PosterVote

Vlachokyriakos, Vasilis; Comber, Rob; Ladha, Karim; Taylor, Nicholas; Dunphy, Paul; McCorry, Patrick; Olivier, Patrick

Published in:
DIS '14

DOI:
10.1145/2598510.2598523

Publication date:
2014

Document Version
Peer reviewed version

PosterVote

Vlachokyriakos, Vasilis; Comber, Rob; Ladha, Karim; Taylor, Nicholas; Dunphy, Paul; McCorry, Patrick; Olivier, Patrick

Published in:
DIS '14

DOI:
10.1145/2598510.2598523

Publication date:
2014

Document Version
Peer reviewed version

PosterVote: Expanding the Action Repertoire for Local Political Activism

Vasilis Vlachokyriakos[1], Rob Comber[1], Karim Ladha[1], Nick Taylor[2], Paul Dunphy[1], Patrick McCorry[1], Patrick Olivier[1]

[1]Culture Lab
School of Computing Science
Newcastle University, UK
{v.vlachokyriakos, robert.comber, karim.ladha, paul.dunphy, patrick.mccorry, patrick.olivier}@ncl.ac.uk

[2] Eclectric Research Studio
University of Dundee
Dundee, UK
n.x.taylor@dundee.ac.uk

ABSTRACT
Online and digital technologies support and extend the action repertoires of localized social movements. In this paper we examine the ways by which digital technologies can support 'on-the-ground' activist communities in the development of social movements. After identifying some of the challenges of deploying conventional voting and consultation technologies for activism, we examine situated political action in local communities through the design and deployment of a low-cost community voting prototype, PosterVote. We deploy PosterVote in two case studies with two local community organizations identifying the features that supported or hindered grassroots democratic practices. Through interviews with these communities, we explore the design of situated voting systems to support grassroots democratic practices and participation within an ecology of social action.

Author Keywords
Democracy; activism; participation; e-voting

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION
Online and digital technologies support and extend the action repertoires of localized social movements [21], including extending the reach and awareness of the local movement to the global scale. Offline activities such as gathering signatures, demonstrations, picketing, hunger strikes and so forth have been mirrored to the online world as online petitioning, virtual protests, virtual sit-ins etc. [28]. Increasingly mobile and synchronous online communication technologies are employed for co-ordination and communication among local groups at the micro- and meso-scale, whilst new forms of broadcast and social media simultaneously allow for rapid and global distribution of political discourse [13]. Digital and online technologies are now readily assisting the mobilization of individuals, communities and populations in the quest for social change.

Yet, it has been acknowledged [14,16] that whilst mobilization is critical for the actualization of social movements, the demand for social movements and the supply of potential for action remain integral to the development over time towards mobilization. For years activists and campaigners use door-to-door surveying to collect data and apply pressure on councils and local governments. Tools such as online surveys, online petition websites, SMS voting etc. are added in the action repertoire of activists. Even though the cost of managing and initiating a campaign online is significantly lower, additional barriers of participation are added (e.g. digital divide, accessibility etc.). More specifically, even though the Internet allows for broadcasting local political debates, it also disconnects them from their locale and attract a more viewpoint-oriented sample comparing with face-to-face surveys [8]. Even though research in developing voting systems for consultation in a top-down approach is extensive, the development of sustainable, low cost systems for the collection of opinions and raising awareness is widely underexplored.

In this paper we examine the ways in which digital technologies can support 'on-the-ground' activist communities in the collection of opinions for the development of social movements. We suggest that radically democratized digital technologies can support varying levels of participation in grassroots democratic practices. To support this assertion, we describe PosterVote, a low-cost electronic voting prototype designed to facilitate the collection of opinions of different stakeholders in

DIS '14, June 21 - 25 2014, Vancouver, BC, Canada

ACM 978-1-4503-2902-6/14/06…$15.00
http://dx.doi.org/10.1145/2598510.2598523

communities for local political action. The development and deployment of PosterVote can be seen as a form of research through design [34]. Although driven by an understanding of the context and processes of voting, PosterVote aims to create radically new forms of bottom up participation. The design of PosterVote and the configuration of technology to support such a bottom-up vision can be seen as a political act, though the specific contexts of this act are not defined. By deploying PosterVote with two local communities we explore the suitability of the deployed electronic voting prototype for: the collection of informal opinions in communities; the promotion and dispersion of social action; and supporting different levels of participation.

BACKGROUND AND RELATED WORK

Support for political activism through digital technology has a long history with notable examples emerging simultaneously with the popularization of the World Wide Web [16]. In the last few years, the role of online and digital technologies for political activism is receiving increased attention from the HCI community (e.g. [17,20,32]). New emerging fields in the area of HCI and electronic government are exploring the use of technology to bridge the gap between citizens and representatives on the local and national level. Technologies have been developed to achieve a variety of participation types from direct participation and registering of opinions [18], to more meaningful participation and deliberation [5,9]. A number of systems have been deployed providing online virtual town meetings or online spaces for deliberative workshops [9,12,19]. This work explores the potential of digital technologies, particularly considering the roles of online social networks, in the mobilization of actors in a social movement [17,31]. A primary driver for these developments has been the reduction (or perceived reduction) of the cost of participation and the maximization of the reward for participation.

