

Playful Interactions for the Citizens' Engagement. The Musical Language as a Possible Application

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Abstract. The human side of the city is taking more and more importance. It allows to create a positive human experience and to evaluate what people feel and what are their emotions in the city during the interaction with services and spaces. Moreover, in order to make the cities more “human”, an active citizens’ involvement in design processes is more and more considered as a necessary factor. However, the mere existence of tools that can engage people does not ensure real and effective actions. This work proposes to consider the dissemination of game elements in the city environment (exploiting the physical affordances of the urban pattern) as a possible approach to enhance the citizens’ engagement, and discusses the related technological and interaction issues. The musical language is proposed as a possible language related to the game context that we would apply to city for engagement purposes in the urban environment.

Keywords: Human smart city · Gamification · Musical language

1 Introduction

The human side of the urban environment is taking more and more importance both in the academic debate [1] and in the practical applications [2]. Indeed, the people quality of life is an increasingly central concept focusing on creating a positive human experience and on evaluating what people feel and what are their emotions in the urban context during the interaction with services and spaces. In order to make the cities more “human”, an active citizens’ involvement in design processes is more and more considered as a necessary factor. As an example, the co-design practice aims to involve people in designing solutions on the basis of emerging wants and needs.

However, the mere existence of tools that can engage people in the city matters does not ensure a real and effective action by people. The main reasons are related to the lack of openness from citizens, their perceived difficulty in meeting the needs of all the people, and their lack of experience in these processes. So, it is important to find specific solutions that facilitate these engagement processes.

This work proposes to consider the application of game elements in the city environment, as a possible approach to enhance the citizens’ engagement. In details, in the second section we identify how the game could improve the engagement processes; in the third section we propose the dissemination of game elements in the urban

environment as a strategy to really engage people; in the fourth section we show how the music, as one of the languages related to the game context, can be applied for engagement purposes in the urban environment; in the fifth section, we focus on the role of the digital technologies in these processes; finally, in the sixth section, the conclusion and the future work.

2 The Game in the Urban Environment

In general the freedom which characterises the game makes it applicable to more and more complex environments, for example with the aim to help people in representing and understanding the events in a more easy way or in bonding them with other people [3, 4]. It is a positive element increasingly present also in the city environment, since it is able to create a suspension of the monotonous urban continuity.

The “gamification”, which is defined as the application of game elements in non-game contexts [5], can be intended as an approach that allows not only to better live in the city, but also to really engage people in the city issues.

In details, the application of the game in the urban environment can be applied in order to achieve five main goals:

1. Offering the people an active and positive experience in the city environment. In this case the city becomes an active territory, more lived and practiced, increasing as a consequence its attractiveness for other people.
2. Encouraging people to approach to the territory issues, by making them aware of the meaning of specific things (social consciousness), of the main city problems, and of the importance of their behaviour to change a current situation.
3. Encouraging people to make positive actions and to adopt sustainable behaviours in the city environment (for example concerning the transportation or the environment issues).
4. Encouraging people in strengthening relationships with other people, for example with other citizens or the Public Administrations.
5. Pushing people in finding and designing solutions for communal problems, by contributing with their ideas (crowdsourcing approach).

These list of goals can be intended as a “flow” concerning citizen engagement, starting from the less to the most committed behaviour, which requires people an always deeper involvement and activity. Indeed, the highest level is represented by the fifth point of the list, since in this case the citizens are asked to intervene in order to transform their city according to their needs and desires. Of course, these points are strongly dependent on one another and they influence each other: they have in common the fact that they have both an element of “content” (because the citizens’ actions leads to create something) and an element of “relation” (because the citizens’ actions also implicate a contact with someone). For example, the point number four is strictly related to the point number five, since, in order to build a shared vision of the territory, it is important to have a strong relationship with the other people who live in it.

So, the game can be a useful approach to make our cities more “human” and activate people in different ways. Nowadays these principles are mainly applied in online and only-digital platforms. For example, Thiel [6] argues that mobile applications with game elements are important enablers for the citizen involvement in local issues. Moreover, Rehm et al. [7] designed a mobile application which supports civic engagement and civic collaboration through the gamification approach. However, the use of digital interfaces not adequately integrated and connected to the urban environment risks to create a deeper separation between the citizen and the context.

However, the majority of these applications do not lead to a real and high citizen engagement. So, it is important to rethink and improve the application modes of the game elements in the urban environment.

3 Rethinking Game for the Citizen Engagement

The assumption at the basis of this work is that the city environment itself can be intended as an application field of the game elements that lead to a better citizen engagement. In fact, we believe that the elements of the city could be used as enablers of the game itself, especially by exploiting their physical affordances as game tools. The described process aims to encourage the citizen to make specific actions and to assume specific behaviours according to the goals of engagement defined in the previous section.

