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Let's play urban planner: The use of game elements in public participation platforms

Sarah-Kristin Thiel
AIT Austrian Institute of Technology, Centre for Technology Experience, Austria.
E-Mail: sarah-kristin.thiel@ait.ac.at

Through the provision of digital tools, government institutions aim to counter the growing alienation of citizens towards institutional politics and overcome traditional barriers of participation. However, as yet this approach has not shown the desired effects of increasing public participation in political decision-processes. In an attempt to encourage more citizens to make use of e-participation tools, some of these platforms hope to use the leverage and motivational effects of games by incorporating game-inspired elements. This research provides an overview of the current practice of applying gamification in public participation as well as preliminary insights into the effects of this approach. We review a selection of commercial applications as well as research projects, for which we list the included game elements and a critical discussion of the approach. Our results show that most projects focus on communicating accomplishments to users that are based on their quantity of participation. While little work has yet analyzed the concrete effects of individual game elements, up to now evaluations have mostly focused on the acceptance of specific gamified public participation platforms. The contribution of this research is twofold. Firstly, it offers relevant insights for the design of future e-participation platforms. Secondly, this work helps to establish a common terminology for game research.

Keywords: Urban Planning; Gamification; Game Elements; Motivation; Public participation; E-participation

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Introduction

With the emergence of technical innovations (e.g. Web 2.0, mobile technology) traditional barriers of participation (e.g. spatial and temporal, lack of interest, distrust) cannot only be overcome but the process of engaging can be made faster and easier (e.g., Linders, 2012). Hopes in this respect are put into what is summarized as electronic (e-) government. Industry, authorities and academia alike have developed a plethora of systems for public participation. The vast majority of these allow citizens to raise their voice or request information from authorities. Recent evaluations however have shown that these platforms have not yet been successful in raising the level of public engagement (e.g. Digital Democracy Commission, 2015).

Considering that the main reason for the original low level of engagement is a lack of knowledge of how to (= with what means) but also why to engage (Bohøj et al, 2011), an explanation as to why these digital efforts have not yet borne fruit, could arguably be that citizens have not yet caught up with all these new forms of e-government participation methods. Another explanation could be found in the design of these digital engagement platforms. After all, the most common critique has been that merely offering information or providing a one-way channel is not engaging enough for people to become active (e.g. Lukensmeyer & Torres, 2008).

One approach that targets the design of more engaging platforms is gamification. Promising the increase of system usage through the integration of game aspects, this strategy has already proved to be partially successful in a variety of domains such as e-commerce, education and health. By incorporating game elements into participatory platforms, the core objective is to add additional motivational factors that will in turn result in increased involvement. In context of a wider research in conjunction with other scholars and research projects, this article provides an overview of platforms that have already experimented with gamification, detailing their approaches and - where available - describing their findings. By analyzing the included game elements in relation to the underlying purpose of the tool, we offer a critical assessment of the gamification approach as a way in which to foster public participation. We further explore the question of whether adding game elements to participation platforms has the potential to improve current participatory processes through a more engaging design of the tool employed. Practitioners could benefit from using this overview as a collection of examples of implementations of gamification in e-participation. We conclude with a presentation of our findings and a look at the possibilities of future work.

Public participation

E-government is the manner of providing public services via electronic means. Its sub-form, e-participation aims to facilitate interaction and communication between citizens and city administration. It can further be distinguished between *political* e-participation where citizens engage in public affairs with the aim of influencing political outcomes (Brady, 1999) and *civic* e-participations where citizens act for the public good (Jordan & Taylor, 2004).

The success of participatory processes can be defined and evaluated in terms of the relevant stakeholders. In general, success is highly dependent on the goals and objectives of participation. In case the objective is to merely inform the public about plans, decisions or structures, criteria for success could be that more citizens know about these aspects than they did before. On the other hand, participation that achieves a broader awareness is generally not enough, instead input in the form of ideas and opinions coming from a broad

spectrum of citizens is sought. For what is commonly called “true” participation a key factor determining the success of a participation method or strategy is the active involvement of the public in processes and decisions that usually lie in the hand of authorities. It is commonly agreed upon that an active involvement (= getting insights, opinions) from a diverse group of citizens yields better plans and implementations (Burby, 2003) that are also more likely to be accepted and supported. Apart from these outcome oriented criteria, Brown and Chin (2013) further advocate process criteria for evaluating the effectiveness of public participation. These describe the participatory tool itself, focusing on representativeness, type of involvement as well as user experience.