Thus, while on the one hand there is a reinvigorated enthusiasm for designing technology for socio-political action in a variety of concerns [15,24], there is also growing concern for the potentially negative impact of digital technologies on civic engagement and action [17,29]. In particular, online activism (pejoratively: slacktivism), such as re-tweeting a political message, or changing one's profile picture on a social network site; is seen as a low-cost, low-risk route to action – though there is some evidence of its positive impact [17]. Other types of online activism (hacktivism or sometimes called disruptive electronic contention [6]) such as cyber-attacks, virtual sit-ins, denial of service attacks etc. are of higher cost and questionable legality and require specific skills and motivation from the organizers. Although, online activism is more likely to inform offline action in authoritarian or repressive contexts as it is a form of freedom of speech [11], in western societies, it is viewed with skepticism, as the link between online participation and offline action is unclear. This is particularly the case where the pathways to participatory social change are limited, for instance, by existing political structures [32], and by technology design [33].

In parallel to concerns about online activism, there has been a growing interest in on-the-ground civic engagement supported by digital technology. In-situ technologies have been deployed in libraries [27], classrooms [4] and other public spaces such as in universities to increase civic engagement of the youth [10], public squares to support passive and active civic engagement [22] and others [32]. A subset of these systems utilizes both online and offline interfaces that allow citizens to either interact in-situ or ex-situ. The most prominent examples of such systems use personal devices as input methods (e.g. posting a response on twitter) whereas using public displays to visualise the discussions and motivate participation. Although these systems partially succeed in raising visibility about the issues being discussed, they still require special technical knowledge for people to participate. In addition even though these systems are designed to increase perceptions of efficacy [2], they are mostly initiated or managed by local political organizations and local councils. As a result, these prototypes serve mostly as tools for consultation with only the councils having the power to drive agendas. Even though such systems succeed in providing tools for top-down citizen consultation and dissemination of information from the local authorities to citizens, their cost of expansion and the hierarchical approach that they follow makes them inappropriate for activism. Innovative and sustainable tools has to be developed taking into account the characteristics of bottom-up movements and considering ways to make such tools sustainable.

Electronic voting research has seen great advances the last few decades in both the security aspects of voting (e.g. verifiability, secret ballot etc.) [3] and accessibility [23] and HCI aspects [1] (e.g. usability issues, digital literacy, interface etc.). A number of secure voting systems are being developed with interfaces ranging from conventional paper ballots [3] to biometric voting systems and SMS voting. Even though these systems are great advances for electoral accountability, voting systems for activism need not only to collect opinions but also raise visibility and motivate debate within the community thus supporting societal accountability [26]. In this paper, we attempt a first exploration of the design and development of situated voting systems to support grassroots democratic practices by putting the technology in the hands of local activists instead of local organizations and councils.

SITUATED VOTING FOR ACTIVISM

With Viewpoint, Taylor et al. [30] found that the deployment of situated voting technologies was capable of collecting large quantities of feedback, but struggled to address the low sense of efficacy in the community. As questions posted on the device were determined by representatives from local government and other

organizations, there was no provision for members of the community to drive the agenda themselves. In this regard, it can be argued that the deployed system ultimately acted as a data collection tool in a consultation process. What the system did not take into account was the need for the community itself to push topics that mattered to them. Moreover, whilst deployed voting devices are simple and mostly easy to use by citizens, effort is required from researchers to build and maintain them. Most activists do not have access to these resources, making it more difficult for them to use these systems instead of traditional survey methods. Cheaply available tools—such as online surveys, SMS voting etc.—can have limited local reach and only attract a small number of responses compared to situated devices.

Conventional situated voting devices and their aforementioned associated cost and maintainability issues do not allow their deployment in non-controlled environments. In some cases, the opinions that an activist needs to collect are dependent on a situated area in a community, which might be located in a non-supervised environment. The mere presence of an activist action in the location, with which it is attributed, increases the credibility of the act. Indeed, one of the uses of graffiti is to support local activism as in most cases it refers to the area in which it is situated. Moreover, it is common for activists to collect opinions in-situ by using conventional surveys and promote social action by giving leaflets and putting up posters. These conventional practices have to be considered and inform the design of technology to support action. The simplicity and sustainability of such conventional activism methods makes them resilient and effective over time.

Another prerequisite for activism is supporting diverse viewpoints of stakeholders. Whilst our goal is to provide those who are politically active the ability to drive the political agenda, stakeholders with different views might want to collect their own data if they are in opposition to those conducting the polls, or to verify the data being collected. In agonistic contexts verifiability and integrity of the voting system are necessary for the reliability of the data being collected and as a result of the evidence's strength. Opening up the ownership of such tools for action may entail security measures to be put in place to prevent jeopardising the voting process.

Activists have long collected data in various ways, from collecting signatures to using distributed sensors (e.g.[25]), and used this data to support their point of view and put pressure on those in power. With this in mind, we have sought to explore the role that situated voting technologies might play when designed explicitly to address the needs of activists. An ideal design would remove the need for technical skills or other funding to deploy the technology, allowing anybody with a cause to collect their own data, including multiple parties engaged in the same debate. In the remainder of this paper, we describe our response to some of these issues in the form of a voting technology that can preserve the advantages of technology for collecting opinions while broadening its ability to act as a tool for activism.

