Learning from Public Toilet Doors: Designing a Participatory Feedback Platform for a Connected Campus

Dan Xu
Amsterdam University of Applied Sciences,
Digital Society School
Amsterdam, NL
d.xu@hva.nl

Ilaria Zonda
Amsterdam University of Applied Sciences,
Digital Society School
Amsterdam, NL
i.z.zonda@hva.nl

Mick Jongeling
Amsterdam University of Applied Sciences,
Digital Society School
Amsterdam, NL
m.jongeling@hva.nl

Gijs Huisman
Amsterdam University of Applied Sciences,
Digital Society School
Amsterdam, NL
g.huisman@hva.nl

ABSTRACT

Writing on walls in public spaces has been a way for people to communicate and express themselves. In this paper, we present the design of a participatory feedback gathering system inspired by this practice. By engaging the campus community in sharing their feedback on the use of spaces and facilities, we aim to encourage them to participate in co-creating the campus space. Our prototype combines a physical object's affordance to attract attention with an internet forum to gather feedback. We document some key findings from our exploratory study and share ideas about future work.

KEYWORDS
Writing on walls; Public opinions; Participatory feedback; Smart campus; Space co-creation

CHI'19 Extended Abstracts, May 4–9, 2019, Glasgow, Scotland UK

ACM ISBN 978-1-4503-5971-9/19/05.
https://doi.org/10.1145/3290607.3312854

'I Wish This Was' is a participatory public art project that explores the process of civic engagement. Thousands of stickers with the text 'I WISH THIS WAS' were posted on vacant buildings across New Orleans to invite residents to share their hopes for these spaces. They were soon filled with various responses, from functional to poetic expressions. This work is an example of participatory feedback. For more information about the art work see: http://candychang.com/work/i-wish-this-was/.

Sidebar 1: 'I Wish This Was'.

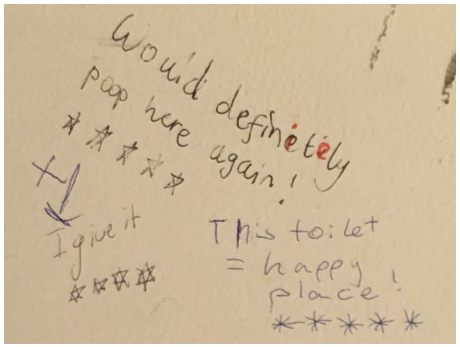

Figure 1: People voluntarily come up with ratings and feedback about the space. Photo taken from the woman's toilet at Leiden University Library.

INTRODUCTION

From prehistoric cave paintings to graffiti, we humans have been using the surfaces of public spaces as a canvas for expression and communication since the dawn of humanity [11]. Though writing on surfaces of public spaces is often regulated, writing on the condition of secrecy frees the individual of social influence and is considered to provoke more genuine response [3]. Once an individual's voice enters the public discourse, aggregated and in dialogue with the voices of others, it becomes a fundamental element of 'public opinion', which further constitutes a democratic environment [12] (Sidebar1).

Arguably, one of the most prolific groups of this practice is the student population, demonstrated by their scribbles found ubiquitously on university desks, classroom walls, and toilets stall doors (Figure 1). These inscriptions offer some intriguing insights into the people who author them, patterns of customs and attitudes of the community, reveal things about the cultures that are not in public awareness, and can aid the formulation of certain action plans [1].

Meanwhile, to manage the tension between limited working spaces and the growing population universities are adopting pervasive sensing technologies to measure space occupation rates under the hypothesis that providing real-time information can help users to find suitable spaces and increased transparency can reduce the claimed but unused space [13]. The measured occupation rate unfortunately yields little insight into what kinds of activities people carry out within the space, what features of the space support or hinder those activities, and what people wish for in that space [9].

The 'writings on walls' as an expression of public engagement and as a lens into collective life experience of people in a certain space, was a key inspiration for the current project. With the aid of digital technology we propose to apply the concept of 'writing on walls' to the design of a participatory feedback platform as a valuable supplement to sensor data to provide insights for space management. Here, we present initial research and a first prototype designed around this concept.

PARTICIPATORY FEEDBACK

The concept of 'participatory sensing' refers to the use of mobile devices to form sensor networks that enable users to gather, analyze and share local knowledge [2]. Applications have been developed to enable citizens to submit design ideas for public parks, evaluate the sonic environment, and measure air quality [2, 10]. People's engagement with the participatory process is rewarded by improved urban environment. As part of 'sensed data', here we focus on the gathering, analyzing and sharing of individual's views and opinions, therefore the term 'participatory feedback' is used. An example for campus life is ActiveCampus which enables the campus community to learn about their immediate environment through 'digital graffiti' which they can view and edit with their mobile devices [6]. However, unlike writing on physical walls, when there is only a mobile application available, efforts

have to be made to increase its visibility and encourage people to adopt the use of the application before it is assimilated into the shared culture and practice within the community.