Gamification

Gamification has been defined as the usage of game elements in non-game contexts (Deterding, 2011b). Several (empirical) studies have reported positive effects of gamification in various domains, including increased levels of motivation and user activity as well as greater enjoyment (for an overview see Hamari et al., 2014). The impact mentioned the most is an increased motivation of users to participate in tasks or the general usage of the service (Deterding, 2011b). One should note that negative effects of gamification have also been reported. Gamification not only adds additional issues for system designers to consider (Wiggins, 2012), but can also alienate people who are not affine with games (Prestopnik & Crowston, 2012). While gamification might work for one group of users (e.g. the younger generation), it might cause negative effects for others. Games and game-like systems are prone, more than other systems, to cause unwanted behavior such as cheating (e.g., Kohn, 1999). Another related and unwanted side-effect that could arise with gamifying participation is a decrease in (content) quality. At this point we want to highlight the difference between *participation* and *engagement* specific to this context. Engagement refers to the contribution of content or other interactions that are relevant to the overall purpose of the platform. When interactions from users do not align with the concept of the platform or do not advance discussions in any way, these users merely *participate* but do not *engage* with the topics. A question relating to the integration of game aspects in e-participation is hence whether gamification fosters engagement or only participation. And if so how is the quantity and quality of participation affected?

In a nutshell, gamified participation platforms can be defined as successful when it leads to an increase in the quantity of participation without negatively impacting on the quality. At best, the quality of deliberation and argument is increased as well. Failure on the other hand is when either the quantity has not been increased or the quality has decreased as well as any combination of these two factors.

Game elements

Investigating the effects of game elements in any domain implies that one knows what game elements are and therefore what (e.g. features, interface elements, concepts, rules) to look for. With game and gamification scholars all using a variety of differing terms (e.g. mechanics, atoms, blocks, aesthetics), it can be noted that a clear distinction between and definition of individual game aspects is still missing. For the purposes of this article, we resort to the common umbrella term ‘elements’. Where applicable, we understand the distinction between element and mechanic as elements being more concrete aspects of an application that are mostly part of the interface (e.g. leaderboards, badges), while mechanics describe concepts (e.g. rules) or impacts of using the application (e.g. education).

A central objective of gamifying participation is to strengthen citizens' motivation to become involved in public decision-making. The composition of motivational factors leading to engagement has been found to be quite complex (Crowston & Fagnot, 2008). We argue that investigating game elements based on their motivational affordances provides a fair indication of whether they are suited to foster participation. Accordingly, we chose *Octalysis* as framework to help structure as well as compare gamification strategies for public participation services. Established for use on theories regarding motivation, Chou's (2015) Octalysis classifies elements according to whether they influence intrinsic ('inspiring and motivating') or extrinsic ('manipulative and obsessive') motivation. Providing an indication as to whether game elements appeal or strengthen someone's initial (intrinsic) motivation or offer an additional, external stimulus, this framework appears well-suited to analyse gamification strategies. Game elements are summarized into categories, which are referred to as 'core drives'. The Octalysis framework distinguishes between 'right brain' and 'left brain' core drives. Left brain core drives are associated with motivations that can be associated with logic, whereas the right brain core drives relate to emotional and social aspects. This categorization matches to a great extent the distinction between intrinsic (right brain) and extrinsic (left brain) motivation.

Table 1. Overview of how core drives can be linked to concrete game elements (adopted from the Octalysis website26)

CORE DRIVE	DESCRIPTION	ASSOCIATED GAME ELEMENTS/ MECHANICS
Epic Meaning & Calling	This applies when players believe that they are doing something "greater than themselves" or were "chosen" to do something.	Coins (virtual currency)
Development & Accomplishment	Refers to an internal drive of making progress, developing skills and mastering challenges.	Challenge; Points; Missions; Badges; Leaderboards
Empowerment of Creativity & Feedback	When the system allows users to engage in creative processes where they receive feedback.	Progress bars; Customization
Ownership & Possession	Gives users the feeling that they own something, also applies when they can customize parts of the system (e.g. profile).	Incentives; Rewards; Items
Social Influence & Relatedness	Social aspects that drive people (e.g. acceptance, companionship)	Chat; Levels; Profiles; Teams
Scarcity & Impatience	Based on the phenomena that we want something even more if we cannot have it (right away).	Time constraint; Time dependent rewards
Unpredictability & Curiosity	Refers to human's innate curiosity of wanting to find out what is happing next.	Easter eggs; Branching choices; Unlockable content
Loss & Avoidance	Refers to the drive of wanting to avoid something negative to happen.	Lifetimes

Table 1 provides an illustrative overview for how core drives can be linked to concrete game elements. The list of game elements is non-exhaustive and should merely illustrate how the core drives can be satisfied. For a better readability, in the remainder of the article we abbreviated identifiers for core drives (e.g. *Empowerment* for 'Empowerment of Creativity and Feedback').