POSTERVOTE

PosterVote is the incorporation of conventional posters widely used for activism and low-tech hardware to allow the collection of opinions that can be used to apply pressure on local authorities. It is an artifact that enables sustainable electronic voting by dropping the development and maintenance costs to approximately $3 USD per piece comparing with the price of a computer or a tablet for a voting device, while increasing the potential for social movements to engage in action and for communities to support and respond to such action. It is designed to be at least as accessible and easy to participate as surveys but also to inherit the benefits of technology thus supporting scalability. The use of the voting posters by activist groups instead of local authorities and officials allow questioning the existing power hierarchies in a community by collecting supplementary evidence about an issue or to open the agenda of community issues to less engaged citizens. In addition, the design of the technology allows and motivates participation of the wider public regardless of their digital literacy. That is, PosterVote can be adopted by any typical or non-typical socio-political movement and appropriated into conventional and unconventional social and political action.

Figure 1. An example design of the paper poster showing the question, possible options and elements for buttons and LEDs

Design

PosterVote consists of two parts: a conventional paper poster to be put on walls and lampposts; and a piece of lightweight hardware consisting of buttons and LEDs. The hardware is attached to the poster, creating an augmented tool for dissemination and feedback of political discourse. Figure 1 shows an example design of the paper poster. Interested parties can create and print their own posters by using a website developed specifically for printing poster designs according to the hardware dimensions. The circles next to the answers are the design elements that indicate the position of the buttons whereas the squares next to them indicate the position of the LEDs.

The hardware consists of five buttons each assigned to a possible answer of the poll, and five LED lights (see in Fig. 2). When a button is pressed one vote is registered and stored, and the corresponding LED is turned on to indicate that the button is pressed and the vote recorded.

Configuring Participation

The location that the posters are placed allows the configuration of both participation levels and who is participating. In this way by placing multiple electronic posters in strategic locations an interested party can collect opinions of specific citizen groups and gain a deeper understanding of the needs of the community. Moreover, the use of simple interfaces such as buttons and LEDs for the minimal level of participation allows less literate and digitally excluded groups to be involved in the decision-making, something that is not readily achievable by electronic means of voting or surveying. Many large-scale collaboration projects, like Wikipedia, depend upon a very small number of participants (less than 2%) for the bulk of the contributions made, yet this is enough to create profound value for millions of users [30]. Expecting the same amount of effort from every participant in a collaborative project is unpractical and inequality of participation should not only be expected but also harnessed [30]. Similarly, Postervote is designed to harness such inequalities in collaborative projects for collecting the opinions of local communities. Activists and more engaged individuals can contribute by setting up polls and collecting data whereas other community members just vote or make use of the collected information. Moreover, the physical and digital nature of the poster allows for both localized and dispersed social action.

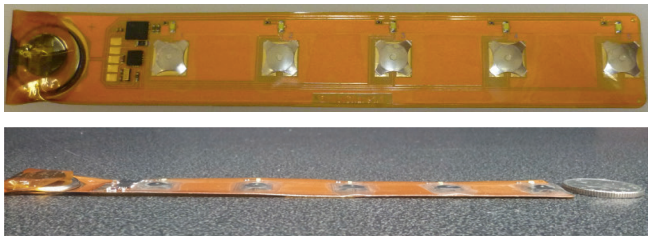

Figure 2. PosterVote: Flexible hardware to be placed at the back of each poster (the five buttons and the LEDs on top). In total, the hardware consists of a memory, a clock, five buttons, five LEDs, a placeholder for the battery and a port to download the results by using an FTDI to USB cable.

To allow additional interactivity and the ability to display and share the results, a method of downloading the results was incorporated. Pressing a specific combination of keys (in this case the first and last button at the same time) causes the LEDs to transmit the results by flashing a series of on-off tones. This can be captured by a phone's video camera and analyzed either on the spot by using the phone's processor or on a server by uploading the video footage. The footage is processed by identifying the on/off states of the LEDs and by decoding this captured digital signal. Finally, the footage is converted to the results of a specific poll and sent either back to the device or uploaded to a result's website. Events such as the Arab spring exemplify the importance of technologies for the collection of evidence (in the Arab spring with the form of pictures and video footage) and sharing such evidence with the public (by the use of social media). Camera phones and social media sites are the most prevalent means of facilitating these actions with a mostly underexplored space of designing technology to support offline action.

This method of collecting the votes in the devices is designed to be sustainable by lowering the cost of deployment and requiring the active involvement of the community. At least one participant is required to upload the results at the end of the poll. Even though it is not required, residents of a community can be involved in either the initialization of a campaign or the collection of the data from the posters. Politically apathetic residents of a community can participate by mere voting whereas more active residents can be involved in setting agendas and collecting and uploading the results, thus creating a participation ladder.

