

Assessments and Consensus on users' needs of Cross-Cultural Stakeholders: expectations on 'being part of a Digital TV project!'

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ABSTRACT

It is a consensus that during design phase stakeholders should have a deep understanding about usage of the new technology as supposed to be appropriate to the target users —it is the case of Digital TV in this study context. This requirement addresses one primary research question: how stakeholders, who live in contexts extremely different from the users' context, can design and implant Digital TV for diversity? Our aim is to describe the assessments and consensus related to users' needs for cross-cultural stakeholders with limited prior knowledge of users' context. A socio-technical analysis was done identifying technical-contextual-social factors based on an organizational semiotic framework. The results lead to useful insights that can guide managers of multi-national driven projects to define better integration strategies

Categories and Subject Descriptors

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

General Terms

Design, Human Factors

Keywords

Multi-national driven projects, cross-cultural stakeholders, organizational semiotic framework. information system.

1. INTRODUCTION

Attention of the HCI community has been drawn to the challenges of the third wave era [1], which is characterized, among others, by the ever-prevailing phenomenon of multiplicity (i.e., multitasking with multiple tools and users). HCI community needs to give a shift of focus from individual-based to group-based. One of the challenges is to consider inputs from the different stakeholders in every phase of the development value chain that raise new issues in order to enhance the quality of a system in general [2]. Importance

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has been given to move towards participatory methods in which target users can act as co-designers, to cope with the diversification of user groups.

It should be noted that design for diversity is more than embodying several users' requirements and encoding them in system. The design should go beyond that in order to cover appropriation of the product (its use, its quality in value and/or its acceptance by the involved users). Any proposal of changes to extend usage boundaries of everyday life artifacts (e.g. TV) must be contextualized and understood relatively to the causal chains where it may have influence. Technical stakeholders (i.e., software developers, usability experts, etc.) should have a deep understanding about usage of the new technology as supposed to be appropriate to the target users.

In particular, in the case of development projects where technical stakeholders belong to completely different cultural backgrounds (e.g. multi-national driven projects) the understanding of the users' needs depends strongly on a clear understanding of users' idiosyncrasy [2]. This requirement addresses one primary research question to be discussed in this paper: how an international, cross-cultural team can design for diversity and focus on design for appropriation, if they have to lead with a set of (previously unknown) cultural constraints?

In the studied presented in this paper, the primary constraint refers to the fact that technical stakeholders live in contexts extremely different from the context of the users (live in different countries, with different languages, and different cultural and social aspects). In this text we will refer to them as "cross-cultural stakeholders". For that, we could suppose an ideal scenario: the existence of a team of HCI practitioners applying traditional participatory methods and the outcomes being transferred to the other stakeholders through video, reports and so on. Ambler [3] identified as a challenge that usability experts write for other usability experts, but not for software developers in general that may present a much narrower view about human factors. The difficulties that emerge are mainly related to the fact that stakeholders do not know apriori the users and their styles of life. Very often users' needs and requirements reports don't lead stakeholders to imagine the added value of the product to the users' lives.

The paper goal is not to validate the users' needs and verify their context of life in order to identify if a system being developed will be accepted by them. The main objective of this paper is to show

that direct meetings between cross-cultural stakeholders and users in their context can lead stakeholders to perceive the outcomes of the system and the difficulties to its deployment beyond technical solutions. Our hypothesis is that this kind of analysis would give in general an added value to the deployment and very often would increase the commitment of the development team. For validating this hypothesis, we organized the results of a case study (the stakeholders' perceptions about the challenges or opportunities for a digital TV system deployment and its appropriation by the target users) according to a social vision. We intend to clearly present in a socio-technical vision [4], that cross-cultural stakeholders have difficulties to understand the users and their way of life in advance and this may influence the development of a multi-national driven project. The final outcome of the paper will be that of defining useful insights that can guide project managers to plan better actions for their team during the validation of requirements and of interaction design solutions and to define better integration strategies.

2. CONTEXT OF THE PROJECT

2.1 Project Background

The case study presented in this paper refers to an international project [5] funded by European Commission (EC) under the framework of collaboration between Europe and Latin America in the topic of interactive Digital TV (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).