[26] http://www.yukaichou.com/gamification-examples/octalysis-complete-gamification-framework/#.Vge0UOztlHw

Case studies

Relevant projects were gathered by searching for recent literature on public participation, urban planning and gamification through the use of Google Scholar and extended by references of found articles. The list of commercial applications is also an outcome of this literature review, which was completed by findings from a screening of online articles and news concerning e-participation and public participation.

The criteria for being selected for this review included that the system is relatively recent (no later than 2010), includes at least one game-related aspect, is either web-based or a mobile application and aims to support (public) participatory processes. We thus omitted tools that had a more educational notion or represented entire games. For the purpose of this analysis we considered aspects (i.e. concepts, features) of an application as game-related when either the authors or owners clearly marked them as such or when they have been previously marked game-related in literature. For each tool their functionalities, concepts and elements that can in some way be related to games are listed. Whenever the connection to games might not be obvious, we provide a short discussion on why we included them in our analysis. Identified game elements are categorized using the framework Octalysis introduced in the previous section. We do not claim that this review is exhaustive; but rather that it is a snapshot of the platforms somehow linked to public participation that were available at the time of writing.

Commercial platforms

Commercial projects were the first to experiment with game elements. Whether this was done with the objective of increasing the motivation of users to become involved, to make the usage of the system more enjoyable or had simply been a design choice without further intended implications is unknown. This section provides an overview of commercial projects that incorporate at least one game-related element. By commercial we mean that the tool has no (apparent) connections to academia and was thus either developed by a company, institution or an official authority.[27]

HunchBuzz[28]

Designed as an innovation software, *HunchBuzz* seeks to manage ideas and feedback from different stakeholders (e.g. citizens and city officials). Participation within HunchBuzz can be broken down into four phases: challenge, innovation, collaboration and execution. In short, first a topic is proposed (challenge), then ideas on that topic are collected. During collaboration those ideas are openly discussed, decided upon and then implemented (execution).

Table 2. Analysis of elements used in HunchBuzz.

DESCRIPTOR	EQUIVALENT IN OCTALYSIS
Challenge	Accomplishment
Points	
Incentives	Ownership
Competition	Accomplishment

[27] We made an exception for Community PlanIt, which has been developed by the Engagement Game Lab at Emerson College. We still allocated it under commercial projects as it resembles more a finished product than a prototype implemented to test a concept.
[28] http://hunchbuzz.com/

Challenge: Challenges serve as discussion starters and introduce topics. A challenge does not necessarily need to have a specific goal or a defined end, it can be broad or specific and can be limited by time or open ended.

Points: Users can earn points for contributing to the system by posting their own ideas or voting on other people's suggestions.

Incentives: Authors of challenges can choose to incentivize contributions. In that case, users are rewarded with points and win prizes. Collected points can be redeemed for a variety of goods at any time.

Competition: The progress of other users can be viewed on a leaderboard.

Focusing on ideation and innovation processes, this tool requires the active involvement of its users (= responding to challenges by proposing ideas and commenting). Formulating topics as challenges brings the required action and desired outcome of the participatory process into focus, making it clearer for participants on how to contribute. Setting a time limit further communicates a priority ranking and a sense of urgency. Incentives might add to a users' motivation to contribute, but will arguably not add to the quality of the contribution. The same applies to points that without an underlying meaning might only lead to users cheating (= trying to earn more points) the system. Also, whether competition in an innovation platform that seeks effective solutions for problems leads to those solutions being better is debatable. In case the competition (and points) are dependent on the quality-based ranking of contributions instead of on quantity, these game elements might be more effective in leading to the success of the platform.

Community PlanIt[29]

This platform seeks to 'make community-planning fun, while providing a context for learning and action'. When used for a case, an instance of the platform (called 'games') is deployed for a certain time frame. A game comprises of several challenges that participants need to complete. Each challenge serves the purpose of seeking people's opinion or ideas on a specific topic. During this ideation process interaction with authorities and other citizens is limited to a chat room, which is not necessarily linked to specific input from citizens or challenges.

Table 3. Analysis of elements used in Community PlanIt.

DESCRIPTOR	EQUIVALENT IN OCTALYSIS
Coins	Meaning
Challenges	Accomplishment
'Mission Map'	
The 'Soapbox'	Social influence

Coins: Taking part in the game by for instance completing challenges or missions earns the participants' credits. These credits (here represented by coins) can be pledged to a selection of causes. After the game, the cause with the most credits receives real-world funding.