Multiple uploads of the results during the voting process allows cross checking the tallies and leads to an increased reliability. In a similar but mathematically verifiable way, a number of secure and verifiable e-voting systems designed for national elections [3] require the participation of the electorate for assuring the integrity of the voting process. Uploading the results online (every time a community member captures the data with a phone) allows sharing and could provoke discussion around the issues being surveyed or the results' legitimacy. By uploading the results on an online space, debates about the issues at stake could occur online, removing this burden (and cost) from the situated technology. In addition, sharing detailed data about a campaign – not only votes collected but also locale, method of collecting votes, schedule for data collection from the posters, filming the surroundings to verify the location that the poster is placed captured videos etc. – can make the voting process more transparent and credible. Even though a survey may be very specific for a community itself, spreading experiences and data to external links increase the reach of the process, and support is given to communities with similar considerations. Sharing collected data before the end of poll is important for reliability purposes as diverse groups of stakeholders may support different and contradicting opinions.

Multiple voting can be an important determinant of how citizens use the system. In [32], many residents suggested that multiple voting was not a serious issue as it reflected how strong someone felt about an issue. However, the use of electronic voting tools for the grassroots collection of evidence poses additional trust considerations as ownership of the voting system can possibly affect the perceived reliability of the gathered data. Even though the situatedness of the prototype and social norms may prevent

such acts from occuring, the effect of multiple voting in these configurations and contexts still remains a matter of debate. However this design choice ensures the sustainability of the prototype – keeping down the cost allows multiple posters to be placed in a community without being concerned of vandalization. While we acknowledge that multiple voting is a significant shortcoming of PosterVote comparing with conventional methods such as face-to-face surveying, this first iteration is used as a probe to further explore the understanding and requirements of activists from voting tools.

DEPLOYMENTS

To collect feedback about the concept, a prototype was implemented and deployed in two local communities in the UK. The first deployment was in collaboration with the local strand of an international movement for sustainable communities. Another case study was conducted in a different local community with the community's regeneration planning group during a local annual festival.

Case study 1 – Road planning group

The first case study was conducted in collaboration with an activist group interested in collecting opinions and mobilizing the community for pedestrianizing and changing parking regulation of a central area of the community (from now on road planning group). The group wants to raise awareness about parking regulations and traffic in their community. The questions that the group put on the posters were related to managing car traffic on the central street of the community, and altering the parking regulations of a neighboring street to reduce the number of parked cars in the center.

We met with two of the group's activists who highlighted the difficulty in reaching residents in the community by using alternative to conventional door-knocking survey methods. After presenting the technology and the prototype to them, they indicated the street on which they were planning to put the posters up for the first deployment (the street which the parking regulation change will be proposed) and gave us the questions to be printed on two posters. The posters were printed and handed over to the activists who put them up on lampposts across the street as you can see in Figure 3. The posters (which were printed on normal A4 pages) were stuck on cardboard to prevent them from rolling around the posts. Thick transparent tape was used in order to protect the paper posters from adverse weather conditions.

The posters were deployed for a period of eight days and then they were collected to download the results. At this point it has to be noted that uploading the results by filming the LEDs wasn't used, as the activists preferred us to compute the results at the end of the deployment. Subsequently, two additional deployments were conducted: the first on the same road as the first deployment with again parking regulation related question but with richer possible answers instead of yes/no; and the second on a different street of the community with rerouting traffic as the topic of polling. In both cases the posters were deployed for two weeks during a busier period than the first deployment and the two activists involved in setting up the posters and collecting the results chose to print two laminated posters per street (see Figure 4).

Figure 3. PosterVote stuck on a lamppost during the first deployment

Table 1 shows the number of votes for each of the posters for all three deployments with the road-planning group. The majority of the participants were in favor with changing the parking regulation in the street (deployment 1 and 2) whereas keeping the same traffic regulations (deployment 3). Further analysis of the collected votes for all three deployments indicate that approximately half of the votes found were cast between two seconds. This indicates that either multiple voting occurred widely or participants were casting votes in groups.

Table 1. Votes cast for each one of the deployments. Deployment 1: 2 posters for 8 days; Deployment 2: 2 posters for 14 days; Deployment 3: 2 posters for 14 days

	1st deployment	2nd deployment	3rd deployment
Poster 1 (votes)	62	281	219
Poster 2 (votes)	81	22	137
Total Votes	143	303	356
Votes/Day	**17.8**	**21.6**	**25.4**

As we can see in Table 1, participation in the second and third deployment was higher than the first. This has to be attributed to the period that the posters were deployed as the first deployment was conducted on a student-based street during summer vacations. The big discrepancy in votes between Poster 1 and Poster 2 during the second deployment has to be accredited to the location where the posters were positioned as the first was placed next to a metro station whereas the second in a less visible spot. In

general comparisons across posters and deployments due to the differences in time of deployment and locations that the posters are put up are not appropriate and the numbers are used to roughly indicate participation levels.

Response

Following the deployment, we presented the results to the two community activists and conducted an interview about their opinions and reflections on the results.

