

D.2 Gamification as a Means to Improve Stakeholder Management in Urban Planning Participation

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1 Introduction

As cities and urban areas grow, the stakeholders involved in urban planning processes increase and diversify. Communication between these different stakeholders is paramount to successful architectural and urban planning. Public participation has gained on significance over the last 60 years as a means to incorporate their local knowledge in planning processes.

Public participation forms an essential part as a form of democratic decision-making and in building trust between stakeholders. However, public participation offers do not meet the needs of all stakeholder groups at different planning stages. This is most evident when projects provoke resistance from the general population. This research investigated the misalignment of expert offers and public needs in urban planning public participation at early planning phases as well as the possibility and user acceptance of gamification in addressing these.

A profound literature review on urban planning processes, public participation and gamification in urban and architectural planning has been conducted. An explorative approach has been taken using mixed methods based on stakeholder interviews, a stakeholder survey, and a stakeholder workshop to explore the perception of planning processes and participation from different perspectives and on an assessment of stakeholder's acceptance of gamification in this context.

2 Gamification in Urban Planning

By the end of the decade, more than half of world's human population will live, learn and work digitally connected. This part of society uses buzzwords such as social media, mobile, web-based applications, Industry 4.0, digital business models, internet of things, big data etc. to describe the phenomenon that affects our daily life as individuals and as part of a global society. While for many of us digitalization is already omnipresent and has become a matter of course, for others it is associated with far-reaching challenges or even existential fears (Jung, & Kraft, 2016). Due to a high fragmentation and localisation of the architectural, engineering, and construction industry digital penetration is low (Bughin, et al., 2016).

However, over the last decade digital public participation or eParticipation has become more present with the promise to reach a wider audience, improve access to information, as well as liberate participation processes from place and time constraints. Mobile technologies enable the connection of digital information to physical locations, virtual reality helps laypeople overcome visual-spatial barriers associated with 2D plans of 3D worlds, and augmented reality and public displays overlay physical spaces with digital data (Thiel, Fröhlich, & Sackl, 2018).

In this context, gamification, the use of game design elements in non-game contexts (Deterring, Dixon, Khaled, & Nacke, 2011), is being increasingly adopted for collaborative design (Poplin, 2014), (Tan, 2014), (Bai, et al., 2018), for issue reporting (Traffic Agent, n.d.), or to incentivise certain behaviours such as utilising sustainable mobility options (Kazhamiak, Marconi, Martinelli, Pistore, & Valetto, 2016). Wolff et al. (2017) describe gamified applications to bring communities together and to educate citizens on planning processes as well as for accessing city and planning related citizen data. Additionally, gamification is employed in governmental agenda setting, or policy creation and analysis (Hassan & Hamari, 2019). Aside from common digitalisation related challenges such as data protection, data decoding, or the digital divide, more contextual challenges include motivating the public to part take in participation offers (Thiel, Fröhlich, & Sackl, 2018), (Schoßböck, Rinnerbauer, & Parycek, 2018), determining relevant metrics to measure the success of gamification in participation (Jenney, et al., publication planned), addressing both user and contextual requirements (Koivisto & Hamari, 2019), or improving user experience and interaction (Thiel, Fröhlich, & Sackl, 2018). While gamification research in urban planning is currently application based, in other fields such as health and education there is an increased focus on empirically examining the effects of game elements on increasing participation and motivation (Morschheuser, Hamari, & Koivisto, 2016). This research has produced positive to mixed results; however, findings are limited to few game elements (points, badges, leader-boards and rewards) and these are often measured in groups limiting insights into individual elements (Koivisto & Hamari, 2019).

3 Method

The investigation into gamification as a means to improve stakeholder management in public participation was considered from a multiple stakeholder perspective and utilised mixed methods. The aim was to explore (1) how different stakeholder groups perceive planning and participation processes; (2) what stakeholder issues exist in this context; (3) where there are misalignments between stakeholder needs and offers; (4) can gamification address the identified stakeholder issues and misalignments; and (5) what is the acceptance of gamification as a solution to different stakeholders. For this, mixed methods were employed in an explorative approach.