Target users are Brazilian citizens residing in the town of Barreirinhas, a small municipality (47.728 inhabitants [6]), with a high illiteracy rate (40%). Only 33,3% of the population lives in urban area and most of them have no access to basic sanitation, resulting in one of the lowest Human Development Index in the country. Barreirinhas is a municipal district with high calling to tourism, since it's nearby a touristic region, constituting today the main access destination of this ecological reservation, and unique sand dune ecosystem, of mangrove and sandbanks.

The area where the research takes place is considered the downtown area of the municipal district, due to the commerce concentration, inns, hostels, hospitals, bank, schools, register offices, and market and public institutions: State and municipal. It is estimated that the daily traffic of people in the area is of 5.500 among citizens, people in business trips and tourists. The referred area presents a better development than the other: pavement roads, lights, social places, and masonry houses. Target users live and/or work in this area. This area boundary was defined in function of the PLC network range.

Stakeholders are 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. In the Brazilian side, the stakeholders are: i) Interaction design professional, responsible for knowing users and designing the interface applications from collected data and according to accessibility and usability principles. This stakeholder works on a Northeast Research institute; ii) Business model analyst, responsible for the self-support project and works on a Southeast Research institute; iii) Telecom infrastructure installer, responsible for the system operation on the final user location and for the PLC network installation. This stakeholder works on a local organization; iv) Broadcaster, who is the responsible for the transmission of content generated with the system; v) Enabler of PLC return channel interactivity that works in a Brazilian association of telecommunications; and vi) TV content producer, responsible for creating the interactive content in relevant community-oriented domains (health, business and education). In the European side, they are: i) Application developer, responsible for content creation tool. The stakeholders that take this role work on two software companies localized in Finland and Germany; ii) STB developer, responsible for providing a low-cost STB compliant with envisioned solution (PLC-modem, iDTV standards, etc.), and works on the iDTV innovation center at Italy; and iii) Project Manager, responsible for the management of activities and deliverables.

2.2 Meetings with Brazilian users and Stakeholders

First meeting with users – Knowing the Users. The main goal was to perform a users' field study in order to identify the users' needs regarding their use of Digital TV. The study involved 117 participants with different ages, levels of education, socio-economic ranges and professional groups. The team applied questionnaires and conducted interviews in their workplace or residence (see Figure 1). The team also conducted direct observations of 26 participants using some iDTV applications in various situations (voting, communication). The results were analyzed in a quantitative and qualitative manner [7]. The quantitative analysis referred to the statistics on socio-demographic data. The qualitative analysis enabled the definition of the users' needs, which were related to infrastructural limitations such as: restrictions on Internet access, reduced number of schools, and limited choice of entertainment. From a preliminary analysis, different users' profiles (personas) [8] were identified and several scenarios about potential TV services were created.



Figure 1. TV with decorative cares

Scenarios of interaction were constructed to represent the interaction of iDTV services, through the realization of the following steps: (1) Definition of the elements of an Interaction

Scenario (IS), such as: scenario objective, involved personas, actions of the personas using the technology in several environments and, finally the types of contents manipulated; and (2) Association of these elements to the artifacts resulted from the users' study, such as the stories, the personas, etc. The elaborated scenarios contain a narrative from 4 to 7 lines long.

First meeting with the Stakeholders - Validating the Initial Specifications. A meeting between the interaction design team and the other stakeholders was conducted in order to present the results of the users' field studies. Most of the twenty stakeholders who attended the meeting were not familiar with the users' reality and seven were not familiar with the scenario-based design approach. The validation was conducted by means of a characterized enacting of the scenarios as a theater representation (see Figure 2) [9].

The theatre presentation was 30 minutes long. When the presentation was over, there was a moment of great emotion from the surprise of the artistic production. On the occasion the actors involved on the presentation were acknowledge. Next, all the participants returned to the meeting room and a discussion was initiated. Professionals validated the scenarios associated with each play. At the end of this discussion session, a questionnaire comprised of 5 open-ended questions was applied. The questions were related to the importance of the strategy applied to the understanding of aspects of the interaction scenarios, and the services to be offered. Then the team generated a video in order to show the approved scenarios to users.