According to the community activists, one of the main problems of the design when compared with conventional surveys is the ambiguity of the collected data. More specifically the prototype doesn't allow the collection of demographics and there is no way to identify voters. Multiple voting adds more ambiguity in the interpretation of the results by not being able to map the number of cast votes to a fixed number of residents. They suggested that submitting demographic information before voting would have possibly prevented multiple voting and would have generated additional data. The main advantage of PosterVote over other electronic means of collecting opinions is related with the location where the prototypes can be deployed. More specifically, PosterVote allows the configuration of participation according to the region that the system is deployed: *"[…] the thing about having it on a lamp post is its directly relevant to that particular position.* [in a supermarket] *the sample population is too broad, we wanted to be people who used Coniston* [street]*"*. However even though the activists perceived PosterVote as better than electronic polling systems placed in stores, they believe that putting them indoors might increase the trustworthiness of the results, as a polling device on a lamppost raises doubts about the reliability of the collected data.

Even though PosterVote was perceived as having potential for democratizing local communities, its affordances are not yet entirely clear as users lack of previous experiences with relative devices: *"loads of shops and museums have* [computer-based] *devices like this so its more in the range of peoples experiences; this* [PosterVote] *is not at the moment"*. The subtle affordances of PosterVote were one of the most important reasons of skepticism against the collected results as *"it is like we build our own tool to prove something"*. Thus it seems that even though we designed the prototype to be as simple as possible, it's innovativeness lowered trust on the collected data.

One of the limitations of PosterVote was its inability to show results and limited interactivity: *"if the democracies are about to work, they* [citizens] *have to get feedback and feel that they have influenced something I made a difference I will do it again"*. When asked whether visual downloads of the results would make the poster more interactive one of the activists replied that *"taking videos of the poster is not very simple; definitely for the* [neighbourhood name] *population"*. Thus filming the posters and uploading the results was perceived as too complicated for the road planning group activists. Instead putting up paper posters with the results was suggested as an effective way to give feedback to the residents.

Governance of the voting systems and whether ownership by local governments can foster increased participation comparing with local communities was one of the main issues raised. Actions of local governments were seen with skepticism as civic participation and consultation projects the last few years have been conducted only to meet some governmental civic participation goals: *"I think people are skeptical about local government collecting information because it tends to be this word "consultation" […] people are very cynical about these consultations it's a lip service being paid and I think if the local council did this* [putting posters up] *then people would feel, well what they are going to do about it…"*.

Figure 4. PosterVote during third deployment

Generally, apathy in society today was perceived as the main motivation for inventing and testing new tools to support democratic practices: "*I think the trouble at the moment is that people are switched off from the standard political system, […] and that's because of peoples ignorance but also disaffection they are disquiet about the political process and anxiety about politicians not representing them adequately. I think our democracies isn't working and different ways are needed which needs to be interactive; this is a start I think that you need to start by having a system to get peoples views more validly"*.

Case study 2 – Regeneration group

The second deployment was conducted in a local area after being contacted by the community's regeneration planning group (from now on referred as regeneration group). This local voluntary organization has recently taken on the responsibility for the regeneration plan of the community. According to new legislation in the UK [7], local communities have been given new rights and powers for neighborhood planning. Under the act, local communities can apply to establish neighborhood forums for the "purpose of promoting or improving the social, economic and environmental well-being of the area" [7].

Following introductory meetings with the regeneration group, the voting prototype was presented to them as part of a wider engagement, in order to probe how it might help them promote their work and simultaneously collect opinions in the community. A local summer festival was suggested as a good opportunity to collect some of the visitors' opinions about the local area and at the same time deploy the voting prototypes. The festival is an annual showcase event organized by the local community, which attracts visitors from the local city and surrounding areas. Any interested parties can set table stalls in the festival to promote their work or sell products. The regeneration group proposed three questions with five possible answers for each question – after being informed that the posters can support up to five alternative answers. All three questions were in relation to what people liked in the area and future directions of the community.

Figure 5. Posters on Regeneration group's table stall

The regeneration group's stall was located in a central location of the festival. We designed, printed and set the hardware on the posters with the suggested questions and answers. One poster per question was created.

Although the posters are designed to be attached to highly visible and public positions, such as lampposts or walls, the group was not specifically instructed to do so. The group instead decided to place the posters on a white sheet of paper on their table stall with the prompt "Push our buttons" (see Figure 5). According to the group this would reduce disturbance to other participants in the festival and could allow them to be close to the people that interact with the posters so that they could get further feedback about the issues being voted. Posters were deployed for a total of 5 hours during the festival. Following the deployment an interview was conducted with the person responsible for the group's stall and the posters were returned to calculate the results. The number of votes per poster was very similar for all three posters (221, 234, and 259 votes for first second and third poster respectively).

Response

We conducted a semi-structured interview with the community member (from now on referred as Clare) who was managing the community's stall during the festival. The interview lasted for one hour and the participant described her experiences during the day and responses from the visitors.

The first impression of visitors was generally positive with the community member commenting: *"their reaction in terms of seeing their expressions and gestures were very positive, they didn't comment very much on the form of doing it. Which was good because it meant that actually it appeared to them to be low-tech way to doing things"*. After mentioning a pertinent comment of one of the visitors who was looking for a pen to tick the boxes as an alternative to pressing the buttons the conversation moved to comparing e-voting solutions such as the poster with more traditional forms of collecting data such as surveys with the organizer focusing on the simplicity of downloading the results out of electronic means of collecting opinions. More specifically she said: "*[…]I felt that this offered a simpler way of doing things, for my point of view it is much better because then you don't have to transfer the information into a database.*". In terms of the interaction, according to Clare people expect tick boxes and pens because they are used on filling questionnaires but PosterVote was more playful for visitors.

