

An Analysis of iDTV Appropriation in Developing Countries from the Users' Behavior Involved in Community-Oriented Content Creation Process

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ABSTRACT

The arrival of Digital Television in Latin America has been preceded by a huge expectation that—through its interactive resources—it will alleviate problems related mainly to a lack of information, communication, and limited entertainment options. This paper describes an iDTV experience with users in Brazil during the realization of a European Project. Supporting the interactivity and the content production was the main focus of this experience. The results indicated the main challenges for the iDTV development. Developing Country's economic growth and cultural aspects of people can help researchers to find alternatives to enrich the users' iDTV experiences regarding transition between iDTV and other media.

Categories and Subject Descriptors

D.H.1.1 [models and principles]: Systems and Information Theory

General Terms

Design, Human Factors, cross-media transition

Keywords

Multi-national driven projects, cross-cultural stakeholders, economic growth, community oriented content creation.

1. INTRODUCTION

The Terrestrial Brazilian Digital TV System (SBTVD) was launched in December 2007, since then, 34 cities—most of them state capitals—now have digital broadcast TV (but it only includes high definition transmission with no case of interactivity). The established deadline to access this technology in all Brazilian municipalities (n=5600) is 2016. Some factors of this system (e.g. existence of programming languages, declarative and imperative to develop interactive applications for Digital TV (iDTV)) will require more content to be conveyed through these applications. The production of content that exploits the interactivity offered by the SBTVD is still restricted. There have been over the past two years, prototypes of instructional applications, often encouraged by the Brazilian Forum for Digital Television, an organization that brings together universities, media companies and government agencies. As result of this support, we highlight the production of content for distance learning via the digital TV promoted by universities. It is worth mentioning that they are experimental programs, most in a testing phase. Universities are considered herein as spaces of TV content production.

Exploring this idea of content production, Mayora and his friends [1] mentioned in their paper there is a new tendency and expectation—mainly from iDTV developers' point of view—: "The transition from mere content consumers to more proactive prosumers that transformed the web is finding now place in the context of iDTV. In the close future it will be common that TV content will be empowered with interactive applications that will be created not only by professionals but also on the final users' side. This fact will change the traditional role and stereotype of TV users from "coach-potatoes" to active generators of content".

Motivated by this tendency and considering also communities built around TV can be naturally associated to specific local services; we developed the SAMBA project [2], from 2007 to 2009. In this project, the objective was to provide rural communities with means for creating and consuming relevant content, mostly impacting on digital inclusion for the target region. Specifically, SAMBA aimed at providing specific communities and territories (such as rural areas affected with low accessibility to the Internet in developing countries) with interactive services focusing on the habitants' local needs.

In this paper we focus in one of the three main activities, which composed the project [3]: Users' field studies in order to analyze the appropriation of the content management system (CMS), for community oriented content production. These studies were performed by Human-Computer Interaction (HCI) experts—authors of this paper—with the participation of relevant stakeholders, who could be an iDTV application developer, an enabler of PLC return channel interactivity or an infrastructure installer [4]. Stakeholders were composed of researchers and developers from 8 countries (half European and half Brazilian) involved in the TV services deployment plus two local organizations in contact with the target users. Target users were Brazilian citizens residing in the town of Barreirinhas, a small municipality (47.728 inhabitants [5]), with a high illiteracy rate (40%). Target users belong to two different categories: primary users, meaning end users of the content, and secondary users corresponding to community content-creators.

The results of the analysis about the appropriation of secondary users for the content production will be briefly presented. They provided authors of this paper with orientation and insights of how to take into account both local content creation aspects (as the cultural aspects, the users' expectation and interests) and the new scenario of the developing countries—as Brazil—in the phase of exploration of new ideas and solutions for future projects.

Since there are still no interactive services for iDTV in Latin America, this work can help those that can not conduct field researches to obtain such insights.

2. CONTEXT OF THE PROJECT

2.1 Project and City Background

The case study presented in this paper refers to an international project [2] funded by European Commission (EC) under the framework of collaboration between Europe and Latin America in the topic of iDTV. The main motivation of the project stands in the fact that iDTV technology presents an ideal way for bridging the Digital Divide, especially in developing countries such as Brazil where low income population does not have access to computer technology and where TV has a great penetration among the population. This project pursues the creation of a framework for enabling local communities to produce content and broadcast it through a TV channel. Citizens will be empowered with a way to participate in the process of creating and accessing digital content. For satisfying this requirement of participation, the system uses the Power Line Communications (PLC)-based networks as return channel of Set-Top Box (STB).

