Congonhas Media Cascade - Ituita

A permanent urban interactive interface for citizenship

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Abstract. This paper presents the process behind the design of an interactive Media Cascade in the historic city of Congonhas, Minas Gerais, Brazil. It first introduces the physical and social context of the rehabilitation of the city, in which the cascade, called Ituita, was proposed. Different to the ephemeral character of most urban interactive installations, Ituita intends to become a permanent reference for the citizens, being as much as a playful interface for interaction as a place for raising and putting in evidence issues related to the city. This paper, thus, presents the three different levels of interaction—reactive, pro-active and dialogical—proposed in the interface designed for Ituita. Then, it discusses the possible urban benefit of such a proposal and concludes with assessments of both technological and social slant.

Keywords. Dialogical interaction; public space; citizenship; interactive interface; cascade.

ITUITA: CONGONHAS MEDIA CASCADE

The Media Cascade is an interactive public installation designed for the central square of Congonhas, a city of 40,000 inhabitants located in Brazil. The town is well known for its Baroque Basilica architecture—the Sanctuary of Bom Jesus do Matosinhos, Unesco's world heritage site—and its associated soapstone sculptures created by “Aleijadinho”—an important Brazilian sculptor from the 18th Century. Despite its historical heritage, the town’s expansion in the 20th century decharacterized the urban site due to negligent laws and lack of proper planning and public investments. In order to reverse this process, in 2010 the Municipality commissioned the architectural group Opera to work together with traffic engineers with co-participation of local citizens to elaborate an urban diagnosis of the city and a rehabilitation plan for the central area.

The diagnosis revealed a series of problems with infrastructure and traffic, lack of public spaces, visual pollution, private use of public space, lack of control of building regulation and its irregular application, among others. It also showed that most inhabitants (54%) have a negative perception of the urban space. According to the research such a negative perception is primarily caused by the precarious situation of most buildings in the central area. People
claim that the city’s bad condition does not ‘encourage’ anyone to take initiatives to improve their own properties and they attribute to the public administration the sole responsibility to improve the urban landscape.

The conclusion that an expressive part of the inhabitants does not feel responsible for the improvement of the urban landscape caught the attention of the architects commissioned to design the project of rehabilitation of the central area of the city. The project specified changes in pavement materials, enlargement of sidewalks, conversion of streets into pedestrian zones and revamping of the town’s central square. These transformations could work as catalysts to improve the spatial quality of the town as a whole, but other strategies were needed to stimulate the inhabitants to feel co-responsible for improving their own space. Aiming to create social connections and facilitate the public discussion and interaction, the architects designed a Media Cascade as a public interface to serve as a catalyst of social interactions.

The Cascade is called *Ituita*, a name derived from the Indian Guarani language meaning stone cascade, in which *itu* means waterfall (*y* = water and *tu* = fall) and *itá* means stone. *Ituita* is located at the center of the square, consisting of five polygons clad with soapstone, separated from each other by three glass panels. The water of the cascade runs over these glass panels, which have LED-displays installed behind, serving as output for a digital interactive interface connecting online users with people physically present in the square.

The original idea was inspired by the D-tower (Serafijn and Spuybroek, 2003), a 12-metre high sculpture in the city of Doetinchem in the Netherlands, attached to a website and an online questionnaire. D-tower was conceived as a visual display of four colours, changing according to the responses of the citizens to the online questionnaire. As it is a permanent display people’s input are not only part of the ephemeral moment that composes the visual installation. It actually triggers a meaningful output for all citizens, working as a long-term thermometer of the city’s mood.

At first *Ituita* was also supposed to serve as an ‘urban thermometer’, mapping the public opinion on social, cultural and political aspects of the city. The cascade would show through a set of colors if the population was satisfied, indifferent or unsatis-

*Figure 1*  
Computer rendering of the Media Cascade.
fied with issues such as violence, urban sanitation, pollution etc. However, more than the development of the public digital display, Ituita became a research project in partnership with Lagear (Graphics Laboratory for Architectural Experience). It then evolved to a complex display that by means of the online response of people presents three dynamic interactive graphics in the square depicting three levels of engagement between citizens, the neighbourhood and the city. The objective of this permanent installation is to create social connections and trigger discussions about the city’s problems and possible solutions. It has an initial life spam of five years and is open to different kinds of intervention in its programming and results, in special occasions or whenever it becomes obsolete.

