

# PsychNology Journal

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# PSYCHOLOGY JOURNAL

## The Other Side of Technology

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## Editorial Preface

Urban mixed realities represent a growing and exciting area of research, which requires new ways of thinking about issues such as usability, place and presence. Urban situations are dynamic and can change rapidly, with a vast array of complex and exciting rhythms. They cover a whole spectrum of complex and chaotic happenings which span organisational and material configurations. These characteristics are both challenges and motivations for exploring mixed reality technology solutions, in particular with respect to finding methods to improve the ways in which participants can relate to the environment and to others. Mixed realities cover all situations in which digital objects are combined with physical features of the environment. Technologies include pervasive, ubiquitous, multimodal, and augmented reality solutions. Current projects explore and evaluate forms of interaction and presence in urban environments which use mixed reality technologies to improve or create new practices. This can be achieved in two ways: either by augmenting the engagement with others (including encounters, feelings, exchanges, co-experiences) or through augmenting the engagement with the environment (places, or things), which includes playing, understanding and interpreting the environment in new ways.

This special issue originates from two preparatory events we co-organised at conferences, both of which created the context to discuss design, experience, and mixed reality technology for the urban environment. A panel at the Presence 2007 conference "Urban Mixed Realities: Challenges to the Traditional View of Presence" (McCall et al. 2007) created an engaging discussion on the need to find new perspectives on media technology and human experience. The discussion had as one of the starting points to better comprehend how available information

technology is expanding beyond virtual reality to mixed reality, tangible and ubiquitous computing with implications on user experience phenomena and how to study them. Using concrete cases it was discussed how new perspectives should oppose and go beyond the traditional Presence perspectives with its Cartesian dualism (Floridi 2005) and passive view of subjects putting forward constructivist and relational conceptions of human perception (Zahorik and Jenison 1998, Flach and Holdem 1998, Mantovani and Riva 1999, Sheridan 1999, Mantovani and Riva 2001). For example, instead of being and experiencing as a passive subject influenced by external stimuli, a person is assumed to be an active, intentional actor in an environment that offers different resources for actions. In connection to this discussion emerging themes were debated like the growing interest in "places" instead of "spaces" – while spaces are neutral and dimensional, places are personally, socially and culturally significant (Spagnolli and Gamberini 2005, Turner and Turner 2006).

Following the Presence 2007 panel we organised a workshop at CHI 2008 "Urban Mixed Realities: Technologies, Theories and Frontiers" (McCall et al. 2008) In this workshop 16 presentations of work were discussed which illustrated a variety of approaches and interpretations currently connected to urban environments and mixed reality. The workshops participants contributed to the discussion about what Urban Mixed Realities can be in terms of technologies, experiences, and applications. In particular the workshop aimed to explore which fields and disciplines from science, technology and art should we draw upon and the diversity of backgrounds of participants contributed to review of which approaches are suitable in the

development of urban mixed realities. Also as participants proposed concrete examples it was possible to reflect on what mixed reality systems are and what are the challenges faced by such systems (for example usability, technical and other issues). The review of different applications also served to discuss the potential personal and societal benefits of urban mixed realities.

The aim of this special issue is to continue the work from these two events and to document some of the diverse examples of research in this rapidly growing area with the aim of drawing attention to these. Moreover we aim to contribute to establishing a longer term thread of published works on this subject that illustrate applications, systems, designs, experience studies, theories and the research agenda.

The title to this special issue uses an original and open concept, Mixed Realities (MR), to refer to experiences and environments, therefore the concept is not merely technological or referring to human experience. The decision to use this concept means that it is not just a development or extension of virtual reality but a field of its own with roots as strong as in other fields such as ubiquitous tangible computing. In this sense the concept of Mixed Reality with a singular noun is very precise and refers to a well defined area and community that aims to extend the virtual reality paradigm.

The urgency of the topic is on the one hand due to the availability of technologies that enable to combine physical and digital, real and virtual aspects. On the other hand the urgency arises due to the fact that urban environments are very promising for research as they include complex socio-material situations that provide both opportunities for applications but also higher development challenges when compared to developing and

undertaking research in labs and offices.

To better chart the research challenges we describe how we have structured it within an European integrated project which operates within the field of urban mixed realities. IPCity ([www.ipcity.eu](http://www.ipcity.eu)) is an EU funded project which explores mixed reality systems to support presence and interaction in urban environments. From a technological perspective this includes developing new hardware and software platforms for use in socially dynamic settings. The objective of these systems is to easily weave into everyday practices using pervasive solutions such as mobile phones, wearable systems, architectural solutions and interventions. The project also explores the development of authoring tools so that developers and end users can easily create, modify and store content. In turn this leads to a number of interesting theoretical questions regarding the use, construction and interpretation of urban spaces.