In order to do that, we need to consider the different game elements through which we can “gamify” the urban environment. Hunicke et al. [8] identified three main game components: mechanics (the rules of the game), dynamics (the run-time behaviour of the mechanics acting on the player over time, e.g. progression, rewards, identity, etc.), and aesthetics (the emotional responses evoked in the player, e.g. challenge, fellowship, expression, etc.). In detail, in the city environment the mechanics might correspond to the actions of people in the game itself (e.g. “go”, “turn”, “move”), the dynamics might be the output of the action for the single player and in general for the city (e.g. to obtain a reward, to pass the level, etc.), and the aesthetics might be the specific reached benefits both for the people and for the whole community.

Clearly, the focus is on the exploitation of the morphological elements of the urban pattern. In fact these elements, while maintaining their original characteristics, turn into something else, giving them a new meaning. Considering the semantic categorization of Floch [9], with this approach the urban elements are deprived of their utilitarian value acquiring a non-utilitarian and playful connotation (e.g. a square can become a game table, a road can become a path obstacle, the bricks of a wall can become a puzzle, etc.). With these interventions, the urban space is completely re-articulated, re-produced, re-semanticised, and re-told. In fact, a new story of the city is created and consequently a new overall citizen experience emerges. Sánchez Chillón [10] talks about the city as a platform for the innovation, able to build the “citzentrism”, that is to say the centrality of the citizen in the urban context, and to improve the social consciousness and the co-responsibility in communal aims. The author focuses on the importance of gamification in doing that, talking about “civic gamification” as the methodology for the civic engagement in city issues.

4 The Music Language as an Application of Game Elements in the Urban Environment

The music is one of the languages related to the game context that we are trying to apply to the city for engagement purposes in the urban environment. In details, we are considering how the musical language can be “disseminated” into the city for encouraging people not only to make positive actions, but also to express their experience in the city and to share ideas for an improvement of the territory. In fact, we are thinking how the affordances of specific elements of the urban environment can be used to produce a collective musical composition that represents the shared vision of the city. The basic elements of the musical language (e.g. rhythm, harmony, melody, timbre, dynamic, etc.) can express this shared vision. In this work a process of double re-sematisation will occur: the first is addressed to the specific city elements disseminated in the urban environment that become game and musical tools that allow to express a feeling, a mood, an idea, etc.; the second is addressed to the musical composition itself, that surpasses its artistic value to become a content strictly connected with the people city perception. In general the game process of this application could be: 1. the single person will “play” a specific city elements (mechanics); 2. the action will create or transform the collective music composition (dynamics), 3. a stronger sense of community is created (aesthetics).

The consideration of the city as a musical instrument is also present in the work of Gaye et al. [11], who designs a wearable device that considers the urban environment as a musical interface and the mobility as an interaction model. Moreover, in the work of Petrovki et al. [12] the elements of the urban environment (e.g. buildings, paths, gaps, etc.) are translated in sounds with interventional design purposes.

5 Digital Technologies and HCI in Citizen Engagement Through the Game

The re-semantisation of the city as a playground where people can be engaged requires a transformation of the city allowing people to consider the city elements in a different way. This process is necessary, since otherwise people will continue to have only a utilitarian vision of the city excluding the ludic (and more engaging) one.

Regarding this, the use of digital technologies really allows to “augment” the environment. Violi [13] focuses on the importance of Information and Communication Technologies in re-defining the urban context, transforming non-human in human places.

However, in the case discussed in this paper it is essential to replace personal devices, as smartphones or tablets, with diffused devices embedded in the real world and belonging to the city itself. This change requires a technological shift, which consists in the application of the “smart objects” paradigm. In fact, the city elements become augmented objects used by people and able to make something when used. In general, the integration of electronic devices (e.g. RFID tags, sensors, actuators, etc.) in the objects transforms them, making them able to understand and interpret the human behaviors and activities [14]. It is an important requirement for our aims. Furthermore,

the digital fabrication approach, which consists in using different manufacturing techniques and “open” software and hardware to build physical objects, can be a useful methodology to transform the city elements according to this vision.

Moreover, it is fundamental to think how people interact with these re-semantised city elements, in order to identify the input, output, control, and feedback processes. In this case, the main change is related to the shift from the Graphical User Interface (GUI) to the Natural User Interface (NUI) paradigm, where people interact with a system or a service, but the interface is totally invisible. In fact, the user interaction with these interfaces occurs through actions related to the natural human behavior. So, the interaction is not perceived by the user and the actions required by the digital systems are totally integrated into the daily activities. Concerning the specific elements of our topic, a useful definition derives from Sakamoto and Nakajima [15] who talk about “persuasive digital affordances” to mean the operation of digital objects into the real environment as tools to “inform, persuade, and inspire human behaviors”.

