

## **PREFACE**

# **Pervasive Participation – New Horizons for Citizen Involvement and User Experience**

Over the last decade, various governments across the globe have invested in efforts aimed at a more participatory governance that would bring citizens and representatives closer together while benefiting both sides. These efforts include informing citizens about ongoing and future plans in city making, facilitating dialogues between those two groups, as well as empowering citizens to resolve issues themselves. Holding advantages for the different stakeholders, involving citizens in various stages of decision-making processes might not only increase transparency and eventually trust, but also raise their acceptance of the decisions being made. The aim is to ultimately improve satisfaction and the quality of life [1].

Recent technological advances in participation processes allow the ability to place the efforts described above into practice. In an attempt to also mitigate common barriers to engagement (e.g. spatial, temporal; [2]), practitioners and scholars have started to move away from traditional approaches to public participation and towards technology-mediated approaches, referred to as e-participation [3]. In essence, this approach describes the utilization of information and communication technology (ICT) to broaden and deepen participation in policy development processes [4]. ICT enables citizens to connect with one another as well as with their elected representatives with little effort. However, the challenge is to engage them and capture their interests. The first generation of tools facilitating citizen engagement employed were geographic information systems (GIS). These allowed citizens to respond to questions from the city administration concerning particular locations in the city (e.g. where to build new bikeways). GIS tools mainly provided citizens with information on ongoing and current plans as well as gave them the opportunity to provide feedback on those. To that extent, these map-based engagement tools in their original form and function implemented an information provision and top-down engagement [5]. A practical restriction of GIS-based engagement systems is that due to their complexity (i.e. detailed maps) they are usually best viewed on larger screens or laptops. Although GIS-based systems allow engagement anytime while mitigating barriers of traditional engagement forms (e.g. opening hours of town hall meetings), they are still place-bound. The same issue applies to early web-based engagement platforms. However, these allowed citizens to not only respond to predefined topics but also introduce their own concerns by raising issues and proposing ideas, hence enabling bottom-up engagement.

In this focus section, we present the current state and new horizons for the next generation of e-participation: Pervasive Participation [6]. The goal of this research field is to unleash the potential of feature-rich smartphones and instrumented urban environments for the domain of citizen engagement. The main idea of this concept is to enable inclusive, efficient and sustainable engagement by mitigating traditional barriers to participation. Hope put into pervasive participation pertains to providing

public engagement methods that are accessible, easy to operate, require few resources (i.e. time and skills) and present topics of public concern in comprehensible formats.

Compared to classical e-participation approaches that are restricted to mere web platforms, Pervasive Participation promises a number of advantages. The most obvious one is that people have their smartphones and tablets at their disposition almost all the time, therefore they can readily be engaged on the move and on the spot. There has been a number of research and demonstration projects, such as the European research project “b-Part - Building Pervasive Participation” ([7], which the majority of the guest editors of this focus section was involved), and many of these confirm the extra benefits of on-the-move participation. While the classical mobile input keyboard modalities of smartphones are limited, they offer other possibilities such as touch-sensitive screens, outdoor gestures and voice input. For example, robust speech recognition can provide meaningful support for elderly people, as they would not be restricted to typing on small keyboards. One of the many promising and recently introduced hardware elements are so-called pico projectors, which not only allow the spontaneous display of digital content at different locations, but also facilitate in-situ participation by smaller groups.

One of the main advantages of nowadays widespread mobile devices can be summarized as enabling participation whenever wherever (i.e. both location-based and in-situ participation). Thus, developing *mobile* participation applications (= apps) has become a universal trend in city making [8]. These participation applications differ widely in their approaches and in the level of participation they achieve. Whereas some decision makers interpret citizen engagement as a unidirectional service where citizens can enter issues and complaints to which the city administration will (hopefully) reply eventually (= citizen sourcing applications; [9]). Others take an indirect approach to engagement and collect certain sets of data automatically (e.g. the noise level in a neighborhood; citizen sensing applications; [10]). Citizen sourcing applications can be categorized as achieving a consultation participation level as they do not only provide information but also invite citizens to share their own thoughts and ideas. Other mobile participation applications invite citizens to take part in the actual development of plans as well as allow them to initiate and form their own agendas (= participatory sourcing). Seeking to develop *with* citizens rather than *for* citizens, these participatory approaches focus on bidirectional engagement that establish dialogs between a city and its citizens [11].

Another opportunity to reach citizens outside their homes and enable their spontaneous participation, is to instrument the places that relate to specific concerns, plans or ideas with interactive technology. To this end, public displays and screens in central locations have been appropriated to run participation applications (e.g. [12–15]). Similar to many other participation approaches and applications developed in an academic setting, a main focus is to explore how to best activate citizens to become involved in local decision-making processes (e.g. [16, 17]). Fredericks et al., for instance, investigated what impact the décor of the participation venue had on citizens’ motivation to engage [18]. For this purpose, they placed various assets (i.e. sofa, a pavilion) around the main interaction interface (here a tablet) of the participation application. Installations enabling citizen engagement further included more complex constructions such as archways [19] and booths [20, 21].