Challenges: During each game participants can complete missions on topics related to the overall case. Each challenge consists of multiple missions. Before advancing to a new

[29] https://communityplanit.org/

challenge each mission must be fulfilled. In addition, a trivia question needs to be answered to unlock new challenges.

'Mission Map': In the application, all challenges are visualized as buildings on a horizontal axis. A sun behind a building symbolizes which mission a user is currently viewing. This allows the user to see his or her progress in the game.

The 'Soapbox': While the game itself is isolated from other players, users can interact with others by posting messages in the 'Soapbox'. Highly ranked posts get promoted to the *Buzz*, which acts as a news feed for the entire community playing the game.

While the content gathered in all games is publicly accessible on the webpage, the evaluation of it is not. This is due to this platform being part of an ongoing research project. Consequently, we cannot provide insights into how participants perceived the gamefulness of the platform or whether this increased their willingness to participate.

The mission map provides users with a structured overview of where in the participatory process they are and what is left for them to do. Challenges divide the topic into smaller, easier to understand units, instead of expecting citizens to differentiate between different aspects of a topic. While the coin system can again spark competition among users, it might also be an additional incentive for those citizens that are genuinely interested in the cause.

NextSuisse[30]

This platform concerns ideation processes regarding the future of towns in Switzerland. Participants are encouraged to articulate how their home town should evolve and what aspects (e.g. public transport, greenery) need to be present in order to guarantee the satisfaction of the population. To the best of our knowledge this platform is rather unique in two aspects. Firstly, it is the only public participation platform that – apart from standard registration procedures – requires a certification that a user is indeed a citizen of a particular town or city. Secondly, it is the first to apply the game mechanic expression.

Table 4. Analysis of elements used in NextSuisse.

DESCRIPTOR	EQUIVALENT IN OCTALYSIS
Town configurator	Empowerment
Playing the game	Accomplishment
Time constraint	Scarcity

The actual game has two phases. The first is what we call the town configurator and the second mimics the live mode.

Town configurator: In the first game phase, users can design the town to their liking. For this they have a toolkit consisting of urban elements such as public transportation systems, schools, residential buildings and greenery. In a similar way to the game SimCity these elements can be placed on a simplified plan of the town.

Playing the game: In the second game phase, users can test whether their adaptations lead to a high living quality and high satisfaction of the town's population. These two factors are indicated on multiple dynamic scales that change according to further modifications of the town's layout.

[30] http://www.nextsuisse.ch/

While the tool NextSuisse certainly allows citizens to make suggestions as to how their home town should be developed in the future, it remains unclear how their designs are fed into and considered in decisions processes. Although calculations in the second phase are based on forecasts, the assets available in the toolbox as well as the scenery itself are highly simplified making it questionable whether users can actually link the designs to reality and thus consider feasibility in the real-world (e.g. available space). This could lead to users *playing* with the tool rather than participating in urban planning processes.

mySidewalk[31]

Founded by urban planners, *MySidewalk* seeks to facilitate communication and build stronger communities in civic places. The platform sees its focus more on the evaluation of data gathered through public participation, but also includes an interface where input can be provided. Users can create new projects, or contribute to projects by posting comments or voting on ideas.

Table 5. Analysis of elements used in mySidewalk.

DESCRIPTOR	EQUIVALENT IN OCTALYSIS
Point system	Accomplishment
Competition	
Incentives	Ownership

Point system: In-app activities such as commenting, posting ideas and voting are rewarded with points.

Competition: mySidewalk includes a highscore, which consists of a page listing top contributors based on various criteria (e.g. top commenters, top idea generators).

Incentives: Points gathered for in-app activity can be exchanged for small products in the reward store.

As argued before, gamification strategies building on accomplishment systems that assess success based on quantity instead of quality of content are more likely to decrease the quality of participation than fostering sustainable engagement. In mySidewalk the top list seems to distinguish between quality (e.g. number of comments) and quality (= relevance of ideas), however it remains unclear how this top list is constructed and whether it only considers the number of awarded points.

Academic projects

The vast majority of research regarding gamifying participation has been in the domain of urban planning. In most cases, the objective was to develop complete games rather than incorporating specific elements for concrete purposes. It is worth mentioning that the distinction between ‘what is a game’ and ‘what is an artifact with game elements’ is not always easy. As Deterding et al. (2011b) noted this line can sometimes not only be blurred, but it is also empirical, subjective and social. Therefore, depending on someone’s focus and (usage) intentions one would rate something a game or an application with game elements.

