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Situated Interfaces for Engaging Citizens on the Go

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Insights

- Live screening and playfulness of the interactive space can be effective strategies for attracting the attention of passers-by and turn them into active participants.
- While urban screen interfaces increase participation by encouraging group interaction, privately-oriented tangible user interfaces give people a longer time to reflect upon their answers.

Governments around the world undertake community engagement to seek better outcomes that reflect the interests and concerns of communities and stakeholders, aiming to provide opportunities for more citizens to be involved in decisions that affect their local environment. However, traditional methods of community consultation, such as face-to-face meetings and online surveys often fail to reach a representative proportion of the public, as they are not easily accessible, require people to dedicate time and effort, and risk being disconnected from the sociocultural context [4][5].

A number of applications have thus been proposed that allow people – as they are passing through public space – to participate and be more engaged in the discussion of civic topics and citymaking. Mobile devices, in particular, have become a popular choice of platform: they are reasonably ubiquitous in modern urban society, can be used on demand and allow for more concise expression of opinions compared to conventional written submissions, particularly when leveraging texting and social media [4]. However, those solutions run the risk of excluding whole sections of the community that for various reasons may not own a mobile phone or may not engage with social media on a regular basis. Although mobile solutions are more situated than online forums, they have a number of drawbacks that pose obstacles to community engagement compared to interfaces blended in the urban environment (such as digital kiosks or urban screens). Just like online forums, mobile solutions move the discussion of local community issues to a digital space, which requires community members to firstly know about the associated mobile channel and secondly to explicitly access it. This represents a hurdle, and a missed opportunity to make these discussions about shared urban spaces more visible. Overall, these limitations support an argument in favour of platforms for civic engagement that explore opportunistic interactions with members of a local community by making input and feedback mechanisms physically situated in or around the public space that the discussion topic relates to.

Common challenges and strategies

A range of interfaces has been studied in the past few years, including low-cost interactive posters [6], gesture-based large projection displays [5], urban screens [4], and media façades [1]. A common issue observed in field trials of situated public displays for community engagement is the lack of participation from the public [5]. People usually do not expect public displays to be interactive [3] and either do not notice the interfaces or worry about embarrassing themselves [1]. These effects present barriers to situated community engagement via interactive technologies. Yet, previous field trials show that once people overcome these barriers and submit responses, they express feelings of empowerment and connectedness with the local government and broader community. Based on the analysis of relevant works in the field – such as *PosterVote* [6], *SCSD* [1] and *MyPosition* [5] – we postulate that crucial to successfully deploying situated polling interfaces, is to address the following challenges:

- Challenge 1.** How to increase accessibility to community engagement interfaces, so that a larger section of the community can engage in civic participation [5][6];

- Challenge 2.** How to raise awareness about the opportunity to participate in community engagement among passers-by [1][3][5][6];
- Challenge 3.** How to motivate people to participate [1][4][5][6];
- Challenge 4.** How to balance visibility of the interface and privacy in the engagement process [1][4][5];
- Challenge 5.** How to provide effective feedback on the interaction with situated interfaces to participants [2][3][5].

In addition to identifying common challenges, our analysis also pointed towards some strategies recurrently employed when addressing them:

- Strategy 1.** Blending interfaces into the urban built environment for more democratic access;
- Strategy 2.** Using public urban screens for real-time feedback on the engagement process;
- Strategy 3.** Using tangible user interfaces or full-body interaction as interactive mechanisms and to raise awareness about the interface itself;
- Strategy 4.** Ensuring a level of playfulness enough to cater for an enjoyable yet trustworthy experience.

The situated character of those interfaces makes them highly dependent on contextual constraints. Nonetheless, there is a lack of comparative studies testing the different strategies within the constraints of the same location and community.

Vote As You Go

We developed *Vote As You Go* [2] as a study attempting to investigate the effectiveness of the recurring strategies listed above to address the identified common challenges. For that, we developed two interfaces for deployment on areas of high pedestrian flow in a public space equipped with a large urban screen. We used the latter to create different scenarios that allowed us to study the visibility of the interfaces, privacy of the voting process, and mechanisms of feedback to participants.