Seeing that existing public participation applications have largely succeeded only in *increasing* participation but not *broadening* it [22], another main goal of pervasive participation is to activate other groups than those referred to as the “usual suspects” of participation [23]. Accordingly, it is important to both invite and encourage members of previously less active groups to become involved in public decision-making processes. These groups mainly include youth and resource-weak communities (i.e. low socio-economic status). A currently popular approach to activate not only these groups but citizens in general is by adopting design principles and specific characteristics from games [24]. Seeking to foster the public’s (civic) skills there are mainly two strands regarding this approach; one strand is to capitalize from games’ capacity to facilitate learning [25, 26], the second strand builds on the entertainment factor of games. By incorporating game mechanics and dynamics into participation applications the aim is to make engagement more enjoyable and thus increase citizens’ motivation to become involved.

This focus section includes articles exploring pervasive e-participation concepts and prototypes that both make use of novel strategies (e.g. gamefulness) to entice previously less interested citizens to become engaged, as well as appropriating existing technologies in novel ways to activate and encourage different citizen groups to take part in communal decision-making processes. All four papers respond to challenges and opportunities of pervasive participation. While the first two articles explore novel approaches to engage previously less-active groups in public participation, the third investigates in what way established technologies can be utilized to activate youth to assume agency in communal decision-making. The fourth article takes the approach “going where citizens are” literally and analyses how to involve pedestrians, a group that is often left out in considerations regarding urban planning.

In “Mini is beautiful”, Devisch et al. advocate the use of mini games rather than developing complex stand-alone games, which might push the original focus of the intervention in the background. Particularly in complex planning processes planners should reconsider the type and use of games and instead opt for games that focus on collective learning outcomes instead of tangible outcomes. Their paper introduces a conceptual toolbox that helps design and select appropriate serious mini-games that support spatial planning processes by structuring smaller scale interventions around stages of collective learning. Devisch et al. argue that serious mini-games are better suited for spatial planning processes as they can target learning goals more precisely and in-time compared to overall, bulkier full-fledged serious games. Being customizable and responsive to different factors that contribute to the unique socio-economic and spatial context, the collective learning outcomes contribute to more participatory procedures. By presenting two case studies with serious mini games, the article illustrates how the toolbox can be implemented.

Thiel et al. investigate the potential of applying gamification to e-participation applications. In their article “Why so serious?”, they analyse the usage and acceptance of specific game elements that were included in a mobile participation application. This application was tested in a field trial in Turku, Finland over a period of five months. Both qualitative and quantitative data showed that the application did not engage new groups of users, but did add some motivation for both those who liked games and those who did not. The authors further investigated whether a combination

of both internal and external factors such as motivations, skills and contextual aspects can be used to predict active participation. They found no support for such a model. Their findings indicate that citizens are primarily motivated by genuine interest in urban planning.

In their article, Poplin et al. introduce a framework of methods to engage citizens by drawing on storytelling capabilities of pervasive IT tools such as GIS and serious games. To illustrate how methods of this framework can be applied, they present a case that addresses the use of geographic information systems by youth in order to reflect and elaborate on places within their neighborhood. The objective of the project was to empower youth from resource-vulnerable neighborhoods to become more aware of their environment and take agency in how their neighborhood is shaped and perceived by the community. Within this multi-phase project, students of a local school used paper based maps and GIS tools to both map places that are meaningful to them and map personal stories that are connected to specific places. This socio-technical reflection (“story-telling”) was then used to generate action plans in order to engage the group of youths in co-creation and co-design of their neighborhood. This process helped to make the youths more visible as an active stakeholder-group.

Hausmann & Keller explore opportunities for participation on foot. In their article, they report on the conceptual design of a mobile participation platform that aims to better support involvement of citizens, in particular pedestrians, in all phases of urban restructuring projects. By designing explicitly for pedestrians, their objective is to broaden the user base in terms of demographics and affectedness. The authors introduce a mobile and a web application allowing in-situ participation and present findings from a long-term field study where the application was deployed. They further expand on their experiences of recruiting participants and on lessons learned for similar future applications.

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## References

1. Pateman C.: Participation and democratic theory, Cambridge University Press, (1970)
2. Wilson A., Tewdwr-Jones M., Comber R.: Urban planning, public participation and digital technology: App development as a method of generating citizen involvement in local planning processes *Environ. Plan. B Urban Anal. City Sci.*, pp. 1–17 (2017)
3. Tambouris E., Macintosh A., Coleman S., Wimmer M., Vedel T., Westholm H., Lippa B., Dalakiouridou E., Parisopoulos K., Rose J., Aichholzer G., Winkler R.: Introducing eParticipation, , University of Macedonia, (2007)
4. Macintosh A.: Characterizing e-participation in policy-making 37th Annual Hawaii International Conference on System Sciences. p. 10 pp. (2004)
5. Macintosh A., Whyte A.: Evaluating How Eparticipation changes local Democracy 6, pp. 1–16 (2006)