This technique was chosen because instead of focusing just on the validation of the interaction scenarios, we wanted to effectively communicate interactive design solutions that brought value to the real needs discovered. An analysis was deeply performed in [10] taking into account the following categories: understanding of real; ways of communication, involvement with the content; particular interaction aspects; and clarification of each term. In a simplified way we can highlight the following issues. From the positive comments of stakeholders it was possible to realize their understanding concerning the services to be offered with the future products. In addition, professionals could realize how iDTV interactivity could aid target users' activities adding value to their everyday life. It was possible because —different from the narratives of the interactive scenarios—, on the theatre stories there was a description of how the services may help the involved actors not only as a inclusion mean, allowing or facilitating the use of technology, but mainly as an informative source that could bring value to the real needs discovered.



Figure 2. Scenes in the theater performance

Second meeting with Users – Validating the requirements. The goal of the second meeting was to validate the results of the first

meeting. In this meeting, the team performed 5 workshops with thirty participants, 15 male and 15 female, grouped mainly by personas' characteristics. In each workshop, after an explanation of the workshop goals, the users had the opportunity to use an existing Digital TV application [5]. This moment also occurred in the first experiment, but this time the team prioritized group activities (i.e., the participants helped each other as they interacted with the application using a remote control) (see Figure 4). Users validated persona information (see Figure 3) using cards. Then, the team presented the video with the possible solutions of interaction. To improve the understanding about what it was possible to do, the screens (still as low-fidelity prototypes) were inserted in the video. During a participatory validation session, scenarios and prototype applications were validated; target users provided further requirements for improvement of the system [10]. Each workshop finished with a moment for thanks and considerations about the study.



Fig. 3. Users validation persona **Fig. 4.** Users interacting in group

Second meeting with the Stakeholders – Specifications of evolutive requirements. This second meeting was conducted only with Brazilian stakeholders. The goal was to analyze the new requirements obtained from users in order to define how the services would be used through a set of applications (described in the next section). This meeting was followed by a meeting three months later, which brought together all the stakeholders and the users for the first time. This meeting took place in Barreirinhas and is described below.

2.3 The developed TV products

The SAMBA project provided five applications, covering various areas of community and information transfer and interchange. Each of the applications served to highlight and test a specific aspect of information and service use on a community interaction environment on a TV based platform. 'Gallery' allowed users to provide images of events (such as school excursions, local sports games and parties) to other TV users within the local community, allowing community interaction do to tagging, description and comment in features. The purpose of the application was to allow users to share visual information in a community as well as providing and testing grouping and access mechanisms, while allowing for TV based feedback and annotation mechanisms. 'Vote' provided the capability to create polls and ask other users in the community for (multiple-choice) votes or (free text) opinions.

This application allowed users to easily gather opinions from other users, keeping the effort needed for users to reply as small as possible, while still allowing them to express unexpected and unplanned-for opinions. 'News' and 'Info' allowed access to news items (including sports, gossip and weather information, based on

information provided by a news paper feed) as well as access to locally created information (from official sources, such as health and nutrition information, commercial sources, such as shop opening times and offers and user created content, such as event information and social and interest groups). Both applications used the same presentation client on the TV system, reducing the learning effort for the user while allowing the study of the mix of information from different sources and the reception by the user. As the primary information application, this was also the application that users were most likely to use for extended periods. Finally, 'SMS' built a link between TV and phone services by enabling users to send text messages to mobile phone users by using the TV. The purpose of this application was primarily to demonstrate the link between services aimed at various devices and their interaction.

In SAMBA Framework, complete solution for creation and delivery of iDTV based services was provided mainly from the final user point of view. Stakeholders took in account both usability issues, connected to the use of new technologies from non technology prone users, and low cost requirements, for meeting the needs of the low-income classes. For meeting these requirements, Stakeholders needed to understand factors related to the appropriation of the DTV system and the structure of the town. They applied a user-centered process, dedicated to human factors and usability activities, in order to maximize the potential of adoption of the system by future users. This process was composed of many meeting activities among stakeholders and with target users. Moreover, they studied the physical and social factors of the town before installing the PLC based network solution as return channel of low cost set-top-boxes. In the fourth section, a semiotic artifact, called semiotic ladder ([4], [11]), was applied to represent their assessments and consensus about this socio-technical study. This artifact choice was inspired in work of [12], in which showed how organize the challenges for the conception and design of a new interaction device to use iTV applications.