[31] https://rebrand.mysidewalk.com/#

Love Your City (Stembert et al., 2013)

The interactive platform *Love Your City* aims to establish a more direct communication between citizens and the local authority by enabling citizens to propose and shape their ideas, help authorities plan the public domain as well as organize communal activities with other habitants. Although not explicitly mentioned, the tool uses a variety of game-related elements.

Table 6. Analysis of elements used in Love Your City.

DESCRIPTOR	EQUIVALENT IN OCTALYSIS
Emotions	/
'Fading date'	Scarcity
Heart points	Accomplishment
Profile	Social influence
Statistics	Accomplishment

Emotions: In the very first step of the participation process, users are asked to state how they feel about a situation by choosing from a selection of icons that represent different emotions. These icons further have the objective of making it easier for others to sympathize with the person who posted the message.

'**Fading-date**': In Love Your City! each post comes with an initial lifetime that reflects its relevance. Other users can influence its relevance by adding or removing days. When a post runs out of lifetime (i.e. reaches its fading date) it fades away and is no longer visible in the system. This mechanism was introduced to establish norms and values between citizens, it does not help to find consensus.

'**Heart points**': For each post (regardless of the participation path chosen) the user receives 'heart points'. While it is not explained how these credits benefit users, it is assumed that they are displayed in the user's profile and allow for comparison (i.e. competition) among users.

Profile: Each user has a profile that provides additional information about the user (e.g. demographics).

Statistics: The system further provides the user with some information about his or her progress by displaying statistics of usage. These statistics for instance inform how many solutions as part of co-creation processes a user has proposed.

For this platform neither the influence nor the acceptance of the game-inspired elements added were analyzed in any way. Thus, we cannot give insights into how these were perceived let alone how they affected participation.

While the objective of emotion icons is detailed above, we are sceptical that the statement of feelings can increase the perceived relevance of a post and thus make others more willing to respond or discuss the matter. It could be argued that the interest of people is evoked, when a topic is tagged with a particularly strong positive or negative emotion. However, not everyone reacts the same way to similar topics and people might grow annoyed with others using these strong emotion tags to attract interest. In the long run, it might even be that those posts in particular will be ignored by other users. Here the 'fading date' implements a better mechanism to control the quality of participation by the community rating a post's relevance. The statistics further help users reflect on the impact and relevance of their contributions.

NAIST photo (Ueyama et al., 2014)

The participatory sensing application *NAIST photo* was developed as a Foursquare[32] application and allows people to 'check-in' to locations (stating that you were/are somewhere). Aiming to tweak the reward mechanism for check-ins, they introduced three schemes to the already present game elements.

Table 7. Analysis of game elements used in NAIST photo.

DESCRIPTOR	EQUIVALENT IN OCTALYSIS
Points	Ownership
Badges	Accomplishment
Status	Social influence
Ranking	Accomplishment
Mission	

Points: For every check-in users are awarded points that can be exchanged for real-life money at any time.

Badges: Whenever a user check-in and fulfils a certain condition he or she is awarded a badge. There are different badges for various conditions. Badges are visible to all users and thus represent a title of respect in the community.

Status: Status levels depend on the number of earned reward points. The more a user has, the higher his or her status level. Higher status levels receive more reward points for check-ins.

Ranking: This game mechanic does not have an impact on the amount of rewards gained, it only sorts users based on the number of rewards already gained and since this ranking is visible to all users allows for a comparison between users.

Mission: This game element was not further explained in the source used for this analysis. It is assumed that missions are tasks that users can fulfill in order to gain badges or points.
This extension mainly incorporates game elements that build on the mechanic achievement. By rewarding users for completion of activities, it is anticipated that users will keep doing those activities. As the motivation is hence dependent on rewards and is not based on intrinsic interest, people might be inclined to contribute only to receive gratification and not because they truly want to engage in the topic. Again, this might negatively influence the quality of participation.

B3—Design your Marketplace! (Poplin, 2014)

Rather than incorporating a selection of game elements into the system, the designers choose to implement a serious game for their real-world use case. Due to its focus on urban planning and support for ideation, we still included the system in this review. The created tool aims to provide a 'playful' digital environment for both learning about a city's district, designing a marketplace, voting on other people's designs and discussing designs with urban planning experts as well as other participants.

[32] https://foursquare.com/

Table 8. Analysis of game elements used in B3.