A comprehensive literature review on planning processes, public participation, and gamification in urban planning to gain theoretical insights, preceded an explorative inquiry involving stakeholder interviews and a survey to identify issues and misalignments, as well as a workshop to assess stakeholder acceptance of gamification as a solution approach.

3.1 Interviews

The interviews were conducted between July and August 2019 and lasted an average of 127,5 minutes. Ten people ($f = 4$, $m = 6$) from three stakeholder groups (city planning employee $n = 2$, planner $n = 5$, member of the public $n = 3$) took part in four homogenous group interviews. Participants were sent general questions regarding participation before the unstructured interview, where they were then invited to describe their participation experience. Resulting discussions revolved around participation associated with 1–2 specific and recent projects stakeholders had been involved in. The first stakeholder group (IC1) consisted of two employees of the city planning department ($f = 1$, $m = 1$) responsible for creating master plans and engaging in public participation, primarily where projects cover a large area, are controversial or have a high media presence. The second focus group (IP1) consisted of two landscape planners ($f = 1$, $m = 1$) who regularly engage in public participation at both regional and building scales as part of their design process. The third focus group (IP2) consisted of three employees ($f = 2$, $m = 1$) responsible for development and public communication for a housing company which builds, maintains, and manages a large portfolio. The final focus group (IB1) consisted of residents ($f = 0$, $m = 3$) in one of the projects from the IP2 housing company, currently undergoing development and as such had experience in planning participation.

3.2 Survey

From October to December 2019 an online survey was conducted to verify the identified issues from the interviews in a double Delphi process. The survey also provided insights into stakeholder touchpoints. The first part of the survey gathered general data (age, education, profession). In the second part participants selected which group they most identified with in public participation processes; city planning employee ($nDR = 13$, $nDJ = 13$), planner ($nDR = 3$, $nDJ = 2$), or member of the public ($nDR = 6$, $nDJ = 2$). This choice affected the phrasing of issues in the final part of the survey, framing them from the perspective of conducting participation or of taking part in it. Two datasets were derived from the survey: dataset DR comprised of 22 people ($f = 10$, $m = 12$) between the ages of 16–75 and was used to examine user's reasons for participating. Dataset DJ, a subset of DR, comprised of 17 people ($f = 7$, $m = 10$) between 16–65 and was used to verify stakeholder issues. All participants ($n = 22$) achieved at least a bachelor level degree except for one, who had achieved the German school level of "Realschulabschluss". Participants had a wide range of professions. One survey participant had taken part in the interviews.

3.3 Workshop

To investigate stakeholder acceptance, a workshop was conducted, where the interview and survey findings were presented and an introduction to gamification in urban planning given. Following this, two prototypical implementations of gamified applications for public participation in planning, prototype 1 (Mertl, 2019) and prototype 2 (Jenney, et al., publication planned), were presented and evaluated by participants using the UTAUT methodology (Venkatesh, Morris, Davis, & Davis, 2003). Technology affinity and attitude were also addressed (Neyer, Felber, & Gebhardt, 2016). The workshop took place in February 2020 and was attended by four people, two of whom had taken part in the survey. Participants were evenly distributed across stakeholder groups (city planning employee $f=0$, $m=1$; planner $f=0$, $m=1$; member of the public $f=1$, $m=1$) and all had experience in public participation. Their age ranged from 33–64.

4 Findings

Findings are presented in three sub-sections: 4.1 Process Participation, describing the different stakeholder perceptions of planning and participation; 4.2 Misalignments, describing identified issues from different stakeholder perspectives; and 4.3 Gamification Potentials and Acceptance, describing how gamification can address the identified issues as well the technology acceptance results. The stakeholder groups city planning employee and planner were found to be similar and are jointly referred to as planning experts in the rest of the paper.

