scenarios, tasks completion is achieved as a consequence of collaborative walkthroughs of different parties (i.e. music

composition in scenario 2). These walkthroughs, defined in the design of tasks paths, may consider social factors involved in collaborative environments. The importance of designing for sociability in collaborative applications implies the need of defining several social-oriented collaborative features (such as turn-taking, visual feedback from other users input, etc). In this sense, the design for mobile iTV collaborative applications should implement an accurate management of collaboration from a socialization-oriented viewpoint. Previous research on online communities' collaboration issues may be useful, taking in account the specific characteristics of this new communication tool.

Scalability – Different users interact in different ways. In particular, users of mobile iTV may follow the same pattern of users of other electronic gadgets where novice and experts interact in substantially different ways. This means that mobile iTV systems should be designed flexible enough to consent different users to interact according to their specific interest and available device (i.e. John and Elena in Scenario 1 browsing about the same restaurant for different information and in different devices while other users are interested only in visualizing the content of the large display). In this sense, the design should be focused on an interoperable way for multiple devices and for multiple sociability willingness. User interfaces should allow different interaction scales, considering both quasi-passive users (i.e. only as spectators) and active users at the same time, providing functionalities that allow different grades of interaction (and socialization) by means of their mobile iTV devices.

Personalization – This design aspect is related to the same motivation of the previous one about different interaction of different users but with a slight difference. While in “Scalability” we intended to allow a single user interface to be used in different ways by different users, in “Personalization” we refer to allowing each user to configure their own user interface according to their personal preferences (like the brothers in scenario 2). The availability of such kind of personalization features will allow users to feel more comfortable during interactions and will stimulate a more sociability-prone behavior.

Behavior – Designing for sociability should consider that when viewing and interacting with mobile iTV applications in public spaces, users adopt different social behaviors according to the specific experience of use (the content they are watching, the place they are doing it and even the personality of the user). This may affect the social manners of the user in different ways. Users behavior may range from *selfish* users (willing to have total control, low sociability, poor utilization of the return channel and private visualization of content) to more *communicative* users (actively using the return channel, active even when using larger screens in public places as output). Other conduct patterns affecting socialization are those involving third parties in proximity to users (i.e. student in scenario 2). Taking early design considerations in this sense may help to reduce third party disturbing-prone features in interfaces and devices. Specifically, interface design for specific public contexts (i.e. airports lounges) should consider which characteristics and interactions schemes that are socially acceptable.

Conclusion

The successful adoption of future mobile iTV applications will affect and be affected by several sociability related issues. In this paper we have identified five design aspects – namely privacy, collaboration, scalability, personalization and behavior – as important sociability-sensitive factors to consider while designing mobile iTV. In considering these aspects, some lessons learned from the design of other systems may be reused, but always keeping in mind that mobile iTV has unique characteristics that have strong implication on sociability of the users and their relationship with the surrounding environment:

- iTV mobility does not only imply accessing content anywhere and anytime, but also performing, in public environments, activities usually confined in private or semi-private spaces and therefore affecting user social behavior in a different way than in totally private usage.
- The use, in a public space, of a personal device rather than a shared one clearly changes the perspective of social interaction and collaboration. If on one side the use of a private device, usually designed for single user, can isolate the user from the social context, on the other it allows new forms of collaboration with nearby people using their own devices.
- The heterogeneity of mobile devices iTV enabled is much wider than traditional TV sets, and will grow in the future. Moreover, being the user “on the move” the possibility of interaction with the surrounding and ever changing spaces, using shared public devices and retrieving local information, increases the possibilities of services, data interchanging and contextualization and therefore of socialization.

- Even with the adjunct interactivity, the iTV remains based on a push technology and personalization is a key factor both for the user and for operators (specially related to advertising). Mobility adds a third dimension that is space.
- The possibility of casual use of shared public devices also changes the prospective of how privacy and personalization should be managed, since these two aspects can generate conflicts to each other.

Being sociability a subjective appreciation of willingness of interacting with others, it is not easy to establish a definite metric to quantifying it in individuals while interacting with devices. However, application designers should prevent which features may stimulate or inhibit the users to interact in a more sociable way to exploit all the potential of interactivity and user experience.

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