DESCRIPTOR	EQUIVALENT IN OCTALYSIS
Marketplace CONFIGURATOR	Empowerment
Design Ranking	Social influence
Top designs	Accomplishment
'Little Helper'	Empowerment

Marketplace configurator (expression): The main component of the B3 game is a 3D/2D representation of a marketplace. By choosing elements from a tool box (e.g. park benches, playgrounds) and placing them on a virtual landscape, users can design the marketplace to their liking and according to their perceived requirements.

Design ranking: Users can vote on designs by giving up to five stars for each design. As designs are also associated with the player, who created the design, this voting system can also be regarded as a way of ranking individual users.

Top designs: Being based on the concept of leaderboards, this feature displays the designs that have been ranked the highest.

'Little helper': (help and progress) A fictional character, displayed in a corner of the game view, guides and communicates with the player in the form of text-bubbles. The character's appearance can be chosen by the player. The humorous depiction (i.e. design and language) of the character aims to contribute to the playful environment.

The tool was evaluated by two diverse groups of participants: university students and a group of senior citizens. Although the senior citizens appeared to appreciate the game as a new form of engaging with urban planning, their comments were often more related to affordances connected to the advantages of e-participation in general (i.e. being able to participate anywhere and anytime) and did not necessarily link to game aspects specifically. Poplin (2014) stressed the need to investigate the reasons behind users' motivation to 'play' such games, which includes an analysis of the effects of specific game elements. Her evaluation showed that users were more playing around (exploring what is possible) with the tool instead of reflecting on the feasibility of designs. As the tool did not provide feedback on factors such as costs or required resources, estimating whether a design could be implemented and thus rating the quality of contributions was difficult, unless users were experts in urban planning. However, for collecting input on what assets were generally desired in a marketplace, the tool could arguably be beneficial.

Reports Forum (Crowley et al., 2012)

Crowley et al. propose a framework for citizen reporting that incorporates a number of game elements. The framework consists of a forum and a mobile application. While users can post physical, social and amenity issues in the forum, the mobile application is meant for creating posts about social issues. A post contains a short textual description (also tags), an optional picture and a geo-reference. Where applicable, users can further indicate fixes to existing reports.

Table 9. Analysis of game elements used in Reports Forum.

DESCRIPTOR	EQUIVALENT IN OCTALYSIS
Points	Accomplishment
Tasks	
Badges & Trophies	Accomplishment & Unpredictability
Extrinsic rewards	Ownership
User roles	Social influence
Leaderboard	Accomplishment
Reputation system	Social influence
'Group endeavor'	

Points: Posting new reports or applying a fix to an existing report earns users' points.
This application incorporates all four types of incentives identified by Zichermann and Cunningham (2011): status, access, power and stuff (marked in italics).

Badges & Trophies for tasks: When completing a task defined in the application (i.e. cleaning up litter) users receive virtual badges, which can be seen as a *status* symbol. While for most tasks the user knows upfront that he or she has gained a reward, there are also badges that are hidden and are more difficult to attain (so called 'Easter Eggs').

Extrinsic rewards: Apart from virtual rewards, users can also be rewarded with *stuff* and *access* (i.e. coupons, reduced fees).

User roles: The assignment of user roles are nor explained in any more depth. It is only mentioned that they are similar to those roles attainable in Foursquare[33]. Representing the *power* reward, we assume that these roles will allocate certain powers to users.

Leaderboard: Aiming to add additional competition among users, player statistics can be viewed on a leaderboard.

Reputation system: Users can express their opinion on the perceived importance of an issue by using up or down voting posts. The number of votes a user has gained are then used to compute a user's reputation.

'**Group endeavor**': Multiple users can team up to collaboratively fix issues.

Merely proposing a design for a mobile reporting application, this source did not report on any results from the deployment of the tool. The authors stress that the incorporated game elements have to lead to a fun and socially engaging user experience where users can choose between a competitive or collaborative playing style. By including the mentioned game elements, it is anticipated that users will be intrinsically motivated to use the application. The game elements building on accomplishment, might be able to motivate users to become (more) active (= increase quantity of participation). Considering that merely the reputation system and the teamwork are said to be able to foster intrinsic motivation (Chou, 2015), it seems questionable whether this gamification approach can maintain a reasonable level of participation, let alone increase its quality.

Täsä (Thiel & Lehner, 2015)

This mobile application has been developed in the context of a project that aims to foster public participation in the city and enhance the communication between citizens and city

[33] https://foursquare.com/

officials. Like many other e-participation platforms Täsä is also based on the participatory sensing approach. As such, the main interface is a map where contributions (geo-referenced pieces of content) are visualized.