3. THE MEETING BETWEEN STAKEHOLDERS AND THE TARGET USERS

The objective of this meeting was to reinforce the motivation of users in the project given that they expressed their trust in the project during the previous meetings mainly because it was financed by EC. Before organizing this meeting it was not foreseen any impact on the perception of stakeholders' that would had affected the success of the project. However the facts indicated that stakeholders' perception from this meeting revealed important socio-technical factors that positively contributed to its success (and motivated us to write this paper).

The meeting took place in the same facilities as previous meetings with users and was 100 minutes long. 42 participants attended the meeting including stakeholders and subsets of users that were interviewed before. From this group, 26 were potential users of the first trials (only 6 were new participants) and 16 were stakeholders representing the different partners of the development team. 8 out of 16 cross-cultural stakeholders had never been in the city before. The meeting was managed by the Brazilian design professional who took also the translator role. The meeting had 5 main moments.

Initial moment. Users' and stakeholders introduced themselves one by one (starting with users). Users were asked to say their name and any previous knowledge they had about the project. stakeholders were asked to say their name, and institution and place that worked. After that the organizer pointed out the meeting's goals.

Technical presentation. After each participant introduced themselves, two stakeholders (the ones related to the PLC infrastructure and iDTV installations) presented some technical issues regarding the coverage areas of the iDTV transmission, the potential users to benefit with the first STBs, etc. He gave other clarifications that seemed necessary when people made questions.

Project goals presentation. At this moment, the Business model analyst, a researcher of the Southeast Research institute, talked about scenarios the users would have and about their role to the project success. In his speech, he made some motivational questions in order to make them to realize how important was their role to the success of SAMBA project, such as, i) they should use and interact with the various functions in the Digital TV, when the transmission starts; ii) they should give us their feedback by thinking in the benefits for the collectivity and for their children in a future perspective; and iii) they should be proud for being from Barreirinhas, that is a city known worldwide; etc.

Application demonstration. In order to take full advantage of this meeting for increasing motivation and credibility of users', the iDTV applications were demonstrated. While the European Application developer showed some possibilities of each application, the Brazilian user interface design professional (the mediator) did the translation. They started doing some initial remarks about the user interface the users were seeing. The organizer did some break points to point out/translate the solicitations of the users regarding specific applications that were presented. In some cases, other stakeholders (as the manager) were also invited to talk. There was a moment of intense participation of the audience.

Final moment. The organizer wrap-up the meeting, attendance of participants was thanked and each potential user received as gift a T-shirt with a sentence in Portuguese expressing: *Eu faço parte* (I do make part of it) associated to the project icon (see Figure 5). The organizer invited users to keep participating on this project until the end.



Figure 5. Users wearing the T-shirt

It is important to note stakeholders spent two days after the meeting visiting the city in order to know better the context.

4. ANALYSIS OF THE RESULTS

The key point of the analysis was the informal interpretation of cross-cultural stakeholders about the meeting. The eight stakeholders informally discussed and expressed their emotions during the next days after the meeting. All the information was collected using notes and a questionnaire was elaborated including the following themes: knowledge about the city, knowledge about users and characteristics of this meeting. The model of organizational semiotic was used for the analysis. This model is based on practical field applications for analyzing and designing information systems taking into account the physical and social affordances, and the norms attached to them.

In our analysis the stakeholders' perceptions about the physical affordances referred mainly to city infra-structure while the social affordances referred mainly to habitants' aspects such as their style of life. The norms were considered as the requisites of the project. The main factors (affordances and norms) identified were grouped according to the levels of the organizational semiotic ladder [4] represented by different signs involved in a communication process according to six levels. A sign is defined as representation of something to someone in some context or capacity in any community or social context. In our case, the signs are the factors that were identified (observed, talked and felt) by the stakeholders that were: i) challenges, when there were revealed difficulties for technology deployment or ii) opportunities, when there were revealed chances of making the technology appropriation by the users easier.