THREE LEVELS OF INTERACTION—REACTIVE, PRO-ACTIVE, DIALOGICAL—TOWARDS PLAYFUL INTERACTION

Most installations are currently either reactive or, at most, pro-active, as they have preset feedback to people's interaction. Ituita aims to explore and further those two possibilities between space, technology and people to promote a third level of interaction—dialogical—that fosters communication among Congonhas' inhabitants and, ideally, a collective negotiation of their social space. Therefore, this project encompasses three levels of interaction: reactive, pro-active and dialogical.

The first level of interaction is reactive, as the interface programmaticaly reacts to the input given by the participant (Dubberly, Haque and Pangaro, 2009). According to Ranulph Glenville (2001: 654) “Action and reaction are characterized by a simple, supposedly causal connection. When, for instance, I click on an icon on my computer, I expect a particular type of behaviour to result. I do this, that results, and so I do what comes next”.

The second level of interaction is pro-active. According to Kas Oosterhuis (2002), a pro-active interaction means not only responsiveness to people's interaction but a contribution to present-time changes that take people by surprise. Even if Usman Haque (2007) praises responsiveness as a means to mutually react, Oosterhuis’ term pro-active seems more appropriate as the object of interaction is not predetermined and may surprise people.

Furthering those two levels presented above, the third level of interaction—dialogue—happens when the interaction between people with information and with themselves triggers social transformation. According to Vilém Flusser (1999), the dialogue or intersubjectivity is the main characteristic of responsible design. Responsibility in Flusser's sense means the openness of the design to others, as he considers every design an obstacle and proposes that responsible design be the least obstructive as possible. Even if social transformation is not programmable or programmed in the system, it is a possibility triggered by the responsible design based on dialogue.

As urban interactive installations usually draw from digital technology and games, it is important not only to discuss the three levels of interaction but whether each level is functional or playful. A functional interaction happens when interacting with an interface to access a predetermined content. A playful interaction happens by interacting with content through an interface. When interacting with a music box, for example, by winding the crank, one is interacting with the interface, not with content—the music—which is a predetermined output. On the other hand, when playing the piano, the musician creates music, an indeterminate content—accessing predetermined notes through the keys. While in the first case those interacting tend to become functionaries of the ‘apparatus’, acting as expected, in the second, they might use the apparatus to engage playfully with content.

According to Flusser (2000), ‘play’ is a means to overcome a functional relationship with the apparatus. A playful interaction means using the apparatus beyond its prescriptions, engaging with content and not only with the interface. Certainly, a music box might be used in a playful way, but its prescriptions are much more limiting than those of the piano. On the other hand, who plays the piano might become
a functionary when struggling with the interface—keys and notes—or merely reproducing a song. As the piano, current technology—such as that of video games—has a potential for playful interaction, but, paradoxically, it has been mostly used in a functional way, as the output of interaction brings no novelty, let aside social transformation. It might be said that the ‘magic by ignorance’ (Baltazar and Cabral Filho, 2011)—the interaction that seems magical due to people’s ignorance of the system behind it—is no longer an issue for video game users, as the pervasiveness of technologies leads them to lose interest in unveiling the ‘black box’. In fact, there is no magic at all: users become functionaries of the games they consume.

Interaction in urban installations is usually designed for people to interact with the interface, not with content. They are not playful in Flusser’s sense, but only to the extent that the ‘magic by ignorance’ prevails. Moreover, even a bodily engagement is predominantly mediated by images. The visual facilitates people’s immediate grasp of ephemeral installations, leading to a lack of a more enduring engagement of people with each other and with the space.

In order to overcome the stasis prompted by image-based interaction with the interfaces, it is needed to increase people’s feeling of belonging. This might be achieved when people are encouraged to negotiate and physically act in a playful interaction with content by means of an interface that enables communication. The main challenge in the design of Ituita was, then, to achieve the dialogical level of interaction without becoming functional; that is, stimulating a playful interaction towards keeping the ‘magic of experience’ (Baltazar and Cabral Filho, 2011) without relying on the ignorance of the system.

Ituita was designed to encompass the three sorts of interaction (reactive, pro-active and dialogical) towards a playful experience. Its main goal is to interconnect two different places open to unexpected encounters—the Internet and the square. In the website dwellers can answer questions concerning the city and participate in the online forum, which at first means a reactive interaction. The answers of different citizens are graphically depicted in the square creating a dynamic image of patterns with which people can gestually interact. Even though the interaction between people and the graph is
programmed in a reactive way, the dynamics and uncertainty of the patterns depicted enable the pro-active interaction. Moreover, because of the relevance of the questions for the citizens, the fact that a collective view on the issues is physically put in evidence in the square and people playfully interact with the cascade interface, there is a clear drive for dialogical interaction, triggering a desire for social transformation. People are encouraged to play in the square with the graphs using their body movement, and also to take seriously the results displayed to engage in the forum further discussing the issues with other citizens. Ideally, such an engagement will stimulate initiatives to improve their own space impacting the city as a whole.