Introducing a novel interactive object to gather feedback into the environment is one way to attract people's attention, elicit spontaneous interactions, prompt on-site reviews and encourage civic engagement [5, 15]. For example, Sens-us is a stand-alone feedback gathering system with colorful physical elements that has been shown to be effective in drawing attention and eliciting interactions continuously for several weeks [5]. The physical component affords easy interaction for people to answer closed questions, however, some people may feel self-conscious about having to express their opinions to a non-conventional object in public [15]. To have the best of both worlds, the current project combines a physical object to draw attention with a digital platform to gather feedback.

DISCONNECTED CAMPUS

Data shows that in the Netherlands the funding universities receive from the central government can not keep up with the growth of the number of students over the years [14]. The same trend is also reported across Europe and the United States [4, 8]. In a time when university resources are under pressure, less budget allocated to supporting infrastructure like housing allows more money to be spent on education and research. Against this backdrop, to address the problem of uneven use of campus spaces, the Amsterdam University of Applied Sciences (AUAS) is currently in the process of implementing a 'smart campus tool' that can be used for both room booking and monitoring real-time occupancy of space in the form of heat maps over campus building models.

The current project aims to improve on the smart campus tool. Exploratory research was conducted to investigate issues regarding facility use and facility management at AUAS. The aim was to empathize with both campus users and managers, in order to guide us in exploring the best way to involve the whole campus community in sharing feedback on their use of campus spaces and facilities.

Exploratory user research

We started out with observations and reflecting on our own campus experiences. Later on we conducted in-depth interviews with 10 participants from the AUAS (Sidebar 2) about their current experiences with campus spaces and sources of information about new places. Meanwhile, we interviewed the manager of the Facility Services department of the AUAS about the current feedback gathering methods, space management, and relevant decision making processes. We gathered our results with field notes and transcripts, below are some of our key findings:

Habitual go-to-places: Other than attending lectures in designated classrooms, the campus users tend to stay within or close to their own faculty buildings for activities like studying, meetings and hanging out with fellow students. Because they are familiar with the arrangement of the facilities, the ambience, and can be surrounded by familiar faces. Once they find a place that suits their demand for

The participants were aged from 19 to 27 (mean = 22.5); 5 female, 5 male; 8 were students from AUAS, 1 was a student teacher, 1 was an intern working in a research institute within AUAS.

Sidebar 2: User research demographics.

'They (the faculties and students) don't have much of a choice ... the budget dictates what they get in the end.'

Sidebar 3: Quote from a Facility Services manager during the interview indicating the is difficulty of involving 'grassroots' campus users in the decision-making process.

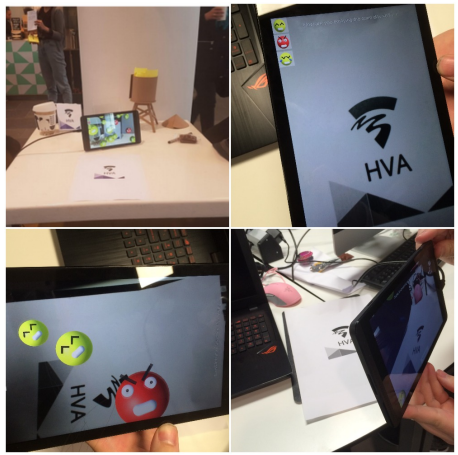

Figure 2: Our first AR prototype enables the participants to directly 'write' digital messages on physical objects mimicking the act of writing on walls.

a specific activity they tend to stick to the choice instead of exploring new territory. Similar activities usually demand similar space and facilities requirements.

Discovering new places from word-of-mouth: When it comes to discovering new places, all participants reported that they are usually informed by people within their social network, both online and offline, like their partner, friends, or classmates.

Lack of communication with managing department: Currently, at the AUAS, there is no formal method to gain insights into the actual use of facilities and gather feedback from campus users directly (Sidebar 3). Once a room is reserved, it will remain unavailable in the system even though it is not in use. With regard to making decisions about the campus facilities, the faculties put forward their requests via their two representatives that attend the meetings along with other attendees like the student council representatives and the board of AUAS.