Table 10. Analysis of game elements used in Täsä.

DESCRIPTOR	EQUIVALENT IN OCTALYSIS
Area of Influence	Accomplishment
Competition	
Profile	
Progress	
Missions	
Time constraint	Scarcity

Area of influence: Users are rewarded with points for in-app activities (e.g. posting, commenting). These points are measured in square meters and represent the area of influence a user has acquired.

Competition: Users can compare their progress with other by viewing either the leaderboard or the high score list. The leaderboard always displays two users ranked higher and two users ranked lower than the current user.

Profile: The leaderboard, the high score list and the size of a user's influence area (amount of points) can be viewed in the profile. It further contains information on how much input the user has already created.

Progress: The profile also lists what activities a user has recently been awarded points for.

Missions: While Täsä is mostly designed to allow bottom-up approaches, missions were added for city officials to gather input on specific topics. Later on, they were also opened for citizens. Missions are usually framed as a question (e.g. where are more bike lanes needed) and are often connected to a specific development project.

Time constraint: Each contribution starts with an initial lifetime, which means that they will die (= disappear from the map) when they run out of this allotted amount of time. A lifetime can be increased if it is commented or voted on.

As the main field trial with the application has only recently been finalized, meaning results are still limited. Like many of the other reviewed projects, this application also mainly focuses on accomplishments as a way to spark motivation. Findings from earlier user studies with Täsä suggest that this strategy only works to begin with, where game aspects added to initial motivations to engage. Receiving feedback from the authorities remained the key motivational factor for contributing. The lifetime element ensures that a certain quality within the posts is kept and that the game aspect isn't encouraging increased but poor-quality contributions.

With several study participants not having been aware of or having ignored the game elements, preliminary insights from the long-term evaluation suggest that game elements do not have an impact on overall participation (Thiel & Ertiö, 2016). Furthermore, participants reported their main motivation of engaging with the tool to be that they were intrinsically interested in how their city might be planned, and that only in a few cases did the game aspects contribute towards their motivation to engage.

It is also noteworthy that almost all of the previously discussed applications included functionalities that allow social interaction. In some, they are dedicated chat rooms, in others users can be contacted by using the comment function of existing posts. In some frameworks and papers on gamification, social interactions are listed as another game element (e.g. Lehner et al., 2014; Bowser et al., 2014). One reason that social interaction could be viewed as game-related might be related to teamwork that can be organized via chat rooms or private messages. Moreover, considering that humans are social beings, an application that offers opportunities for social interaction might be perceived as more fun. On the other hand, Koster (2005) noted that fun in games tends to arise from mastery and comprehension, rather than interacting with other people. As social interaction is such a universal term and concept that is applicable to many domains, we chose to not include this element in our analysis.

Discussion

Only very few of the reviewed projects specifically aimed to investigate the effects of particular elements of gamification or the mechanics of e-participation systems, but rather sought to leverage gamification in order to foster engagement with the system. Some of the reviewed projects did not evaluate their gamification strategies at all, either using game elements blindly or just proposing them as an approach. Most of the discussed and evaluated cases did however report on a high acceptance rate of the gamification elements among its users. While achieving a high acceptance is arguably a necessary first step towards a successful use of novel concepts, the next step should be to investigate whether the introduced concept does actually achieve the intended goals, in this case encouraging people to become more involved in political decision-processes. In this respect, the effects on both the quantity and quality of participation should be investigated. For the development and design of future public participation platforms and other related systems it is important to explore which of the added game elements caused particular behavior changes (= increase motivation).

It would appear to date that most studies that specifically targeted public participation purposes have more or less blindly applied the gamification strategy, meaning that they did not go through an elaborate process of choosing game elements. Only a few, most published recently, have focused on the intermediate step and started investigating the impacts of applying gamification in more detail. Due to this lack of focused evaluation regarding the effects of individual game elements, we do not feel confident in making general statements on which game elements have which type of impact on various aspects of interaction and overall participation. The results presented at the end of the project reviews provide some insights into possible effects but should be considered carefully.

While all the reviewed projects applied multiple game elements, some used more (and different) core drives than others. Table 11 shows which core drives defined in the Octalysis framework have been used in the ten reviewed projects. The platform Reports Forum for instance makes use of five different core drives. Whether the number of incorporated game elements, the associated motivation type or what mix of core drives/game elements is the most successful, is another very relevant question to be addressed in future evaluations. After all, the interrelations of game elements remain unexplored as well, which means that theoretically elements could counter-balance each other. If true, this could explain why some studies did not find any effects of gamification in their public participation tools.