The IPCity project contributes also by defining application areas:

- Urban planning applications using tangible and augmented reality interfaces (Macquill et al, 2007)
- Large-scale events where interaction between people through the use of multi-touch displays and mobile devices (Peltonen et. al, 2008)
- Augmented reality games which let users experience a city in the past, present and future (Herbst et. Al 2008)
- Story telling applications which let users create and experience stories of others via online and pervasive applications (McCall et. Al 2007)

From the perspective of themes such applications cover a whole range of topics, many of which are also reflected within the papers presented in this special issue. These themes include: spatial, temporal, ambient and material aspects all of which play a role in shaping the users, designers and

evaluators views of urban mixed realities.

Spatial aspects such as scale – working with objects of different scale, changing scale and dimension – as well as borders and layers. MR technologies can be used for changing the scale of virtual objects and for making invisible objects (borders, archaeology, infrastructure) visible.

Temporal aspects that support the experience of presence are of relevance for an urban situation, such as making traces of the past visible, envisioning future development or the evolution of an event. Urban rhythms play a large role in experiencing a city, such as differences between day and night as well as flow and movement (of people and traffic).

Materiality. In MR environments people engage with material and immaterial (virtual) aspects. The material environment is not only rich in awareness cues, material aspects also contribute to engaging the capacity of objects to absorb people's attention, thereby increasing their engagement with each others and the world. They are also sources of 'reality' and 'haptic directness'.

Ambience. The urban experience includes all forms of sensations about the surrounding environment. It is a notion crossing feeling (physical-material dimension), perception (human interpretation) and life experience (social interaction). It is both a subjective and collective notion. All sorts of elements participate in the creation of the overall feeling.

Social aspects. Social interaction and scenes contribute to the experience of urban settings. The social life in urban setting is constantly changing. Culture and experience of people using and populating urban space is hidden and just partially inscribed in the material scene and only partially visible in the embodied performances of everyday (shopping, going to work) and extraordinary (demonstrations).

The four articles selected in this special issue are complementary for different reasons. First of all they are different in terms of theme including aspects such as interaction design cycles, subject studies, application and systems reports, and evaluation approaches. Moreover the articles all embody different perspectives and agenda and finally represent distinct application areas. However they all explicitly address mixed reality technology and experiences in the urban environment.

In their article "Experience design for interactive products: designing technology augmented urban sport facilities for girls" Aadjan van der Helm, Walter Aprile, David Keyson contribute with interesting insights on a interaction design project that addresses tangible computing for augmenting urban sports. An exploration of the interesting interface technologies is accompanied by rich description of interaction design processes involving users and aims to support social issues.

The article by Andrew J. Park, Thomas W. Calvert, Patricia L. Brantingham, and Paul J. Brantingham "The Use of Virtual and Mixed Reality Environments for Urban Behavioural Studies" shows how virtual and mixed reality technologies can be used to study urban settings phenomena such as "fear" but in a laboratory setting. 3D virtual/mixed reality models of the real-world environments are constructed in the laboratory and experiments are run with real human subjects in these environments. While on one hand the environment can be controlled in the experiments, on the other hand, the set up must ensure "suspension of disbelief" so that phenomena to be observed.

In "Tags and the City" Minna Isomursu et. al investigates a specific technology for mixed realities namely NFC (near field communication) tags in urban environments. The analysis of this technology is supported by field

trials and aims to consolidate the requirements and challenges of using such technology.

The paper by Rod McCall and Anne-Kathrin Braun "Experiences of Evaluating Presence in Augmented Realities" not only shows an original application of Mixed Realities in urban settings but also provides insights into evaluation approaches including theories and methods. The article presents the concept of "Unified experience". An original game "Timewarp" from the perspective of the game design is presented along with results of user trials and how these should shape a future evaluation approach.

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The issue of PsychNology Journal also includes two more papers. The first one is “Decoding Cognitive States from fMRI Data Using Support Vector Regression” by Maria Grazia Di Bono and Marco Zorzi; it concludes the series of works presented at CHIItaly 07 and selected for publication because of the high scores received by the conference reviewers. The authors report on a decoding method that could be used to achieve the ultimate goal of correlating fMRI data to cognitive states. In the case discussed in the paper, the cognitive task consisted of a game played in a virtual environment; the results are flattering with respect to the possibilities opened by the Support Vector Machine technique described.

The second paper is entitled “Contrasting the Effectiveness and

Efficiency of Virtual Reality and Real Environments in the Treatment of Acrophobia” by Carlos M. Coelho, Carlos F. Silva, Jorge A. Santos, Jennifer Tichon, Guy Wallis. The paper deals with virtual reality treatment of phobias, addressing one central issue in this field, namely the comparison between a virtual and a real exposure. The paper provides arguments for the similarity in the effectiveness of the two types of treatment in case of acrophobia, and suggests that Virtual Reality is nonetheless more advantageous given the shorter length of each session.

**The Editors-in-chief**