In this semiotic ladder, the first three levels referred to a platform level and include contextual and structural factors related to the town and its managers: i) The physical world - level in which the signs and the devices to transmit them were materialized (in this research referred to how the stakeholders realized the town structure would receive the new system); ii) Empirical - level in which the statistical properties of signs were identified (i.g. information about a set of interlinked signs, as the set of interlinked households contemplated with the system, the tax of internet access); and iii) Syntactic – this level focuses on complex structures regardless of what is represented in instances of signs. Here we focused on stakeholders' perception about coordination model for the system deployment and on users' acceptance to the forms of presentation of information.

The other three levels refer to an information social system level and include cultural and social factors that have impact on how potential users would have interactive experiences with the system. They are the following:

- i) Semantic - relationship between symbols and what they represent; referred to stakeholders' perception about users and the information system design;
- ii) Pragmatic - purpose in the use of signs; where the meaning that the stakeholders gave to the signs that allow the identification of cultural aspects (privacy policies, interactive situations, context of interaction) was our investigation point; and
- iii) Social - impact that the use of signs has in the social world; corresponding to understanding how the stakeholders realized the benefits in using the system ([1]).

Stakeholders' knowledge about users' context and their attitude towards this last meeting were substantially relevant to stakeholders. Table 1 depicts assessments and consensus about what stakeholders perceived according the semiotic ladder.

Table 1 – **Instantiation of the organizational semiotic ladder in digital TV context**

Levels	Stakeholders' assessments and consensus	Type of the sign
Physical world	The (in)appropriate infra-structure of city and poor conditions of people life.	a challenge
Empirical	The requisites of the project were more relevant after knowing the statistical properties of the city; The viability of using the system in groups instead of having it in public places in order to increase system scalability.	an opportunity an opportunity
Syntactic	The administrative building where the broadcasting antenna will be installed represents power but its manager (the municipality Mayor) was not involved in the coordination activities; Potential users' reacted positively when knowing the limitations of the interactive decisions.	a challenge an opportunity
Semantic	Difficulties to imagine users, who live in contexts extremely different from them; Potential users seem to be able to use the applications with less difficulty than they thought.	a challenge an opportunity
Pragmatic	Brazilian users have fewer concerns about privacy issues than European users; The "Be part of it" effect and other motivational strategies influenced the acceptance of the project by the users.	an opportunity an opportunity
Social	The quality of value of the system as a consequence of the good reputation of local organizations that will create useful contents and the friendship among habitants.	an opportunity

Related to **Physical world level**, stakeholders agreed that the conditions of habitants' life were very poor. Two Brazilian

stakeholders were not surprised with the observed conditions. The others (n=6) said it was different (worse) than they thought. The foreign designer stakeholder said: “this visit will be something I will never forget. I could feel and see with my eyes the poor conditions of people living there. It is very different to see things with your eyes”. Still in this level, stakeholders in general said the city was appropriate in terms of geographical distribution of houses and buildings who will be involved in TV signals transmission. It was a consensus it could be better. The manager said: “The administrative building, where the system will be installed (antenna, transmitter, server) looks a little bit improvised” (see Figures 6 and 7).



Fig. 6. System being installed



Fig. 7. The Satellite Antenna

In the **Empirical level**, we describe how the stakeholders realized the project’s technical requisites (like the combination of electricity and digital TV, the combination of several devices in just one system and Intranet support), that were established when the project was originally proposed. After knowing the town limitations (such as the low rate of Internet access, the high rate of habitants with cell phones (66%)) stakeholders rated these requisites as more relevant than they initially thought. Other important point in this level referred to the number of STBs and other technical features like the broadcast range of the DVB-T transmitter. Visiting Barreirinhas stakeholders got the information that unfortunately some potential users were not candidates to get a STB due to geographical reasons (at least in the first phase of trials). When asked about solutions to this problem, none of them said that the installation of TV sets in public places would be viable. They think they need to get the STBs into a realistic environment. All the stakeholders preferred the possibility of users to “share” the system, installed in just some few households than using them in public places. Their assumptions were based on Brazilian culture in seeing TV with friends or with their family [13].