Conceptual differences about facilities: From Facility Services' perspective, facilities like a chair are merely an asset of the university, identified with an allocated ID and chosen mainly based on its price. The only information available about the chair is that it is classified into four basic categories. For campus users, however, a chair is a tool to support their activities. They identify and choose a chair according to their empirical experiences, which are more fluid and subjective. These difference indicates that 'bottom up' participatory feedback from campus users can provide valuable insights.

PROTOTYPE ITERATIONS

To explore how can we engage campus users to share feedback about their uses of campus spaces and facilities digitally, we created an Augmented Reality (AR) application that allows participants to share their feelings about their surroundings by 'dropping' an emoji on the screen, 'attaching' it to a physical object or location (Figure 2). We reasoned that choosing emoji would lower the threshold for people to express their opinions, compared to having to write text. We tested the prototype informally (no data was recorded) at the open day event of AUAS on 3 November 2018. The prototype succeeded in triggering people's curiosity, and the approach of attaching emoji to physical objects and spaces in AR was seen as potentially useful and interesting. However, some drawbacks with this approach were also identified.

First, AR is not self-explanatory for everyone. Participants with IT backgrounds could more easily familiarize themselves with the application, but others needed specific instructions and explanations. Second, Emoji-only responses were not informative enough. In order to inform subsequent action plans, it is necessary to gather more specific and elaborate feedback. Finally, to make the AR prototype participatory, the users needed to download the application in order to participate. This created a barrier for participation. Taken together, we decided to use an 'old-fashioned' forum format that is more accessible to gather more detailed feedback from participants so that the results can better inform the management department.

Figure 3: QR code display (60cm x 60cm x 15cm).

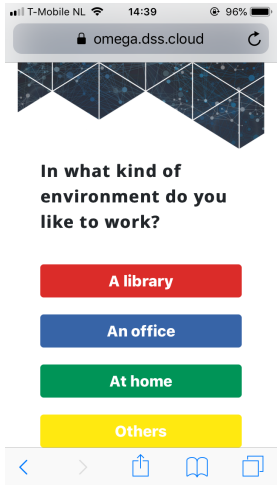

Figure 4: App screen showing how answering options are related to colors of the QR code display.

Second iteration

Currently, we are working on the next prototype composed of two parts: a QR code display as the physical trigger and a digital feedback platform.

QR code display: We designed and made a dynamic QR code display as the physical trigger to attract attention. The body of the display is composed of RGB LEDs which visualize the real-time data gathered through the feedback system (Figure 3). We chose the format of a QR code because it can be scanned easily from a distance by multiple users simultaneously using current mobile devices, which lowers the threshold for participation. The LEDs create immediately visible information regarding room use, which can then be accessed, and added to, by scanning the QR code by all campus users. The abstract color patterns can be viewed as a form of informative 'digitally augmented graffiti'.

Digital feedback platform: After scanning the code, the campus user will be directed to a website (Figure 4, Figure 5, Figure 6). The first screen asks the question about the use of space, the answers to which are numbered and color-coded corresponding to the LED colors (Figure 4). After selecting an answer, a pie chart visualization of all data gathered so far is shown on the screen and the QR code lamp display is updated accordingly (Figure 5). Following the closed-ended question, the user can access the virtual wall to see written feedback produced by other users, users can either choose to respond to others' writings by adding comments or 'likes', or post their own ideas and feedback (Figure 6). With this, we intend to preserve the sense of 'community at-a-glance' provided by aggregated results from writings on walls. In line with the 'writing on walls' concept, to protect privacy and minimize the social influence on expressions, all individuals remain anonymous. In consultation with the Facility Services department, a unique Facility Service Manager account will be created that is only accessible by the department. The activities of this account will be visible on the participatory feedback platform to inform campus users about the reception of their views. This should enhance the communication between campus management and regular campus users.

DISCUSSION AND FUTURE WORK

Space is not only a container waiting to be filled with contents but is socially produced. The spaces that can provide equal access opportunity to everybody are formed through collective actions; they have been developed and transformed in accordance with the changing needs throughout history [7]. Our research suggests that campus users tend to adhere to habitual places for specific activities, which, in turn, establishes the unspoken rule of the place. By subtly augmenting the space with the unobtrusive information, for instance the dominant activities people perform within, we aim to strengthen users' understanding about the space so that they can make better use of it.