**HOW ITUITA WORKS**

Ituita is structured in two parts—the website and the installation in the square—articulating the three levels of interaction presented above. Although both the site and the installation may be interacted with separately, they are interdependent and interconnected. The website feeds the led-displays in the square and the collective graphics that is put in evidence in the square stimulates people to discuss city issues by means of the website. In order to better explain the working of Ituita, a simulation of people using it interpolated with short explanations of specific functioning is described below.

Suppose an inhabitant learns about the website and visits it. There she will find a questionnaire and a forum that can be answered if she is registered with a home or work address in the city. The site may also be viewed by unregistered people.

Accessing the questionnaire, she will learn that each month a specific theme will be discussed. Initially, the questions have been grouped in six main general themes such as garbage, water supply and use, housing and public space, mobility, security and, finally, health. The cycle of themes has a six month duration and after that people might chose to return to an already discussed theme or propose a new one. The questionnaire is programmed as to accommodate other themes and corresponding groups of questions. The model questions are as open as possible so each new theme proposed by the users might just fit in the programmed questionnaire interface and trigger discussion. New proposed themes might appear and be voted by users to become the current issue. Each other day, one new question will be made available on the website, meaning that at the end of the month, twelve questions will have been presented. The user can either choose to answer them as they come or all at once at the end of the month. Each answer is geographically located and grouped according to Congonhas neighbourhoods, providing a straight forward picture of the dwellers’ perceptions. Such cumulative information is of great value to both inhabitants and authorities, because it might work as an empowering tool—for the former—and as a source of action—for the latter.

Before each question an introduction is provided to allow the user to understand the goal of the question. For instance, if the issue is mobility, an important discussion regards alternative modes of transportation. So, an introduction contextualising the discussion comes before the question, such as “preferring alternatives modes of transportation, such as bike, skate or even walking, besides diminishing levels of pollution, is healthier and contributes to the city’s traffic”. With this in mind the user is invited to answer the first group of questions related to her own perception of alternative transportation modes on three spatial urban scales. She is asked about her satisfaction regarding the use of them in her street, in her neighbourhood and in the city. She is required to give three answers to the same main question, based on her perception of the situation.

It is important, though, that people also reflect on the different scales of responsibility concerning the issue. So, another type of question is proposed to check to which scale people attribute responsibility for action (her own, her neighbours and the State). In the case of alternative modes transportation modes the questions are “do you contribute with alternative modes of transportation?”, “do your neighbours contribute with alternative modes of
transportation?”, “do the State contribute with alternative modes of transportation?”

The first group of questions has been formulated to deal with people's perception of the situation concerning the issues raised, and the second group formulated to deal with the way people attribute responsibility for action regarding those issues. The first group concerns the perception of the inhabitant on a given subject in relation to different spatial urban scales—the household (family members), the immediate neighbourhood, and the city. People might be “satisfied”, “dissatisfied” or “indifferent” with the issues. The second group is related to the responsibility of each scale of agency concerning the issues—individual, group and State. People might respond “yes”, “no” or “I do not know” to these questions.

Immediately after the user answers each question, a corresponding icon appears in a graph that only displays her answers, creating a visual link between the website and the Cascade. In this reactive interaction, the colour of the icon corresponds to her answers, being green for positive answers, red for negative or yellow for neutral. These colours have been selected after a survey with people living in different neighbourhoods in Congonhas. People were asked to associate the words “positive”, “negative” and “neutral” to the colours yellow, green, red and blue. The final result showed a tendency to associate red to “negative” (76.74%), green to “positive” (47.83%) and yellow to neutral (55.81%). The two groups of questions are not programmed to have the same sort of answers, the first concerns satisfaction and the second assertion and denial. However, the answers represent similar negative, positive or neutral concerns with the three different scales of the city. Therefore, the three colours appointed in the survey (red, green and yellow) are the same for the three possible answers to both groups of questions. This makes the graph easily understood by those who know what it is about.