In the **Syntactic level**, we describe how the stakeholders realized both the managers’ involvement with the project and the users’ reactions for their interactivity decisions. Stakeholders (n=3) commented they expected the involvement of someone important of the municipality, as the Mayor, who is also the manager of the administrative building, where our server/antenna is placed. The Mayor belongs to a different political party of the broadcaster’s owner. So he was not intentionally involved in this project to avoid the association of the project to politics. In one hand this fact prevented the “favor exchanging” effect among politicians that is very common in local small towns, but in the other it brought us some difficulties to support the system deployment. Since the server does not provide an external access point, the system was

temporarily installed in another server placed in other city. The stakeholders’ feeling was that it was not clear to what extent the town authorities support the project. Still in this level, we analyzed the Stakeholders’ perception after giving users explanations about interactivity resources. The limited level of interaction and of type of information to be presented through the applications depends on requisites like the price of STB (only images and text will be included in the interactive applications). When asked about the users’ reactions to their design decisions, stakeholders said: “Users’ attitude towards the system was of curiosity to know all its possibilities of interaction”. Three stakeholders added they did not see in users any kind of rejection to use the system and said users seemed to be interested and very motivated about the Project.

In the **Semantic level**, our analysis focused on how stakeholders imagined target users. The analysis of stakeholders’ answers proved they had difficulties to predict real conditions of users who live in contexts extremely different from them, even though the users’ context (the town) was being studied by them for a while. Five stakeholders said target users were lot different than they originally thought in a very positive way. The three resultant stakeholders answered the users were a little different than they thought. When we asked the reasons, there was a consensus around their expectations by the users: “we were expected to find people with less interest in the project and less prepared from an intellectual point of view but we for sure underestimate them”. For instance in relation to specific questions like users’ interest by alerts when an icon appears on TV screen, 5 stakeholders changed their opinion. Before knowing users, 4 stakeholders said they could say users would click on alert just once by curiosity. After knowing them, they said users will click on it always they need such information. One stakeholder added: “it also depends on the specific alert relevance to them to take it seriously”.

Related to **Pragmatic level**, our analysis aimed at knowing what features helped to maintain the high level of attention of users during the meeting. Stakeholders rated the features by order of relevance, as results are illustrated in Figure 8. The following features were rated as *the most relevant*: Each person could feel really part of the event they were participating and the Organizers’ knowledge about the users. The demo applications were considered as a relevant feature. The *less relevant* features were: the speech of the local stakeholders and the translations during the meeting.

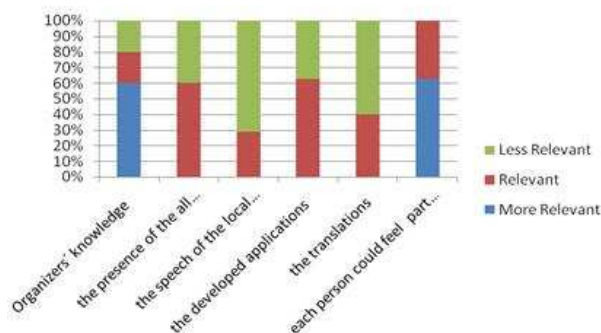


Figure 8. Relevance of Features in the Meeting

The behavior manifested by users enabled European stakeholders to highlight some cross-cultural issues. The statement “Each person could feel really part of the event”, was chosen as the most

relevant, was also the most commented after the meeting. The main discussions of stakeholders were mainly around the “part of” effect. They noticed a feeling of pride when users wore the T-shirt. European researchers manifested that these kind of “enthusiastic” acceptance of being “part of it” by local users wouldn’t be feasible in the context of a similar testbed setup in Northern Italy where users are much more reactive to give away their privacy and often act in a more closed way. Another important issue that called their attention was the high crowd gathered for the meeting and their diversity as well as their active participation by making questions. The basic assumption by stakeholders was that users were strongly motivated due to the organizer’s previous knowledge about users and her motivational strategies applied in the past. The fact of having a gift for users was identified as a positive thing by stakeholders. In this case it was mentioned again by European researchers that similar meetings involving large amount of “extremely enthusiastic and motivated” users would be difficult to setup in Europe.

The last **Social** level was dedicated to focus on how stakeholders perceived the produced content to the communities and what can influence users to adopt the system. Stakeholders commented that the system quality in value will certainly be evidenced by the following reasons: i) The content generation process will be made by local organizations able to provide useful contents and focused on small groups; ii) There is a feeling of friendship and collaboration between the habitants, so they would help each other to overcome difficulties during the interaction; and iii) the applications represented the results of the users’ needs, proved that users were having what they expected. In general, there was a consensus that users understood the real benefits for getting communication and information through the system.