By engaging the campus community in sharing their feedback on the use of spaces and facilities, we hope to encourage them to explore and co-create the campus space where they go about their daily

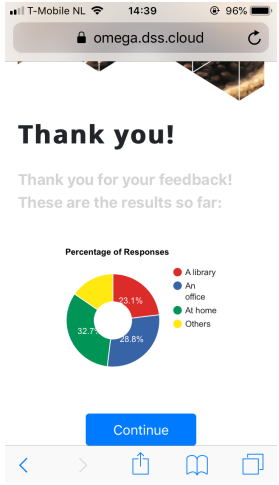

Figure 5: App screen showing pie chart of collected responses.

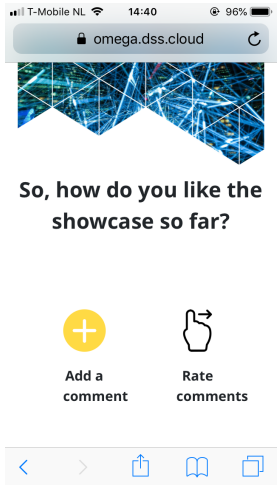

Figure 6: Key screens of the digital platform. The virtual wall is re-purposed for gathering feedback about a showcase.

activities. In doing so, we aim to cultivate a more connected campus environment, in which one is not only more aware of the things and people around but also able to influence the relevant decision-making process. Upon finishing the prototype, we intend to evaluate it with an in-the-wild study. We plan to study the reception of the system and its ecological effects with qualitative approaches like observations and on-site interviews. In addition, we will record all entries and the meta-data like time and annonymized IP addresses for content and interaction patterns analysis.

REFERENCES

[1] Daisy Barbara Ball. 2004. *The nature and extent of desktop graffiti among US college students: An exploratory study.* Ph.D. Dissertation. Virginia Tech.

[2] Jeffrey A Burke, Deborah Estrin, Mark Hansen, Andrew Parker, Nithya Ramanathan, Sasank Reddy, and Mani B Srivastava. 2006. Participatory sensing. (2006).

[3] Morton Deutsch and Harold B Gerard. 1955. A study of normative and informational social influences upon individual judgment. *The journal of abnormal and social psychology* 51, 3 (1955), 629.

[4] Thomas Estermann Enora Bennetot Pruvot and Veronika Kupriyanova. 2017. Public Funding Observatory Report 2017. Retrieved January 5, 2019 from https://eua.eu/downloads/publications/eua-pfo-report-december-2017.pdf.

[5] Connie Golsteijn, Sarah Gallacher, Licia Capra, and Yvonne Rogers. 2016. Sens-Us: Designing innovative civic technology for the public good. In *Proceedings of the 2016 ACM Conference on Designing Interactive Systems*. ACM, 39–49.

[6] William G Griswold, Robert Boyer, Steven W Brown, Tan Minh Truong, Ezekiel Bhasker, Gregory R Jay, and R Benjamin Shapiro. 2002. *Using mobile technology to create opportunitistic interactions on a university campus.* Department of Computer Science and Engineering, University of California.

[7] Henri Lefebvre and Donald Nicholson-Smith. 1991. *The production of space.* Vol. 142. Oxford Blackwell.

[8] Kathleen Masterson Samantha Waxman Michael Mitchell, Michael Leachman. 2018. Unkept Promises: State Cuts to Higher Education Threaten Access and Equity. Retrieved January 5, 2019 from https://eua.eu/downloads/publications/eua-pfo-report-december-2017.pdf.

[9] Samantha Mitchell Finnigan, Adrian K Clear, and Patrick Olivier. 2018. SpaceBot: Towards Participatory Evaluation of Smart Buildings. In *Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems*. ACM, LBW551.

[10] Antonella Radicchi. 2017. Hush City. A new mobile application to crowdsource and assess "everyday quiet areas" in cities. (2017). http://www.opensourcesoundscapes.org/

[11] Robert George Reisner. 1971. *Graffiti: Two thousand years of wall writing.* Cowles Book Co.

[12] Howard Rheingold. 2008. Using participatory media and public voice to encourage civic engagement. *Civic life online: Learning how digital media can engage youth* (2008), 97–118.

[13] B Valks, MH Arkesteijn, and AC den Heijer. 2018. Smart campus tools 2.0: An international comparison. (2018), 18.

[14] VSNU. 2017. Less money per student. https://www.vsnu.nl/en_GB/infographics.

[15] Jon Whittle, William Simm, Maria-Angela Ferrario, Katerina Frankova, Laurence Garton, Andrée Woodcock, Jane Binner, Aom Ariyatum, et al. 2010. VoiceYourView: collecting real-time feedback on the design of public spaces. In *Proceedings of the 12th ACM international conference on Ubiquitous computing*. ACM, 41–50.