The first interface consisted of a web-based survey running on an iPad Air 9.7 inch, installed on a custom stand. This setup provided a tangible point of interaction within the public space, through a physical standalone device with a haptic input mechanism (in this particular case, a touch screen). The second interface was a full-body voting application running solely on the large urban screen and using the live footage from a CCTV camera as input. Making use of computer vision techniques, the application then tracked the presence and movements of people in that particular area: depending on where people stood, the application translated their positions into “yes” or “no” votes; if they stood on either area for long enough, the system would compute their votes and restart the process. The two interfaces enabled, therefore, different voting dynamics: while the iPad interface offered a certain level of protection to the privacy of the voter akin to other public interfaces (such as ATMs), the full-body interface inevitably amplified the participant’s opinion to the surrounding public.

Context and goals

Vote As You Go was deployed at The Concourse, a public space in Sydney, Australia, equipped with a large LED screen overlooking a central plaza surrounded by restaurants, a library and a concert hall. The screen normally features a variety of entertainment content, including cartoons, movies and documentaries. Our interest was in observing how the different social dynamics prompted by each *Vote As You Go* interface could affect the levels of participation within that urban context. For that purpose, we structured a series of “in the wild” field studies so that we could run the two interfaces with different parameters. We then used those deployments to derive insights about their impact on participation. Common to all scenarios was the location of the interaction zone: a corner in the public space diametrically opposed to the urban screen and continually exposed to pedestrians.

We ran a total of four different scenarios: (1) iPad interface with unrelated content on the urban screen, e.g. cartoons, music videos, etc., part of the regular screen program; (2) iPad interface with the poll results visualisation; (3) same as (2) plus the live video camera feed from the interaction zone, each on a section of the screen, and; (4) full-body interaction.

The power of amplified mirror images

In all our scenarios, the great majority of passers-by did not approach the interfaces. That was expected given the casual nature of the voting: we strove not to disrupt the regular crowd dynamics, blending the

interfaces into the urban environment in order to prompt citizens with a possibility of expressing opinions quickly, on the go and, most importantly, through self-initiated participation. That said, our observational data clearly shows that some scenarios were more successful than others in attracting potential participants and, eventually, leading some of them towards interaction. The version producing greatest level of participation was the one where the urban screen was partitioned to display both the visualisation of the poll results and the live camera feed of the interaction zone. Interestingly, the similar scenario where the urban screen displayed the poll results but not the live feed produced the smallest awareness levels, even less than providing no feedback whatsoever about the poll on the large screen (e.g. by showing unrelated content).

As we observed, the iPad stand in itself seemed to attract attention by sparking curiosity among passers-by, giving its unfamiliarity to the urban space the study was run at. Results displayed on the screen, however, tended to be perceived as a large billboard, and consequently subject to display blindness: in general, the connection between votes observed on the large screen and the iPad stand as their corresponding input interface was not perceived as obvious. That connection, however, became more apparent when the live footage of the interaction zone – and, consequently, the iPad stand itself – was simultaneously displayed on the large screen, revealing a clear visual reference between what is seen on the large screen and a physical element in the surrounding urban environment. Such a visual connection therefore increased the level of discoverability of the polling interface, leading to a greater level of participation.

The full-body interface produced similar results, although participation itself was more immediate: people only needed to notice the interface while in the footage to prompt it to respond. However, that does not necessarily mean participation was effective or meaningful. Interviews revealed that people were initially attracted by the fact that they could see themselves on the urban screen. As a participating couple declared: *“We were walking along the space when we noticed we were on the screen, so we came back to check it further. We immediately understood how to interact, it was very straightforward.”* This confirms similar findings in the literature for general public displays [3], but here the effect was likely amplified by the large scale and highly public nature of the screen, creating for the participants a short moment of fame.

Social interaction and reception by the community

The public screening of the interactive space in the full-body interface gave also rise to collective interaction, thus increasing the number of participants. The full-body interface allowed for groups to dwell in the space for a few moments (while collectively watching the urban screen) and vote simultaneously, a seemingly important requirement for community engagement interfaces. Collaboration during the voting process itself was also much less common with the iPad: the few occurrences we observed were restricted to social nudging [5], i.e. a voter being told by an acquaintance watching the process about what their response should be.