In general the opportunities came of better stakeholders’ expectations about users and their style of life and the difficulties were mainly caused by technical resources limitations and by lack of local support. It is relevant to emphasize the identified opportunities and challenges are specific to this town and technology. However chances existing that some results be the same in other small Brazilian cities. From social point of view, Brazilians living in local communities present in general the same behaviors (as they see TV in groups, are open and proactive to participate in the meetings [13], don’t have great concerns for their privacy, etc.). From Infrastructural point of view the reality of Barreirinhas is similar to many other towns. See some indicators comparing Brazilian cities in [14] and [15].

5. DISCUSSION AND RELATED WORKS

The main implications of our findings regarding management of multi-national driven technological projects executed by a cross-cultural team are mentioned below.

Implication for the design of interaction features. The motivation to add any interactive features that depend on users’ interest and usage difficulty perception may come only after direct interactions with users (e.g. in our case, the alert and help functions and features including usage learning effort like the remote control and virtual keyboard artifacts). In this way designers can assess if features previously guessed to be less “desirable/usable” may evoke positive emotional responses from the users. If this would be the case it can be argued that stakeholders can underestimate users until knowing them.

Influence in the stakeholders’ commitment. It is imperative that everybody involved in a project has a clear and common vision of the project expected outcomes and their personal role in it. We found that a meeting between users and cross-cultural stakeholders would reinforce their commitment to the project success in a positive way. In fact, the direct knowledge of users and stakeholders in this case study was mentioned to be the most relevant action for enhancing commitment (6 out of 8 stakeholders considered that meeting users in their context influenced their motivation and involvement and enriched their perception about how users would “live” the system (i.e. requirements were more tangible for everybody).

Focus more on cultural aspects in the assessment meetings instead of demo applications. Making the users feel “part of it” has a direct impact in the success of a project. Indeed, our finding is that it would have been even better to have this kind of meeting in an earlier phase of the project (e.g. at the moment applications had been specified). Meetings would not be only focused on demo applications but instead on establishing a relationship between stakeholders and users. This would allow gaining credibility in order to obtain involvement of the local organization, managers and users and facilitate the technology appropriation and deployment processes. Using all available mechanisms to involve and persuade users that they are “part” of the system (e.g. by calling them with a persona name) is a good practice to gain credibility and to improve the participative strategies with users.

The findings presented here can be useful to project managers to plan better actions for enhancing team motivation and commitment by adding new activities in the project plan. We suggest adding in cross-cultural projects activity plan practices like the ones shown in this work (e.g. do not underestimate users, bring together users and the maximum stakeholders during assessment meeting and focus on cultural aspects). The application of these practices during the validation of phases of requirements and of interaction design will be more efficient if there is the integration of user-centered design concepts with human resources management into the project plan process. Human resources management practices such as participatory culture, motivation, group decisions sessions [16] should be also added in the same plan as activities of training or of dissemination of results.

Participatory design was focus of several EU projects and there are publications in the previous Euroitv proceedings. We looked for projects that addressed the Stakeholders’ points of view about user and city requirements. Beacon [17] is a cross-cultural project on Digital TV carried out also with the support of the EC. It will develop innovative t-learning services in Sao Paulo city in Brazil. In [18] 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 [19]. In all these works users’ field studies were performed. None of them discussed the results of an assessment process among cross-cultural stakeholders in which can capture the richness of the technology appropriation under different points of view.

6. CONCLUSION

In this paper we had presented the different moments of direct experiences between a cross-cultural research & development team and end users of a technological project. The main finding and

contribution of this work was to identify that assessment meetings between final users and development team may highly increase the understanding and motivation of all involved stakeholders. This fact would be an important tool for managers for increasing the success rate of international technological projects. Cross-cultural aspects learned 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 stakeholders, including users.

Future work will consist in a deeper analysis of the preliminary results considering the relation between the platform level and the information social system level. Specifically, in the next two months, we will validate the users' technology acceptance after using the system for a while against the stakeholders' expectations, in order to describe learned lessons about the integration of "cross-cultural" teams.

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