6. Thiel S.-K., Fröhlich P., Ruoppila S., Åström J., Baldauf M., Tscheligi M.: 3rd International Workshop on Pervasive Participation Proceedings of the 9th Nordic Conference on Human-Computer Interaction. p. 148. ACM (2016)
7. Thiel S.-K., Ertiö T.P., Karlsson M., Ruoppila S., Åström J., Adenskog M., Fröhlich P.: Building Pervasive Participation, (2017)
8. Ertiö T.-P.: Participatory Apps for Urban Planning -- Space for Improvement Plan. Pract. Res., 30, pp. 303–321 (2015)
9. Nam T.: Suggesting frameworks of citizen-sourcing via Government 2.0 Gov. Inf. Q., 29, pp. 12–20 (2012)
10. Ueyama Y., Tamai M., Arakawa Y., Yasumoto K.: Gamification-based incentive mechanism for participatory sensing 2014 IEEE Int. Conf. Pervasive Comput. Commun. Work. PERCOM Work. 2014, pp. 98–103 (2014)
11. McLaren R.: Crowdsourcing Support of Land Administration – A Partnership Approach Proceedings of the Annual World Bank Conference on Land and Poverty, Washington DC (2012)
12. Hosio S., Goncalves J., Kostakos V., Riekkii J.: Crowdsourcing Public Opinion Using Urban Pervasive Technologies: Lessons From Real-Life Experiments in Oulu Policy and Internet, 7, pp. 203–222 (2015)
13. Steinberger F., Foth M., Alt F.: Vote with your feet: Local community polling on urban screens Proceedings of the 3th International Symposium on Pervasive Displays (PerDis '14). p. 44 (2014)
14. Du G., Degbelo A., Kray C.: Public displays for public participation in urban settings: a survey Proceedings of the 6th ACM International Symposium on Pervasive Displays (PerDis '17). , New York, NY, USA (2017)
15. Schroeter R., Foth M.: Discussions in Space Proceedings of 21st Annual Conference of the Australian Computer-Human Interaction Special Interest Group (CHISIG), Melbourne (2009)
16. Baldauf M., Suette S., Fröhlich P., Lehner U.: Interactive Opinion Polls on Public Displays: studying privacy requirements in the wild Proceedings of the 16th international conference on Human-computer interaction with mobile devices & services. pp. 495–500. ACM, Toronto (2014)
17. Baldauf M., Salo M., Suette S., Fröhlich P.: The screen is yours - Comparing handheld pairing techniques for public displays 4th International Joint Conference on Ambient Intelligence (AmI). vol. 8309 LNCS. pp. 32–47 (2013)
18. Fredericks J., Tomitsch M., Hespanhol L., McArthur I.: Digital Pop-Up: Investigating Bespoke Community Engagement in Public Spaces Proc. Annu. Meet. Aust. Spec. Interes. Gr. Comput. Hum. Interact. - OzCHI '15, pp. 634–642 (2015)
19. Xu C., Yang C., Weller M.P., Peng Z.: Vote With Your Feet: Street-Sourced Answers to Crowd-Sourced Questions Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems - CHI EA '17. pp. 1409–1414. ACM Press, New York, New York, USA (2017)
20. Caldwell G.A., Guaralda M., Donovan J., Rittenbruch M.: The InstaBooth: Making Common Ground for Media Architectural Design Proceedings of the 3rd Conference on Media Architecture Biennale. pp. 1–8. ACM, Sydney (2016)
21. Caldwell G.A., Foth M.: DIY/DIWO Media Architecture: The InstaBooth in Wiethoff, A. and Hussmann, H. (eds.) Media Architecture: Using Information and Media as Construction Material. pp. 61–78. De Gruyter, Berlin, Berlin (2017)
22. Wellman B., Haase A.Q., Witte J., Hampton K.: Does the Internet increase, decrease, or supplement social capital? Social networks, participation, and community commitment Am. Behav. Sci., 45, pp. 436–455 (2001)
23. Bohøj M., Borchorst N.G., Bødker S., Korn M., Zander P.-O.: Public Deliberation in Municipal Planning: Supporting Action and Reflection with Mobile Technology

Proceedings of the 5th International Conference on Communities and Technologies - C&T '11, pp. 88–97. ACM (2011)

24. Thiel S.-K., Reisinger M., Röderer K., Fröhlich P.: Playing (with) Democracy□: A Review of Gamified Participation Approaches J. E-Democracy Open Gov., 8, pp. 32–60 (2016)
25. Gordon E., Baldwin-Philippi J.: Playful Civic Learning: Enabling Lateral Trust and Reflection in Game-based Public Participation Int. J. Commun., 8, pp. 28 (2014)
26. Devisch O., Poplin A., Sofronie S.: The Gamification of Civic Participation: Two Experiments in Improving the Skills of Citizens to Reflect Collectively on Spatial Issues J. Urban Technol., 732, pp. 1–22 (2016)