Table 11. Overview of used game elements in reviewed projects.

OCTALYSIS	# OF PROJECTS (COMMERCIAL)
Development and Accomplishment	9 (5)
Ownership & Possession	4 (2)
Scarcity & Impatience	2 (1)
** Social influence & RELATEDNESS*	4 (1)
** EMPOWERMENT OF CREATIVITY & FEEDBACK*	1 (1)
** Epic MEANING AND CALLING*	1 (1)

Core drives marked with a * are said to evoke intrinsic motivation.

The core drive *accomplishment* is used the most often. Whereas game elements belonging to *meaning, unpredictability* and *empowerment* were only used once. In four of the reviewed projects users could gain something, usually coupons or real products. Even though we did not include a social interaction feature in our review, half of the projects reviewed comprised elements that could gain a user *social influence* (e.g. user roles, teamwork).

All the reviewed gamified public participation tools build on the common human yearning to collect things, both virtual (i.e. badges) and material (i.e. small items). Rooted in democratic principles, public participation ought to come from the people (intrinsic) and should not (have to) be incentivized (extrinsic). Among scholars it is controversially discussed whether it is ethically right to offer rewards for democratic activity. Those critical of the practice argue that "imposed" contribution activities might not accord with a person's actual opinions. This could lead to false conclusions regarding planning and decision making. Overall, content posted in the tool might not be representative, making its use questionable. In order to avoid a decrease in participation relevancy (i.e. quality), accomplishment systems should not only be based on the quantity of activities, but also reflect on the relevance of contributions for the platform's purpose. A way to accomplish this could be to not only rate individual users (i.e. performance based on activity), but also rate their posted content by for instance letting the community rate its quality and relevance.

Elements that communicate accomplishment are often linked with the ability to compete with fellow users. Whether encouraging competition among citizens goes against democratic principles, where decisions and accomplishments should be reached via consent, is debatable. It is further not clear whether this game element has an impact on participation or motivation. Another seemingly important or at least well used core drive is social influence. The vast majority of these respective game elements allow users to place themselves within the community. Although not having been empirically confirmed, Harding et al. (2015) argue that including a reputation system in e-participation systems would allow users to better judge people's trustworthiness and hence increase users' willingness to engage with those users.

Only one project made use of game elements that are linked to meaning. Various studies stress the importance of clearly communicating the main purpose of public participation tools (Poplin, 2014; Thiel & Lehner, 2015). As a strategy to both communicate this goal to users and achieve the goal(s), we suggest that gamification strategies should be designed in such a way that game aspects mirror the intention of the participatory process. For instance, points could only be awarded when a contribution has reached a certain relevance rating from the community or was accepted for implementation by authorities. In order to advance in the

game (in this example gain points), users would need to ensure that their content is of good quality.

The majority of work exploring gamification in e-participation focuses on the effects of the overall concept rather than analyzing which element caused or promoted a specific behavior. While the individual influences of elements and their interrelations are still unclear, it cannot be said for sure that gamification as a concept will increase participation or effect it at all. Thom et al. (2012) put the effects of gamification into perspective by stating that it 'can encourage some people to use an application more often' – some, but not necessarily all. Coronado and Vasquez (2014) stress that the success or failure of utilizing game aspects comes down to the right stimulation of motives. Indeed, scholars agree that motivation (or interest) is one of the main factors influencing participation (Zichermann & Cunningham, 2011).

Conclusion

This article presented a review of both existing commercial and research projects targeting public participation tools which make use of gamification. We utilized Chou's Octalysis model in order to structure our review and later on compare different gamification strategies with the objective of identifying patterns. While only a few research projects have strategically investigated the impact of incorporated game elements, the vast majority of them report a good to high acceptance of game aspects among users. However, whether this acceptance is sufficient to also increase or at least spark people's motivation to engage (rather than just participate) with public participation tools remains unclear. Our review showed that most gamification strategies focus on reward-based gamification. This type of gamification is said to only spark extrinsic motivation, potentially leading to an increase in the quantity of participation but not necessarily improving/maintaining the quality of participation. That the success or failure of gamification approaches cannot be generalized and is dependent on the implementation of individual game elements, can be seen by the comparison of two projects, where one reported an increase in participation and the other project indicating that gamification did not have an impact on the level of participation.

The initial objective of including game elements was to encourage public participation. As it is yet mostly unknown whether this objective has been achieved, future work should focus on investigating the impact of gamification not only on user acceptance of game aspects (as this has already been studied) but rather on engagement within the tool, where the quantity as well as quality of participation is analyzed.

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