According to Clare, the discussions that were motivated by the posters, was one of the most significant outcomes of the deployment. She stated: *"What I found that was interesting was that people weren't just pushing the buttons, they were actually talking to us about what they have chosen. We felt very strongly that having the questionnaires there, having them in the form that they were in helped us to interact with the people."* In addition, Clare mentioned that she was trying to find a notebook to take some notes of what people were saying to her while voting. One possible design to facilitate this could be having blank spaces for making notes on the posters, however according to Clare this may have hindered participation as *"people might feel more uncomfortable if they have been recorded in some way […] One of the things that I think worked well was the fact that we were not gathering any demographic information and the fact that we weren't asking for any personal information whatsoever I think encouraged people greatly"*. Sitting next to the table stall with the posters provoked discussion about negative things in the area or options that the visitors wanted to vote against. More specifically Clare mentioned when asked how visitors showed their negative thoughts about specific options *"Yes, they voted for the things that they liked and they told me about the things they didn't like*". So the posters served as a way of initiating a discussion between the community activist and the public. One of her suggestions in relation to designing a poster that would allow negative feedback was to have special posters for negative options, for example having a red background color for negative voting polls and green for positive.

One of the interesting discussion topics that emerged was about who has the authority over the posters. Who should in

the future ask questions and suggest possible options for people to choose from? Even though the success of the prototype in engaging the community's visitors to give their opinion about the area and discuss some of the polled issues, Clare is skeptical about giving the prototype out to any interested members of the community. She explains that by saying: *"inevitably there would be some that would put up rude or abusive things and I am a bit concerned about that because it happens with graffiti all the time"*. So even though she found that the prototype served well for community engagement, she also believes that it should be used in a restricted environment and the ownership of the posters should be controlled as it can be misused. Additional meetings with the regeneration group further support the finding that the group, having gained some authority over the regeneration of the area, acts more as a political committee rather than as a group of activists. The posters were perceived as a valuable tool for the group to further influence the development of the community and thus its use should be censored to specific residents. Finally, in terms of the content they put on the posters, Clare was *"very cautious about putting positive options rather than having negative options"*. She believes that having negative options on the poster could possibly bias people more than positive ones. In general, for this specific community it seemed that the organizers were really careful about what will be put on the posters and where.

Even though the visitors at the local festival vary every year, it is usually very popular amongst families with children. Indeed, some families stopped by the community's stall and voted for the asked questions. According to the community representative, parents *"were saying to them don't press more than on[c]e; we didn't say that to anybody. We actually had to encourage people to press more than one button per sheet quite a few people at first thought that they could only choose one thing out of each sheet"*. In general, voting only once (as opposed repeatedly) seemed to be the automatic understanding visitors have for voting. According to Clare, groups of people preferred to 'elect' one group member as responsible for voting for the group. *"What we had more problem with was trying to get more than one person in a group to vote, couples, families they were electing one member of the group to press the buttons and the one member of the group seemed to think that they were doing it for all of them"*. Clare tried to explain this as happening because *"having the same views united them more and perhaps because being seen in public"*.

DISCUSSION

The two conducted case studies and the subsequent interviews with the community activists emerged a number of interesting insights about the deployment of grassroots led e-voting systems to support activism. Even though the two communities had significantly different characteristics, some interesting themes were identified. More specifically in both communities, issues of representativeness, interactivity, governance and social norms were observed.

Representativeness

In both case studies the representativeness of the collected results was one of the most prevalent issues. The road-planning group that deployed the prototype as a situated voting tool indicated that the lack of demographics from the collected votes, the inability of mapping a number of votes to a number of residents, and the possibility of multiple voting undermines the trustworthiness of the results and their representativeness.

On the other hand the Regeneration group, using the system as a replacement of conventional surveys on a table stall, didn't have such concerns as they had the same face-to-face interaction that they have when collecting opinions with conventional means. In addition the collection of demographics was perceived as inappropriate as it would introduce barriers of communication between the community activists and the residents.

Interactivity

According to the Regeneration group, the electronic posters were as intuitive to participants as conventional non-electronic means of surveying but at the same time having the advantages of online surveys. On the other hand though, the road-planning group, perceived the lack of interactivity as prohibitive for participation as it hinders the affordances of PosterVote. In the road-planning case study, the lack of feedback was recognized as one of the main limitations of the prototype and the need for the provision of additional feedback to increase the perceived efficacy of the voters was suggested. Whilst PosterVote motivated discussion between community members and the public in the regeneration case, using the prototype as a voting device on lampposts prevented these discussions to emerge because the only possible interaction was casting votes. A possible redesign of the poster might need to capture discussions and richer feedback from the voters. Finally, using the visual download feature of the system was perceived as complicated for the characteristics of the communities.