In this paper we will focus just on secondary users. In this town three different institutions were identified as potential Secondary Users. They were:

- SEBRAE – That is national-wide agency supporting development for small-medium enterprises and community-oriented services in Brazil with a representation in Barreirinhas
- Secretary of Education – That is a government dependency responsible of education services
- TV-MIRANTE – That is a local TV broadcaster.

2.2 Users' Field Studies and iDTV Content Creation Process

In total, there were five meetings between stakeholders and users. In the first meeting, in Barreirinhas, this research took 5 days to apply 150 questionnaires, from which 117 were received back, having an acceptable total loss of 33 questionnaires (22%). Studies had to involve an ethnographic investigation in order to observe users' experience with technology (i.e. computers, cell-phones and TV) in their daily environment. We went to users' houses and workplaces, took pictures, recorded the way they use the TV and the remote control, etc. Some interviews took place in these moments. Main aspects obtained from participants during users' field studies [6] were the following:

- Great familiarity of participants in interacting through SMS;
- Most of the manifested behaviors of the participants were based on a community-oriented lifestyle, instead of an individualistic one [7]. As for instance, Brazilian people are very motivated by social networks (see orkut success!) in order to have fun. In addition, TV is social, people see TV in group and;
- Since the people stated watching a lot of television, most of the Brazilian participants (66%) declared watching TV

between 2 to 5 h/day and they preferred news (71%) and movies (62%).

In the second meeting we validated CMS requirements with 8 target secondary users. They referred to the definition of different ways to deliver contents to primary users related to its format, language, and grouping [8]. Examples of this are the existence of web templates, availability of multilingual content, visual themes, etc. We also reinforced the importance of commitment of users in the project and invited them to keep participating on this project until the end.

In the third meeting we presented a first prototype of the system for the same users. The CMS in SAMBA project is part of the Platform Domain of the overall iDTV system. A detailed description of the platform domain is presented in [3]. In particular, the CMS is responsible for the creation and management of the content and it is to provide the Web-database in which user data and content metadata are generated and stored. The CMS allows availability of information either through the Digital TV broadcasting channel or through a generic client to access to it through a simple HTML connection. To allow this, some preliminary operations are required in order to properly present these contents in a format suitable for the TV screen. In particular, the CMS communicates with the Playout Centre (the transmissor) and provides it with a specific package consisting of the broadcasted application and the associated content [1].

In the fourth meeting, a CMS training process was performed by the team (one HCI expert and one application developer). It was given to 5 secondary users about the CMS functionalities and the content creation process. The secondary user could be any type of service provider, the merchant himself, entrepreneurial support associations, such as the Small Business Support Service (SEBRAE), government agencies, etc. The Community content production process was performed only by secondary users. Stakeholders made calls in order to provide users with the technical support and to motivate them to create relevant contents.

In the fifth meeting, there was the CMS system validation. In a realistic scenario involving the mentioned local organizations, studies about the appropriation of the technology by recruited secondary users was performed. During three days, team at least of three HCI experts (designer, evaluator and psychologist) and one technician observed the execution of the activities (Creation of content, reuse of content and visualization of created content) and applied one questionnaire.

3. RESULTS

Five (5) recruited secondary users were assigned the task of creating specific content that was relevant for them. They selected the contents to be created. Then using the combination of CMS functionalities, the templates allowed the creation of iDTV pages and the association among them by forming a navigational structure. The created pages were the following: Nutrition (cashew, fruit of the cashew), Free educational courses, Fashion, Tourism, Crafts, Noise pollution, Pro-Literacy in Barreirinhas, and Information about specific local tours. The CMS had an option to reutilize other existing content available in the web through RSS feeds. However there were just a few pages updated by the three mentioned institutions, and they did not have RSS feeds. It can demonstrate TV is still the only communication media in local communities when information needs to be announced.

According to this experiment results, the CMS could not work appropriately in a local server. Secondary users used it in a remote way to create content. Such decision was related to the intrinsic limitations of the town related to low internet access. Despite this difficulty, SAMBA CMS system was perceived by users as a very relevant tool for supporting the local community.

A detailed description of the users' field studies, usability tests and validation process applied can be found in papers [9] and EU-Reports [10].

