

# Designing a City Platform for Sustainable Behavior

## Approaching a Multi-stakeholder Context and Initial Results

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**Abstract.** Persuasive technology has proven effective in influencing individual pro-environmental behavior. However, climate change is a systemic, complex problem that involves an increasingly diverse set of stakeholders. Cities, in particular, can be effective demonstrators on designing from both an individual and system change perspective. We report on our approach of a multi-stakeholder context for persuasive design and on initial results for designing a city mobile and web application for sustainable behavior, based on consultations with multiple constituencies. Our early findings suggest ways of integrating persuasive design with other requirements for sustainability at a city scale, such as participation, information provision and engagement.

## 1 Background

Critiques of persuasive applications in the field of sustainability have pointed that holistic approaches can lead to more climate benefits than targeting corrections in individual behavior. Researchers are encouraged to take a more systemic approach [1, 4] and to use participatory or user-centered design methods for persuasion [2, 3]. Designing at a city scale offers the opportunity to apply these recommendations. On the one hand, researchers can explore the dynamics of urban communities and local governance to employ new approaches to sustainability persuasion in a complex system. On the other, the application of user-centered techniques on a city scale can lead to reflections on the suitability of such methods in complex environments. In this context, we report on our work with the city of Salzburg, as part of the Smart City Masterplan. We detail our approach within a multi-stakeholder environment for the development of a mobile and web app for sustainability at a city scale. We also report on our preliminary results, which show persuasion can be integrated with three other locally-relevant features, namely information provision, participation and engagement.

## 2 Approaching a multi-stakeholder context

We envisioned a structured process for involving three types of constituencies: citizens, local administration and local service providers in the field of sustainability. Our approach was composed of (a) mapping relevant stakeholders and (b) structuring the engagement process for including all of the above-mentioned groups.

The mapping process was used to understand the stakeholders and the different relationships between them. The process was iterative and took place in three steps: target group definition, first stakeholder mapping and an extension of the stakeholder map. In the initial target group definition, we identified the local administration, service providers and citizens as the main categories of constituencies. In the second step, digital resources and partner brainstorming activities led to a mapping of 12 relevant stakeholders. In a third step, references to other relevant entities were added alongside different activities conducted, leading to over 30 stakeholders engaged.

Structuring the needs and requirements was done in three stages. In each stage, a mix of activities took place with the different stakeholders:

- **Goals and vision:** initial consortium workshop (WS1);
- **Requirements:** citizen surveys (S1, S2), a service provider workshop (SP1);
- **Design and specifications:** a service provider workshop (SP2), a consortium workshop (WS2), individual meetings (M1-3).

## 3 Platform features

We report on the platform features, following the “goals and vision” and the “requirements” phase. The results were structured in three clusters which we discuss below.

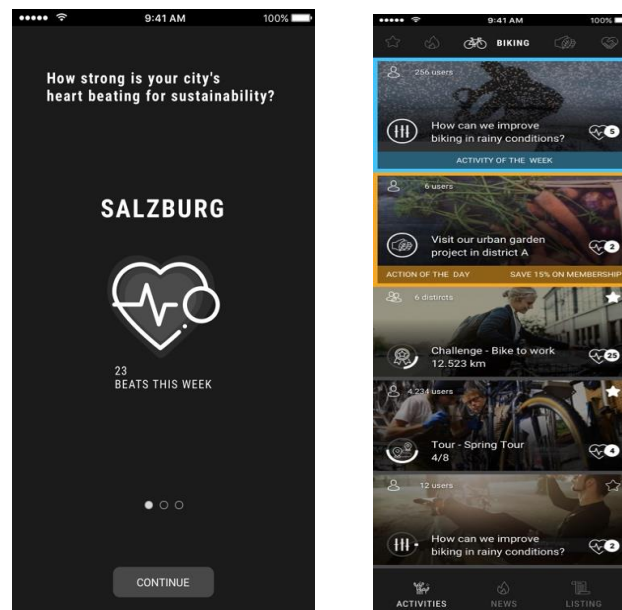
- **Information provision:** Users are interested foremost in accessing information about local sustainability-related services. Features to support this need include the provision of content through an online magazine or blog format. Services can also be included in a listing or map, allowing users to locate them in their proximity or specific city neighborhoods. “Shortcuts” or “how to” content can offer users advice on behavioral changes and these can be provided in a news update feature or through push notifications.
- **Participation:** Users can be stimulated through behavioral strategies. Tracking and offering rewards based on the individuals’ behaviors entail the implementation of a token system. Tokens could also be exchanged for monetary or in-kind rewards. Other initial suggestions for participation features are: material incentives (vouchers, loyalty offers), gamification tools (sustainability challenges, dashboards, immaterial incentives i.e. tokens, coins, achievements), tracking behavior (tracking biking on mobile and event attendance through QR scan).
- **Engagement:** Sustainable behavior of users is stimulated through an active participation in a local community for sustainability. This supports the idea

that place attachment leads to more sustainable behavior or otherwise put individuals care more about their impact on their immediate environment, than on a global or national scale. Citizens can therefore offer feedback to the local administration or to services and participate in community challenges. A cooperative, rather than competition strategy, is therefore preferred.

An internal prioritization was made starting with the above features, based on development effort and impact. Some features were re-thought in order to avoid technical implementation problems (i.e. tokens) or to improve usability and user experience.

## 4 Design concept

The design concept aimed to seamlessly integrate the different functionalities, thereby increasing information, participation and engagement of users with respect to local sustainability. We introduced a simple and shared game objective of collecting heartbeats through sustainable actions. A shared goal helps create a community of players which are engaged in a playful context, to try new services and offers.



**Fig. 1.** Initial screens for app design: gamified objective (left) and overview of activities (right).

The basic game mechanic is centred around collecting and spending *heartbeats* (see Fig 1). As citizens increase the sustainability of their city through individual and collective actions, these are translated into *heartbeats*. Different to other types of currencies (coin, badge), the metaphor is not associated with monetization, but with feelings of care, place attachment and involvement. Participants in the different activities during

the design phase welcomed this concept and felt it was adequate for the needs of the different user types and the creation of community spirit.

Users can broadly use the platform to participate in activities and challenges, access the service listing, and/or track their daily biking. The service listing and activities can also be filtered thematically, based on different areas of sustainability (biking, consumption, etc.). The users collect heartbeats through three basic means: tracking their daily biking, discovering points of interests in the city, participating in activities and challenges. Users can spend heartbeats by making or reporting suggestions or participating in lotteries. The lotteries offer the possibility for users to access material incentives, awarded in public events, without implementing an online voucher or token scheme. Making suggestions is a way to ensure users can feedback the local administration or services.

## 5 Conclusion and Future Work

In this work, we have reported on our approach to a multi-stakeholder context for persuasive design and on initial results for designing a city mobile and web application for sustainable behaviour. We presented here our initial findings on integrating persuasive design with other requirements such as participation, information provision and engagement. We are currently working on a more detailed account of our method with respect to multi-stakeholder engagement and on new iterations of the app design. We aim to evaluate the final design of the app and mobile platform with the different groups of constituents. We will implement the final application in partnership with the local administration, and evaluate it long-term, in a city context.

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