Governance

The most prevalent theme that emerged throughout the prototype deployment was governance over the electronic posters. The low cost of the posters initiated discussions about their ownership. The road-planning group boldly supported the bottom-up approach of collecting opinions and then using them to support action, contrasting such movements with council led e-participation projects that are seen with great skepticism. On the other hand, the regeneration group was more skeptical about opening the ownership of the prototype to everyone in the community, acting more as a committee and representative of the community. Even though these observations might be relevant only for our specific community contexts, the different attitude of these communities on governance was dependent on different political beliefs and organizational

characteristics and hierarchy structures of the group. The road-planning group do not distinguish themselves from the rest of the community, acting as members of a community that they want to democratize. The regeneration group, supposedly due to the gained power newly assigned to them by the local council (i.e. the regeneration of the area), was very doubtful about giving the ownership of the system to other members of the community. Although members of the group were inclined to further democratize the community, who is asking the questions and what questions are asked should be censored according to the regeneration group. In this sense, it is the low-cost, openness and self-preserving characteristics of the technology itself, which is a democratizing agent.

Social norms

The way that the communities deployed the prototype affected how the residents used the system. On the one hand in the regeneration case, the supervision of the voting process from the activist enabled social norms that prevented multiple voting from occurring. The visitors of the community's table stall voted only once per poster as the norms of voting indicate so. On the other hand however, the road-planning group by not supervising the voting process allowed participants to vote in 'private' and thus the social pressure for voting only once was eliminated.

According to these findings, placing the posters in more visible locations and making the act of casting a vote more visible to the social surroundings will possibly decrease multiple voting.

CONCLUSION

This work builds on existing situated e-voting and activism literature in HCI (e.g. [17,18,20,32]) by repositioning technology for data collection in the hands of grassroots instead of local councils. We believe that PosterVote is a step towards expanding the repertoire for local political activism with sustainable tools that will reinvigorate local democracies. Light-weight and low-cost technologies for on-the-ground activism show promise for the purpose of supporting sustainable and deeply democratic processes of data collection and public discussion. As a more accessible tool for political activism PosterVote opens avenues to increase the reach of existing social movements. With low-cost and openly available devices for opinion polling, the possibility to engender citizen political engagement can be fulfilled where members of the public can openly question the political. However, open technology can also be used to reinforce existing power structures, and the importance of governance, transparency and fairness in the design of democratic technologies cannot be understated.

PosterVote limitations when compared with well established e-surveying and e-voting systems are of course significant. If used as a survey tool, the lack of demographics makes it inappropriate for accurate collection of data whereas if it is used as a voting tool it is open to manipulation, as multiple voting cannot be prohibited. Nonetheless, the prototype as a first iteration of such a system, initiated and managed by activist communities, acted as a probe and brought to light interesting insights when deployed in different activism contexts.

The use of PosterVote to expand the collective action repertoires of social movements also brings with it an ethical consideration of 'unconventional' political methods (e.g. guerrilla politics, hacktivism etc.). The use of fly posters for political action can be considered conventional, though the precise legality, even within democratic societies, is questionable. The response of social movements to this possibility can mirror the values of that group – for instance, the regeneration group chose to implement the poster as a more conventional survey device to support face-to-face interaction. There are many alternative and imaginable possible use scenarios, including those that could be considered as unethical and illegal. It is unlikely that any open design in the political space can inherently avoid such possibilities, however, it can be noted that the expansion of the action repertoire for social movements, particularly through introducing new means to engage in situated political action can increase the potential for unconventional political action. Yet, we must also recognize that the willingness of social and political movements to be open to all discourses may be work in contradiction to their own values.

REFERENCES

1. Bederson, B.B., Herrnson, P.S., Niemi, R.G., and Park, C. Electronic Voting System Usability Issues. *New Horizons*, 5 (2003), 145–152.
2. Carroll, J.M., Rosson, M.B., and Zhou, J. Collective efficacy as a measure of community. In *Proc. CHI 2005*, ACM Press (2005), 1.
3. Chaum, D., Essex, A., Carback, R., Clark, J., Popoveniuc, S., Sherman, A., and Vora, P. Scantegrity: End-to-end voter-verifiable optical-scan voting. *Security & Privacy, IEEE 6*, 3 (2008), 40–46.
4. Cheok, A.D., Fernando, O.N.N., Wijesena, J.P., Mustafa, A.-R., Shankar, R., Barthoff, A.-K., Tosa, N., Choi, Y., and Agarwal, M. BlogWall: social and cultural interaction for children. In *Proc. CHI 2008*, ACM Press (2008), 1.
5. Cohen, Joshua. "Deliberation and democratic legitimacy." *Debates in Contemporary Political Philosophy* (1989), 342.
6. Costanza-Chock, S. Mapping the repertoire of electronic contention. *Contributions To The Study Of Mass Media And Communications 66* (2003), 173–191.
7. Department for Communities and Local Government, U. A plain English guide to the Localism Act (2011), 19. http://bit.ly/1loZPe5