4.1 Process Perception

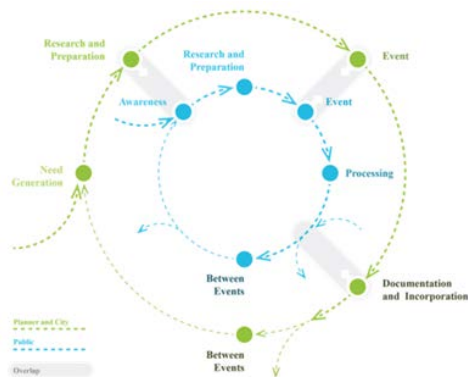


Figure 1: Identified User Journey's for Planning Expert and Public, based on Stakeholder Interviews.

A number of similarities between stakeholder perceptions of public participation in planning were identified. Despite planning experts being aware of and employing different methods of participation including information events, co-creation workshops, project-specific websites, or hotlines, both experts and the public seemed to perceive public participation as a face-to-face, event-based interaction. The user journey around a participation event displays the same key steps for both stakeholder groups; need generation/ awareness, research and preparation, event, documenting/ processing, and between-events. However, a shift between these cycles is evident (see Figure 1). The research and processing phases are less formal for the public. The latter finding can be attributed to a lack of access to project information by the public before an event, as well as a lack of understanding regarding planning processes in general, contributing to public uncertainty regarding their roles during participation, and the disconnect of public volunteered information to planning. As the event is source of much of the information, deliberation for the public often only occurred during the processing phase, resulting in a loss of local insights for planning experts and potentially seeding conflict. While experts made themselves available to the public for questions throughout the planning process, fostering trust, or actively promoted public deliberation, other methods of change management were less employed. The public's lack of understanding of planning phases or the relation between participation instances, coupled with a low feedback from planning experts, in particular with regards to changing information, may be a source for growing distrust by the public towards experts. This observation is based on the public's hesitant suspicion during interviews, that information was purposely withheld.

4.2 Misalignments

From the interviews and survey results, both planning experts and public stakeholders felt it important to engage in public participation to discuss public interests related to a project, site, or proposal; to ask/ answer questions; to be informed/ inform on project boundary conditions and status; voice/ receive public input; communicate on how that input is integrated within the planning process, and laid a high value on communicating about the process and procedures such as project goals and next steps. Despite planning experts believing they communicated the latter aspect, the public seemed not to retain the information. Identified issues specific to planning experts include communicating project benefits, complying with the wishes and demands of local authorities, acting in a legally correct manner, and procuring the financing for participation to occur. On entering participation processes, the public described a natural curiosity and positive inclination towards the project. As the project progressed, this natural curiosity was not satisfied and instead a sense of confusion and helplessness developed.

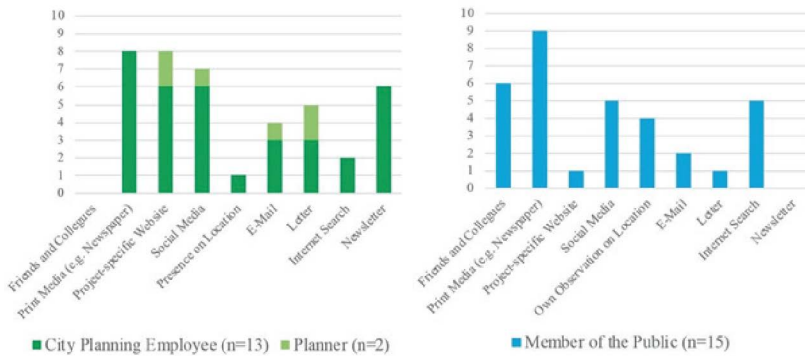


Figure 2: Initial Points of Contact between (l.) Planning Experts (Survey Results) and (r.) the Public (Jenney, et al., publication planned).