Of course, with both interfaces, it is difficult to tell solely from observations whether participants were expressing their opinion seriously or merely exploring the interface through play. Yet, the vast majority of participants we interviewed expressed that they meant the opinions they were casting. Likewise, they revealed concerns about the authorship of the survey and about whether and how the answers they gave would be utilised. Time to properly reflect upon answers was also seen as a potential issue with the urban screen interface. According to one participant: *“I took the questions very seriously, but since I was asked impromptu, I may not have reflected upon my answer as much as I would if I was filling in a written survey.”* In that regard, the iPad interface seemed to encourage more confident responses.

The power of amplified mirror images

The integration of urban screens as part of tangible and full-body interfaces (Strategies 2 and 3, see *Common challenges and strategies* above) had a great impact on awareness (Challenge 2) and participation (Challenge 3). Previous works have made use of public screens for two main forms of real-time feedback: (a) displaying visualisation of interaction results, and; (b) displaying mirror images to reflect the identity of participants and increase their sense of agency [3][5]. For the iPad interface, we tested the former in isolation as well as combined with the latter. While the former type of feedback produced the smallest levels of participation observed, the latter produced the highest. That suggests that combining the display of the poll results with a live display of participants on the large urban screen (as in our third iPad scenario and the full-body interface) is a particularly effective strategy for promoting participation. Although that echoes findings from the literature regarding general full-body

interaction with public displays [3][5], we observed that its effectiveness is also verifiable in conjunction with a tangible user interface, here represented by the iPad stand. The iPad stand by itself was not very noticeable. However, when displayed in the large screen alongside the poll results, an obvious visual connection was established between the civic polling and a physical element on the surrounding urban precinct. Such a connection helped to communicate passers-by about where to go should they wish to take part in the survey. The live display of participants on the large screen may have also contributed to add an element of playfulness and public performance to the otherwise conventional iPad interface (Strategy 4). Although playfulness did not appear to be a decisive feature in itself (the iPad still attracted some people even when unrelated content was shown on the screen), it was certainly appreciated: the admittedly more playful full-body interface not only yielded the highest participation rates but the interviewed participants also perceived it as highly engaging (Challenge 3). At the same time, all interviewed participants declared they quickly learned how to interact with the interfaces, leveraging from tacit rules for social interaction: higher degree of collaboration around the full-body interaction; individual voting or social nudging around the iPad stand. Participants also affirmed to have meant the opinions they expressed. In other words, despite somewhat playful aspects of the interfaces, participants seem to have taken them seriously as instruments for community engagement. The combination of urban screen with either tangible or full-body interaction (c.f. Strategies 2 and 3) can therefore be seen as reasonably effective when balancing the visibility of the interfaces with the privacy of the engagement process (Challenge 4), while providing good level of feedback to participants (Challenge 5).

Design considerations for balancing visibility, privacy and time for reflection

Our observations point towards a number of aspects that can inform the design of “on-the-go” polling interfaces for community engagement, notably:

1. Blending community engagement interfaces into the built environment (therefore promoting opportunistic interaction) makes them more accessible to the general public, but in itself is not sufficient to grab the attention of passers-by and encourage them to interact;
2. Live screening of the interactive space and its resulting playfulness can be an effective strategy for attracting the attention of passers-by and turn them into active participants;
3. Public urban screen interfaces increase participation by encouraging group interaction; and
4. Privately-oriented tangible user interfaces (such as the iPad) give people a longer time to reflect upon their answers.

The above considerations point towards a need for a balanced hybrid model between private and public aspects of civic participation. As our study suggests, a possible implementation of this model is achieved through the use of the private tangible interface for data entry in combination with the awareness raised by the public urban screen and live screening of the interactive space.

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Figure 1. The urban precinct for the studies, with the large screen at the back on the left hand side.