4. INSIGHTS FOR FUTURE WORKS

Our experience in SAMBA has shown us how distant the dream of interactive TV is yet in Brazil. Most of the difficulties faced by the users are related to the digital gap. Even though in SAMBA, a stalemate is created. iDTV is thought as an alternative to reduce the digital gap but the implementation of that still is a challenge exactly because of the lack of infrastructure for a return channel (to provide Internet access).

Given this context, we start investigating new ways to induce iDTV in the country. One of these ways is to use conjointly the iDTV and the cell phone. From 2006 to 2009, there was a 70% raise on the amount of people who own a cell phone [11]. GPRS and 3G networks (having Internet access using a cell phone network), are provided by many private operators with a wide coverage area for this technology in the whole country. This reinforces our feeling that solutions should take advantages of the cell phone Brazilian market expansion and should allow users to make transition between media (as from TV to Cell-phone).

As an example of how this can be implemented, we have developed an application prototype for tackling a social drama in Brazil: Public Safety. Such an application is inserted into the context of collaborative mapping what has particularly been dubbed Collaborative Map Applications (for short, WikiMapps – www.wikimapps.com) [12]. In these systems, the digital map works as a blackboard for accommodating stories told by people about events they want to share with others typically participating in their social networks. A prominent exemplar of WikiMapps is WikiCrimes (www.wikicrimes.org), a collaborative map of report of crimes. The prototype we are developing shall be used in WikiCrimes. Figure 1 illustrates a scenario, in which primary users can get complementary content, via the cell-phone, related to an iDTV talk show about Law Enforcement.



Figure 1. QR Code image seen on TV screen during a talk show about law Enforcement problems.

During the presentation of a certain news, users can require a QRCode application, installed in their cell-phone, to read the QRCode image that appears on TV screen. Via an internet connection, information about the area where the crime being reported is obtained and showed to users in their cell-phone screen.

The generation of the QR Code is done directly in WikiCrimes. Figure 2 depicts how this process is displayed in the site. The user chooses a hot spot (the shaded polygon) and generates a QR Code representing a URL that will lead to a page in which the image of the polygon is displayed.

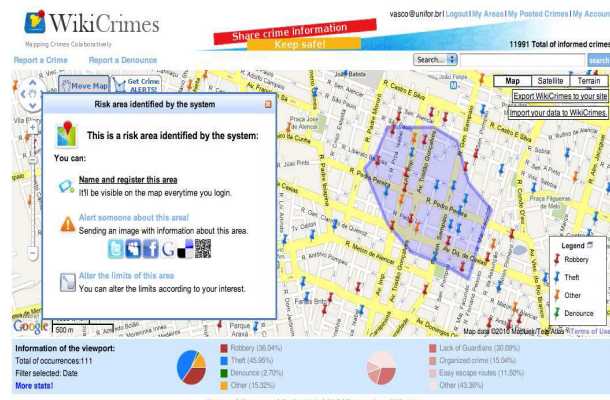


Figure 2. QR Code image generated in WikiCrimes site.

5. RELATED WORKS

We looked for projects that address content production requirements and challenges for developing countries. Beacon [13] is a cross-cultural project on Digital TV carried out also with the support of the EC. It develops innovative t-learning services in Sao Paulo city in Brazil. In [14] there is a description of the inappropriate infra-structure of target town and solutions to introduce the technology in this context. Citizenmedia is also a multi-national project on Digital TV [15]. In all these works users' field studies were performed. Any of them discussed the results of a content production process in which can capture the richness of the technology appropriation under future perspective: sustainable project, people cultural aspects and country's economic growth.

6. CONCLUSION

In this paper we had presented the different moments of experiences between a cross-cultural development team and end users of a technological project. The main finding and contribution of this work was to identify how secondary users act in order to produce iDTV contents. Their behavior change in function of the advantages and challenges: They are satisfied when they realize relevant content for the local community can be created by themselves; They are not so satisfied when they face with technical problems, and when the iDTV style requires a new behavior of people (be more active, participative). Many small Brazilian cities are not prepared to the appropriation of this new technology. Another interesting aspect to mention is the main motivation spreads out in the country that digital inclusion will be solved via iDTV. It can be irrelevant when considering the increasing rates with internet access, cell-phones and computers for the next years. Economic and cultural aspects mentioned here can

provide useful input into the planning of design and deployment of related system, which will be developed and/or used by the same or similar sets of users.

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