So, the user interaction occurs in parallel with the actions commonly performed by people in the city environment. This is important because it allows people to decide when they want play. In effect, the intensity of the engagement (and so the choice to take part in specific processes) is a very important factor. In detail, the moments when they can play can be identified considering some specific variables regarding the people interaction within the city. These main variables are: action (he/she moves; he/she is stopped); goal (he/she moves to go to work; he/she moves home; he/she move to another place of his/her personal life; he/she moves heading for a public place; he/she walks; he/she moves for relaxation; he/she visits places of culture; he/she goes shopping; he/she waits something; etc.); used means of transportation (public transport; private transport; walking movement; etc.); location (street; square; park; waiting areas; public places; etc.). On the basis of these moments, specific occasions of citizen engagement through game elements can be identified.

6 Conclusion

In this paper we propose to apply the game elements in the urban environment to engage people in the territory. This approach shows new paths for the use of the territory that are related to game patterns. So, the game becomes a city language that allows to understand the territory and to communicate with it. It also allows to metadesign the environment. As Van Onck sustains [16] the metadesign is a structural element of the design that defines the rules within which the individual elements of design can move. Indeed, it defines the set of possibilities for the future design, the variables for the future projects. So, if we consider the game as a framework of metadesign for the city, we define the different possibilities of design and of transformation of the urban environment.

In the future work of this study, the observation of the urban environment will allow to define the possible modes of use of the city elements according to the game concepts, to identify the relationship of these elements with the people and their interaction. The study of the structures, the textures, and the forms of organization of the city elements will be the starting point of these future steps.

References

1. de Oliveira, Á., Campolargo, M., Martins, M.: Constructing human smart cities. In: Helfert, M., et al. (eds.) *Smartgreens 2015 and Vehists 2015*. CCIS, vol. 579, pp. 32–49. Springer, Heidelberg (2015).
2. Livework, liveworkstudio.com
3. Turner, V.: *From Ritual to Theatre. The Human Seriousness of Play*. Performing Arts Journal Publication, New York (1982)
4. Mead, G.H.: *Mind, Self and Society*. The University of Chicago Press, Chicago (1934)
5. Deterding, S., Sicart, M., Nacke, L., O’Hara, K., Dixon, D.: Gamification. Using game-design elements in non-gaming contexts. In: *CHI 2011 Extended Abstracts on Human Factors in Computing Systems*, pp. 2425–2428. ACM, New York (2011)
6. Thiel, S.K.: Gamified participation: encouraging citizens’ involvement in local governments. In: *Conference for E-Democracy and Open Government*, pp. 433–438. MV-Verlag (2015)
7. Rehm, S., Foth, M., Mitchell, P.: Gamifying collective intelligence for the common good. In: Schuler, D., De Cindio, F., De Liddo, A. (eds.) *Proceedings of the Workshop “Encouraging Collective Intelligence for the Common Good”*, Limerik, Ireland (2015)
8. Hunicke, R., LeBlanc, M., Zubek, R.: MDA: A formal Approach to Game Design and Game Research. In: *Proceedings of the AAAI-04 Workshop on Challenges in Game AI*, pp. 1–5 (2004)
9. Floch, J.M.: *Sémiotique, Marketing et Communication*. Puf, Paris (1990)
10. Urban 360. <https://urban360.me/2012/08/24/if-urban-life-is-a-game-smart-cities-are-the-playgrounds>
11. Gaye, L., Mazé, R., Holmquist, L.E.: Sonic city: the urban environment as a musical interface. In: *Proceedings of the 2003 Conference on New Interfaces for Musical Expression*, pp. 109–115. National University of Singapore, Singapore (2003)
12. Petrovski, P., Parthenios, P., Oikonomou, A., Mania, K.: Music as an interventional design tool for urban designers. In: *ACM SIGGRAPH 2014 Posters*, Article 21. ACM, New York (2014)
13. Violi, P.: *Smart City between Mythology, Power Control and Participation*. EC-AISS (2014)
14. Kortuem, G., Kawsar, F., Sundramoorthy, V., Fitton, D.: Smart objects as building blocks for the internet of things. *IEEE Internet Comput.* **14**(1), 44–51 (2010)
15. Sakamoto, M., Nakajima, T.: Gamifying smart city services to flourish our society. In: *Adjunct Proceedings of the 2015 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2015 ACM International Symposium on Wearable Computers*, pp. 1515–1518. ACM, New York (2015)
16. Van Onck, A.: *Metadesign*. Edilizia Moderna, 85 (1965)