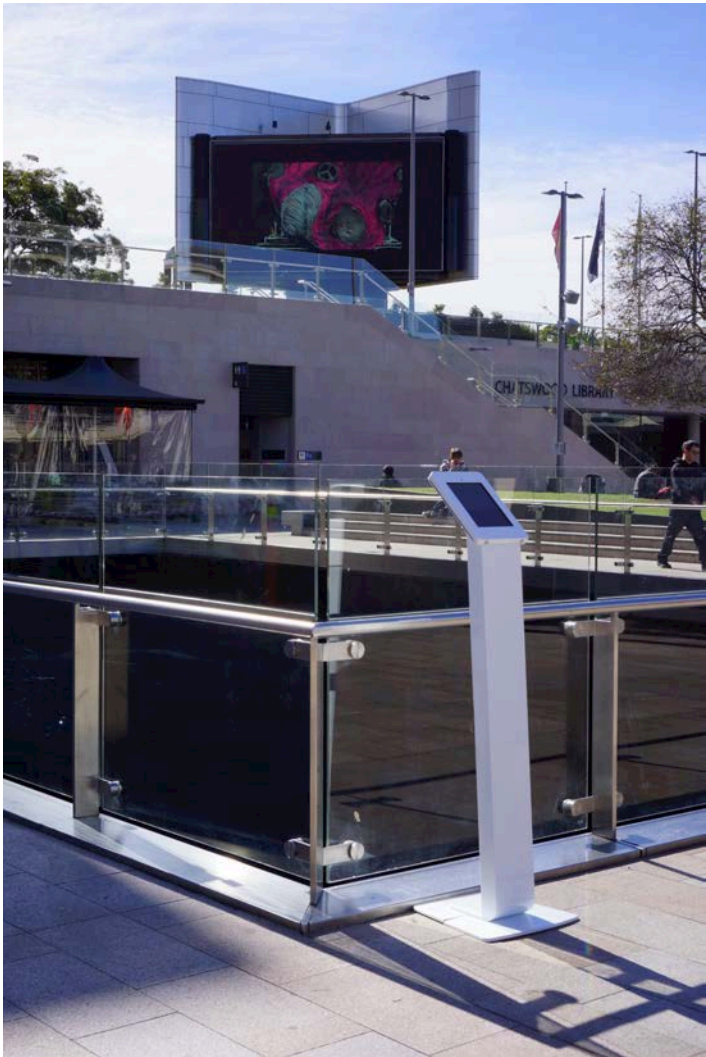


Figure 2. iPad interface running the survey, with urban screen displaying unrelated content.

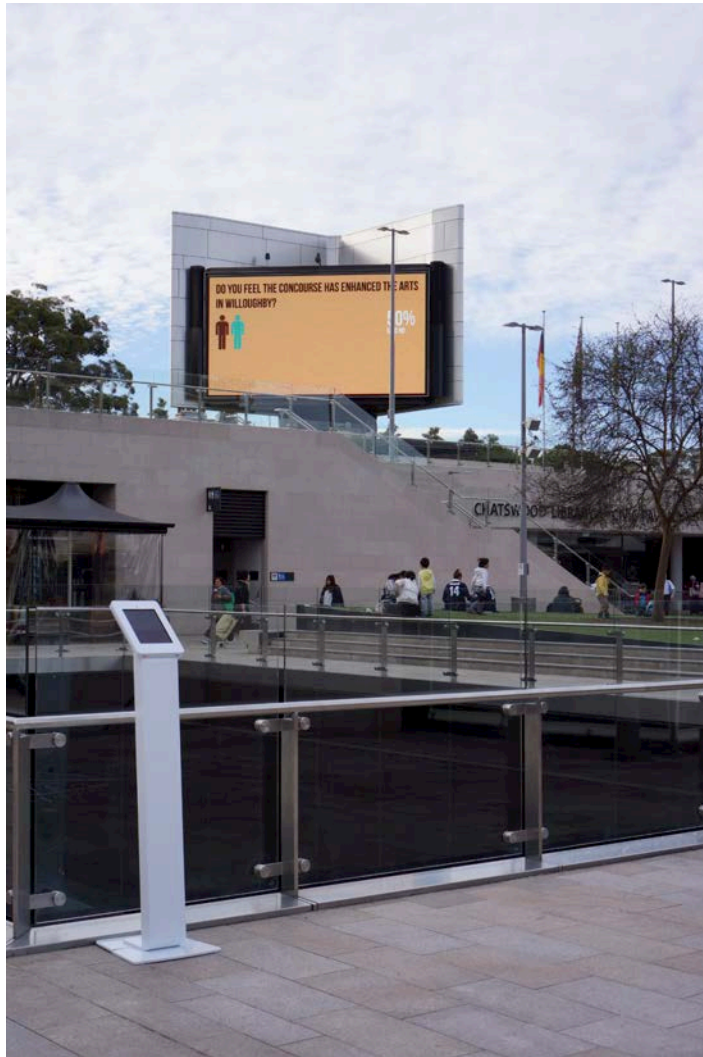


Figure 3. iPad interface running the survey, with urban screen displaying visualised votes.