Comparing the initial points of contact of planning experts from the survey results (Figure 2, l.) with members of the public (Figure 2, r.) from a similar on-location study conducted by some of the authors (Jenney, et al., publication planned), print media ($n = 8$, $n = 9$) such as newspapers remains a key channel for both stakeholder groups in this field. However, planning experts ($n = 15$) indicated a high use of project-specific websites ($n = 8$), newsletters ($n = 6$), and social media ($n = 7$), to inform on upcoming planning participation. These channels require prior knowledge or interest from public stakeholders regarding the project. Members of the public ($n = 15$) indicated a preference for more personal channels such as friends and colleagues ($n = 6$), and own observations on-site ($n = 4$), or more everyday digital platforms such as social media ($n = 5$) or internet searches ($n = 5$). From the findings, a clear definition of participation goals, the open communication of these goals, as well as the management of public expectations especially with regards to their role within participation holds great potential for the improvement of such processes. A greater exploitation of on-location channels, community key figures and the promotion of people's natural curiosity could increase reach and improve attendance. Whilst events themselves were highly rated and enjoyed by all, decoupling these instances of highly condensed information from a specific time or place as well as splitting information into many smaller regular instances or employing concepts of communication design (quick overview, detail on demand, filtering), could enable a greater flexibility and better tailoring. Between events, participation processes can benefit from meta-communication on planning processes, participation procedures, and indications of project progress. As planning projects span a number of years, systems enabling quick on- and re-boarding, can support the flux and change of individual stakeholders.

4.3 Gamification Potentials and Acceptance



Figure 3: (l.) Prototype 1 (Mertl, 2019) and (r.) Prototype 2 (Jenney, et al., publication planned).

Elements such as quests, progress and status bars or points enable orientation within the game world and provide insights into what actions and interactions can be expected. In the gamified navigation application “Waze” (Waze, n.d.), for example, users can easily comprehend both journey and character progression through elements such as points for contributions, time until arrival (progress bar), or avatar location. Player points increase a player’s level, unlocking new actions such as mentoring or map editing. This approach enables easy on-boarding by increasing actions according to user familiarity or knowledge. The use of quests (Waze, n.d.), (Kazhamiak, Marconi, Martinelli, Pistore, & Valetto, 2016) can raise awareness of available options, motivate people into trying something new, and provide a degree of predictability and framing. In urban planning participation, these examples demonstrate possibilities to ease understanding, split information into more comprehensible chunks, and provide an easy overview of projects. To assess the acceptance of gamification in this context, two different gamified planning participation prototypes were presented and assessed in a workshop setting. Prototype 1 was an example of a digitalised event-based co-creation application of a planning participation workshop where members of the public could place blocks representing different functions on a map (Mertl, 2019), to be used in the design process. Prototype 2 was a process accompanying gamified information and participation platform, allowing people to quickly view projects near their location and easily identify participation opportunities (Jenney, et al., publication planned). Stakeholders from all three examined groups felt capable and confident in using both presented prototypes with participants indicating a positive attitude towards use. Prototype 1 was felt to be easier to use, more entertaining, and was related less to anxiety. In contrast prototype 2 was considered more useful and thought to provide greater performance gain. Additionally, experts felt that they would be more strongly influenced by people important to them to use prototype 2. Anxiety related to prototype 2 was low and centred around data security and system manipulation.

5 Conclusion

This research investigates gamification as a means to improve stakeholder management in urban planning participation, through a comprehensive literature review and mixed methods including stakeholder (n = 33; f = 14, m = 19) interviews, a survey, and a workshop. The aim was to identify how different stakeholder groups perceive planning participation, what issues arise in this context, if gamification can address these issues and if gamified solutions are accepted by stakeholders. Important insights gained include (1) the different perception of individual offers as independent of each other and the planning process itself; (2) planning participation processes and participation offers can be gamified to help frame the context of participation events, provide regular but small and easy to digest communication and feedback from planning; and (3) to promote quick and easy on- and re-boarding in planning processes of actively involved stakeholders. Comparable studies over a longer period or in other cities would improve the generalisability of these findings and counteract availability bias. Insights gained from this research, can form the basis for specific research questions in future related work. Especially when it comes to the point of market entry of the gamification concept into the area of urban planning the need for further research should be conducted according to the diffusion of innovation theory (Rogers 2003).

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