After answering the questions the corresponding icons are displayed in the LED panels in the square, adding up to all other answers already given, enabling interaction. Before the first answer, people in the square can only see ghost patterns, grayish transparent icons, which although enabling bodily playful reactive interaction, do not display the perception of Congonhas' inhabitants. As soon as the first dwellers start answering the questionnaire, those grey icons are overshadowed by coloured ones, starting to reveal a social picture of Congonhas made by and for its inhabitants.

This pattern of icons is determined according to three different inputs from the questionnaire. First, it is the shape of the graph that follows a physic pre-programmed behaviour that form the pattern. Second, it is the density and size of each icon on the graph, defined by an equation related to the number of users that answer the questions online. And third, it is the colour of the icons, which is defined by people's answers—if positive, negative or indifferent. As the questions vary within the same issue over the month, the answers might change the density of the graph by increasing or decreasing the size of icons. If on the one hand these changes have a more significant effect for those who know the codes—that is, the city dwellers—on the other, it also offers a playful and decorative pattern for visitors, who might find more information on the city's touristic bureau or just play with the patterns, interacting with the cascade in the square.

The coloured icons expand the possibilities of interaction. Different to the ghost icons, they are dynamically placed according to unexpected
combination of answers enabling a pro-active interaction. Icons with the same colour are grouped to highlight the prevalence of people's perception, appearing in three panels, each according to one of the scales, as described above. The graphs are programmed to respond to the body's movement and to people's distance from the panels. By moving and gesturing in front of the panels people can change the patterns and organisation of icons, but they are not able to change the overall perception of the city, as although the icons might be distorted and follow the movement of people's body, they return to their original shape and place.

If most of the panel is green people are mostly satisfied with the given issue regarding the corresponding scale. If it is red, it indicates the need for change. The colour of the panels becomes a public display of the perception of the inhabitants about the three scales of the city and, hence, a means to raise citizens' awareness of the responsibility to improve the conditions of living in the city. For instance, if the panel that represents the scale of the city and the State responsibility is red, that does not necessarily mean that the government failed in providing a service or infrastructure; it can also indicate that individuals have to put more effort into the city scale, not only in their neighbourhoods. That is also true for the other two panels.

In order to stimulate people to engage in a dialogical interaction instead of only playing with the reactive and pro-active possibilities of interaction, a forum is available at the website enabling people to reflect and discuss their own perceptions in contrast with the collective perception displayed in the LED panels. The online forum is stored in the website together with the corresponding questions and answers feeding a database. As already said, even if the dialogue and the social transformation that might follow from it are not programmed, the structure to stimulate these is responsibly designed (Flusser, 1999).

Figure 4
Pro-active interface in the square.

Figure 5
Graphical representation of the three levels of interaction at work.
One of the main difficulties in the process of development of Ituita was to have the LED display and the website interconnected, having the same graphic output from the questionnaire stored in a single database. It was very difficult to find a programmer happy to look at both as a single interface. This happened mostly because programmers are usually specialised in developing websites or programming physical interactive interfaces as two completely different strategies using different tools. Developing Ituita became a challenge, not so much for its programming complexity, but for the novelty of its proposal. Besides, for Ituita to be effective over time, some important issues were taken into account. First, as Ituita is designed to be a permanent installation with a time span of five years, it is important that it responds to changing social claims. Therefore, the website is programmed as a self-manageable interface, so people can propose and vote on new themes to be discussed. Second, to seize the dynamic potentiality of the cascade, the source code of both the website and the graphic interactive display will be available online, making future interventions possible and also facilitating other experiments of the same kind.

CONCLUSION
Ituita is an attempt to explore digital technologies’ potentialities and overcome functional relationships between people and technological devices. Its importance lies mostly in the process of designing open interfaces for dialogue and not in the final object. The focus on process is essential if one is to use technological devices as a way to produce meaningful and memorable experiences in a playful way. For such a reason, differs from most urban installations, which are usually ephemeral and, even if fun, promote reactive interaction in a functional way.

In conclusion, Ituita calls for public participation by means of playful interactions in different levels: reactive, pro-active and dialogical. The discussion initiated online gains a spatialised dimension in the square, promoting bodily engaged and non-prescriptive appropriations of the space, putting social issues in evidence in a playful way. It is not designed for individual engagement in a public space, rather it relies on a collective interaction among people in the square and those online. The permanent character of the structure enhances this sense of collectivity fostering memorable experiences and, hopefully, will also enhance the involvement of the citizens with the city.

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REFERENCES
Glanville, R 2001, ‘And he was Magic’, Kybernetes, vol. 30 no. 5/6, pp. 652-672.