

Persuasive Technologies for Functional Interaction in Cities

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Abstract. The well-being of a city depends on the capabilities of its inhabitants for functional interaction. We study how persuasive technologies can support these capabilities on the theoretical background of transactional analysis. First insights are drawn from research about persuasive technologies in an innovation lab as a focal point for functional interaction in a city.

Keywords: Transactional Analysis, Functional Interaction, Labs.

1 The City as a Field of Application for Persuasive Technology

The notion of a city is self-referential. It does not depend on an output that is produced or a purpose that a city serves, but on its own well-being as a systemic entity. A city is a paradigmatic example of a complex adaptive system [1]. It is exposed to a perpetual change of its constitutive elements: the buildings, the infrastructure, the inhabitants and the rulesets that define their interaction. Nevertheless, a city is able to preserve its coherence. This ability of a city cannot be adequately described as technical operation; and it cannot be managed by imposing specific behavioral rules on its functional entities. Recent sociological approaches rather turn the attention to the phenomena that happen in-between the entities while they change and evolve over time. These phenomena are addressed by terms like resonance or translation [2, 3].

Research on persuasive technologies has made amazing progress during the last years [4, 5, 6]. The city, however, creates a new kind of challenge for it. In absence of static economic or technical structure, it is not enough to look for ways to encourage certain behavior among people. Instead, it is necessary to support the underlying capabilities of people to adopt new behavior and react to change without losing touch with each other. What makes this task particularly difficult is the fact that these capabilities cannot be described by specific responses to certain stimuli. More likely, they can be compared to the dynamic capabilities of companies to explore and exploit innovation [7]. This paper describes how persuasive technologies can support such capabilities on the basis of a psychological framework drawn from transactional analysis. After a short description of this framework, we present first insights from its practical application.

2 Transactional Analysis and Communicative Capabilities

Transactional analysis studies social behavior as an enactment of relationships [8]. The underlying assumption is that human interaction expresses the attitudes of the participants towards themselves and one another. If they perceive themselves in a similar way, a functional cooperation is possible. Otherwise it is highly probable that the interaction will sooner or later result in a conflict [9]. More importantly, however, transactional analysis states that human beings will only be able to cope with novelty and change if they see each other eye to eye as mature, responsible individuals. The establishment of such relations is the normative goal of the analysis [10].

While transactional analysis was originally introduced as a method of psychoanalysis, its range of application has later been extended to any kind of behavioral study of systems and organizations [11]. In particular, transactional analysis has proven to be quite helpful to gain insight into verbal and non-verbal messages about relationships in communicative acts and their effect on the outcome [12]. Roughly said, what we intend to do is therefore to use persuasive technology to encourage an adequate communicative behavior among people as a foundation of a healthy interaction.

3 Labs as Focal Points of Functional Interaction in Cities

Cities are much too big and diverse to be addressed exhaustively in one experimental setting. Each city, however, has focal points of functional interaction in which the major characteristics of city life become accessible in a closer setting. Traditionally, this includes town squares, market places, church assemblies and seasonal festivals that draw people together which give them opportunity to interact as a group on different topics of their choice. During the last years, many cities have systematically worked on the creation of new focal points for functional interaction, because they have become aware of their importance for city life. In many cases, these new focal points have been addressed as labs.

In the city of Nuremberg, such a lab has been created right in the town center near the pedestrian area. The lab is run by the Fraunhofer Institute for Integrated Circuits. It is open all week during regular shopping hours and accessible for everyone. Unlike many other labs, it focusses on commercially oriented innovation projects. Over a period of three month, the lab is host to different innovation projects at the same time and invites visitors to contribute. Afterwards, the projects are replaced by new ones. The subjects of the innovation projects cover a large range of topics, from renewable energies over security and health to clothing and jewelry.

Although there is always qualified personnel available in the lab to interact with the visitors and encourage them to engage in the innovation projects, technology also plays an important role in organizing and supporting the contributions of the visitors. The technology presents itself in many different forms, from static material artifacts to different kinds of interactive installations. The visitors are accordingly exposed to a mixture of different stimuli from human beings and technical devices at the same

time. Just like the city as a whole, the lab confronts visitors with perpetual change and the need to revise attitudes and adapt in a socio-technical environment. It therefore provides adequate conditions to study the capabilities of the population for functional interaction and the potential of technical support.

4 Studying Persuasion Effects on Perceptions of Relationships

Over the past two years, the Nuremberg lab has provided us with numerous opportunities to study the effect of persuasive technologies on the communicative behavior of the visitors. Due to the real-world setting and the multitude of different topics, our research has so far been focused on qualitative aspects. In particular, we have been interested in identifying the major factors of influence that have to be considered in the design of the technologies. We differentiate the technologies by the form in which they present themselves to the visitors: static and dynamic, standalone and interactive as well as pragmatic and semantic/syntactic with respect to the content for which they serve as a carrier.

Methodologically, transactional analysis suggests four different forms of data collection: observation of personal behavior and appearance, observation of social interaction and conversation scripts, personal interviews with visitors about their experiences and their perceptions of the relationships they consider themselves to have with others. Since the lab is visited by a large number of people over a longer time, research approaches based on interviews are hard to pursue. We have therefore collected observational data. Data collection was structured by the artifact dimensions mentioned above.

5 First Findings

While detailed results still need more time for further analysis and elaboration, our general findings already draw a rough picture of the behavioral dynamics on this scenario. In particular, it shows that the effect of technology in the engagement with the innovation projects in the lab varies a lot between single visitors or couples and visitors in larger groups. Single visitors and many couples generally direct more attention to the technology and engage more deeply in the innovation activities. After spending time with technology that allows them to work constructively, they are often happy to approach others as fellow users. Groups, on the other hand, are rather inspired by more entertaining technology to start a functional interaction.

Several cases also show that the changes induced by technology take a long time. Some visitors have to return again and again before they open up to others and accept them as equal counterparts in an interaction. Once again, it seems to be the usage of technology as a toolkit to build something and thus experience a certain authority over the subject matter that supports the development of new behavior. Furthermore, it seems that multi-sensually accessible technical devices are more likely to provoke responses than others. Regarding the durability of change, some cases indicate that new behavioral patterns persist over time, in particular if people get more engaged

with technology. What remains unclear is the level to which these patterns are transferable to other environments.

6 Conclusion and Outlook

Our research on persuasive technologies for functional interaction in cities is in a very early stage. Nevertheless, first findings indicate that this topic holds a lot of potential to provide interesting insights in the future. While there is still a lot to learn about persuasive technologies in labs, one of the next steps will certainly lead from the lab environment to other settings of interaction in cities. This also includes portable applications on smartphones that people carry around wherever they go. Preliminary studies in this direction have already been undertaken.

Using transactional analysis as a theoretical background for research on persuasive technologies is a fairly new approach, but it seems to be in line with the contemporary discourse in sociology about communal activity. Furthermore, it allows us to create further connections to innovation research and the ability of companies to evolve. We therefore hope that our approach will enrich research on persuasive technologies in many different ways in the future.

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