8. Duffy, B., Smith, K., Terhanian, G., and Bremer, J. Comparing data from online and face-to-face surveys. *International Journal of Market Research* (2005), 615.
9. Fishkin, J.S. *Democracy and deliberation: New directions for democratic reform*. Cambridge University Press. 1991.
10. Hosio, S., Kostakos, V., Kukka, H., Jurmu, M., Riekki, J., Ojala, T. From School Food to Skate Parks in a few Clicks: Using Public Displays to Bootstrap Civic Engagement of the Young. In *Proc. Pervasive 2012*, Springer, (2012), 425-442.
11. Howard, P.N., Duffy, A., Freelon, D., Hussain, M., Mari, W., and Mazaid, M. *Opening closed regimes: what was the role of social media during the Arab Spring?* Techical report University of Washington, Seattle. 2011.
12. Kavanaugh, A., Perez-Quinones, M.A., Tedesco, J.C., and Sanders, W. Toward a virtual town square in the era of Web 2.0. In *International Handbook of Internet Research*. Springer, 2010, 279–294.
13. Kidd, D. Indymedia. org: A new communications commons. *Cyberactivism: Online activism in theory and practice*, (2003), 47–69.
14. Klandermans, B. Mobilization and participation: Social-psychological expansisons of resource mobilization theory. *American sociological review*, (1984), 583–600.
15. Kuznetsov, S., Odom, W., Moulder, V., DiSalvo, C., Hirsch, T., Wakkary, R., and Paulos, E. HCI, politics and the city: engaging with urban grassroots movements for reflection and action. *Ext. Abstracts CHI* 2011, ACM Press (2011), 2409–2412.
16. Van Laer, J. and Van Aelst, P. Internet and social movement action repertoires: Opportunities and limitations. *Information, Communication & Society 13*, 8 (2010), 1146–1171.
17. Lee, Y.-H. and Hsieh, G. Does slacktivism hurt activism?: the effects of moral balancing and consistency in online activism. In *Proc CHI 2013*, ACM Press (2013), 811–820.
18. Litvinenko, A. Social Media and Perspectives of Liquid Democracy: The Example of Political Communication in the Pirate Party in Germany. *Proceedings of the 12th European Conference on e-Government, Barcelona*, (2012), 14–15.
19. Lukensmeyer, C.J. and Brigham, S. Taking Democracy to Scale: Creating a Town Hall Meeting for the Twenty-First Century. *National Civic Review 91*, 4 (2002), 351–366.
20. Massung, E., Coyle, D., Cater, K.F., Jay, M., and Preist, C. Using crowdsourcing to support pro-environmental community activism. In *Proc. CHI 2013*, ACM Press (2013), 371–380.
21. McAdam, D. and Sewell Jr, W.H. It's about time: Temporality in the study of social movements and revolutions. *Silence and voice in the study of contentious politics 89*, (2001), 125.
22. Memarovic, N., Langheinrich, M., Alt, F., Elhart, I., Hosio, S., and Rubegni, E. Using Public Displays to Stimulate Passive Engagement, Active Engagement, and Discovery. *In MAB 2012*. ACM Press, (2012).
23. Oostveen, A.-M. and Van den Besselaar, P. Internet voting technologies and civic participation: The users' perspective. The Public, 11, 1 (2004), 61-78.
24. Parker, A., Kantroo, V., Lee, H.R., Osornio, M., Sharma, M., and Grinter, R.E. Health promotion as activism: building community capacity to effect social change. In *Proc. CHI 2012*, ACM Press (2012), 99–108.
25. Paulos, E., Foth, M., Satchell, C., Kim, Y., Dourish, P., and Choi, J.H.-J. Ubiquitous Sustainablity: Citizen Science and Activism. In *Proc. Ubicomp 2008 workshops.* ACM Press (2008).
26. Peruzzotti, E. and Smulovitz, C. Societal and horizontal controls: two cases of a fruitful relationship. *Democratic Accountability in Latin America*, (2003), 309–331.
27. Rogers, E. M., Collins-Jarvis, L., & Schmitz, J. The PEN project in Santa Monica: interactive communication, equality, and political action. *JASIS 45*, 1994, 401–410.
28. Rolfe, B. Building an electronic repertoire of contention. *Social Movement Studies 4*, 2005, 65–74.
29. Rotman, D., Preece, J., Hammock, J., Procita, K., Hansen, D., Parr, C., Lewis, D., and Jacobs, D. Dynamic changes in motivation in collaborative citizen-science projects. In *Proc. CSCW 2012*, ACM Press (2012)**,** 217–226.
30. Shirky, C. *Cognitive surplus: Creativity and generosity in a connected age*. Penguin Press, New York, 2010.
31. Starbird, K. Digital Volunteerism: Examining Connected Crowd Work During Mass Disruption Events. In *Proc. CSCW 2012 Workshop on Collaboration and Crisis Informatics.* IISI. 116-123.
32. Taylor, N., Marshall, J., Blum-Ross, A., Mills, J., et al. Viewpoint: empowering communities with situated voting devices. In *Proc. CHI 2012*, ACM Press (2012) 1361–1370.
33. Vlachokyriakos, V., Dunphy, P., Taylor, N., Comber, R., Olivier P. BallotShare exploring the design space of digital voting in a workplace environment. *Computers in Human Behaviour* (2014, forthcoming).
34. Zimmerman, J., Forlizzi, J., and Evenson, S. Research through design as a method for interaction design research in HCI. In *Proc. CHI 2007*. ACM Press (2007), 493-502.