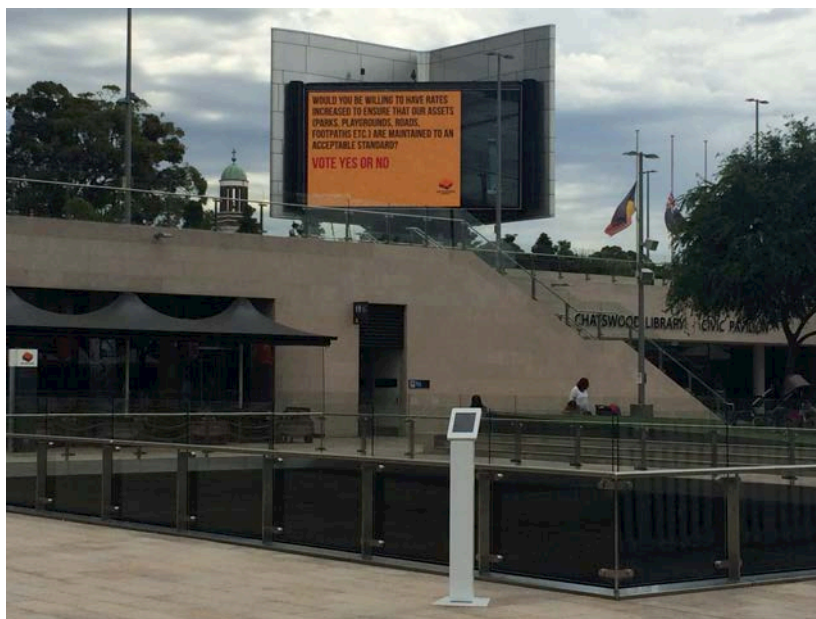


Figure 4. iPad interface running the survey, with urban screen showing visualised votes and live feed.

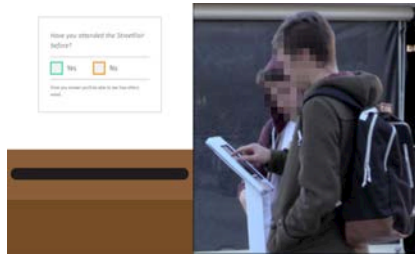


Figure 5. Left: Screenshot of the iPad interface. Right: Social nudging prompted by the interface.



Figure 6. Full-body interaction.

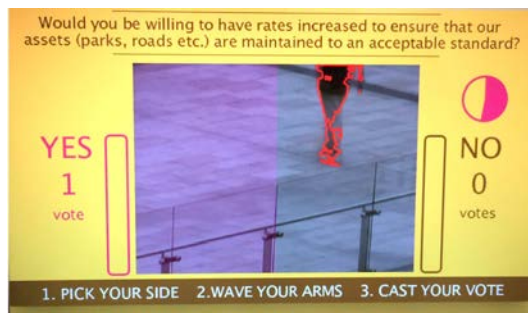


Figure 7. Screenshot of the urban screen during run of the full-body interaction interface.

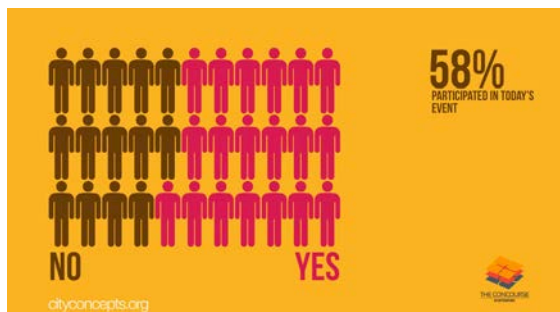


Figure 8. Sample of the data visualisation.

Biographies

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