

## The Role of Pseudonymity in Mobile e-Participation

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### Abstract

*In addition to lack of knowledge and trust in official authorities, privacy concerns are among the reasons for non-participation in public discourse. Mitigating these barriers is important when aiming to promote and ultimately increase public participation. Through the lens of a long-term field study with a mobile participation prototype, this research investigated citizens' participation patterns in relation to their choice in username (real name vs. pseudonym). Our data suggests that while engagement served less socializing purposes, social appreciation was not affected by pseudonymity. Interestingly, those participating with their real-name lost trust in the local government. Overall, we found no evidence that pseudonymity impacts the level of participation, but participants indicated to favor using a pseudonym in the future.*

### 1. Introduction

In the last decade there has been a shift from traditional - mainly representative - forms of public participation (i.e. attending town hall meetings, signing petitions) to novel, more individualized forms of participation (e.g. using social media) [1]. While hoping to diminish traditional participation barriers with information and communication technology [2, 3], it has been noted that adding technology to public participation might also introduce new barriers [4]. The objective of this work is to provide empirical insights on whether certain design choices for e-participation systems influence participation.

This work was motivated by an observation made during a long-term field study with a mobile e-participation prototype. We, the research team, had developed this prototype together with input from both citizens as well as city officials and urban planners based on assumptions, related literature and past experiences. One of our design choices was to include a placeholder for the username field suggesting to enter one's real

name. Halfway into the trial, a user told us that had she known that others had registered with a pseudonym she would have done the same. Another user reported to have created a new account after seeing other usernames. This, in retrospect, made us wonder whether and how the choice of usernames affected participation.

Departing from earlier work exploring the role of pseudonymity and anonymity on participation in online communities (e.g. [5, 6]), the present paper explores the role the choice of username can have on public participation. Instead of pure anonymity where users are completely unidentifiable, we investigate pseudonymity, which allows for the same person to be identified across multiple interactions (i.e. usage of same unique user handle; disguised identity). The research question that we aim to answer with this work is the following:

*What is the influence of pseudonymity on engagement within digitally mediated public participation?*

This is investigated through the lens of a five months long living lab, where a mobile participation application was trialled. Based on gathered insights, we hope to give an answer to whether users should be able to choose pseudonyms, or if platforms should go as far as to require an official registration (e.g. with ID cards). We are ambivalent of generalizing our findings outside of the e-participation context. To that end, the same users might behave differently in other online communities.

Studying the effects of pseudonymity - or anonymity in a broader sense - in the context of public participation is relevant for several reasons. A disguised identity could help people overcome hesitation due to fear of being shunned for stating unpopular political opinions or feeling unable to clearly articulate viewpoints [7, 8]. Yet, allowing users to be anonymous could also decrease the quality of content produced, as anonymity has been linked to spamming and increased use of offensive language in online communities [9, 10]. Recently, also the issue of fake accounts used for political campaigns has been added to the list of concerns. Anonymity could thus both support and harm the participation objective.

## 2. Related Work

The following section provides an overview of research pertaining to factors mediating participation and the impact of anonymity on participation.

### 2.1. Factors influencing participation

Up until now, research on e-participation has mostly focused on characteristics of individuals in terms of demographics and political values and their impact on political behavior but less so on their interplay with design choices for the participation medium.

**Individual factors** have been found to directly and indirectly mediate public participation. Such factors include socio-demographics (e.g. age [11, 12, 13]), personal characteristics, attitudes as well as values and beliefs. For instance, interest in politics and urban planning have been found to positively correlate with public participation [14, 8, 11]. Referring to the belief that one's engagement can make a difference, political efficacy is another powerful motivator for public participation [15, 16]. People who are convinced that their engagement can ultimately increase their living quality, are more willing to devote their time and energy.

Individual factors have also been found to indirectly influence public participation. As such, education has been found to positively correlate with personality strength and political interest [14, 11].

**Social factors** have also been mentioned as mediators of public participation [14, 17]. According to the social capital theory, which measures connectedness rated by trust and relatedness, people who are active in public participation have more social capital available to them and are more connected [14]. To that end, social media use has been found to indirectly mediate public participation.

Two popular theories outline how relations with others influence (participation) behavior. Common Identity aims to map the impact of people's attachment to the entirety of groups, while the Common Bond theory concentrates on relationships between individual group members [18]. Some scholars argue that the opportunity to interact with fellow users motivates participation as it allows them to strengthen existing relationships and build new ones [19].

While some claim that direct interaction is required in order to form common bonds that would encourage participation [20], others argue that sometimes it is enough to be aware of the existence of others that one feels related to or shares a common objective (i.e. social awareness) [21, 22]. In order to capitalize on the effects of social presence, other users need to be visible or

recognizable in a participation platform [23].

While also other factors influence participation behavior (e.g. [24]), this paper focuses on those stated above. In conclusion, it can be said that public participation is mediated by a plethora of different factors, including both internal and external variables [17].

### 2.2. Impact of anonymity

Anonymity commonly refers to an "inability to identify an individual" [5]. There are various types of anonymity, which have varying socio-psychological effects [7, 8]. When using identifiers (i.e. pseudonyms), users are masking their identity but may still be recognizable in an online community where they might have built up an "online identity" [25]. By using the term "pseudonymity" in this article, we acknowledge this distinction.

Literature on the effects of anonymity on participation in online communities remains inconclusive. While there are findings stating that anonymity increases participation [26], other found that it decreases participation [27]. Allowing individuals to speak candidly is the cause for both the virtues and the negative effects of anonymity. While anonymity safeguards both privacy and freedom of expression, it also presents a potential clash of interest between those two concepts [28].

A common argument against anonymity is the claim that it will lead to misbehavior such as rude or harsh language [29] as well as more broadly anti-social behavior [27, 30]. Linking to Common Identity, social appreciation plays a role in online communities. Previous findings suggest that messages from anonymous users are perceived as less trustworthy [31] and are read less often [32]. Others found that reactions on anonymous and non-anonymous content do not differ greatly [6]. In anonymous contexts, (social) cues that would trigger behavioral conventions are lacking [33]. People who would otherwise have associated certain usernames with more credibility than others would have to resort to other cues to rate another user's messages (e.g. avatars). The willingness to endorse other users' posts might decrease if anonymity decreases levels of interpersonal trust. On the other hand, respondents to a survey study reported that being anonymous allowed them to be more honest in their ratings and recommendations [7].

In line with the Social Identity model of Deindividuation Effect (SIDE [34]), those advocating the use of real names usually base their argument on the finding that providing an identity encourages

participation [26, 35]. According to the theory, each member of a community tries to identify with group norms and make them their own [36]. The likelihood of individuals identifying with other group members is said to be higher when users are not distinguishable by individual factors such as their name. Where anonymity strengthens social ties, it can decrease lurking behavior [37].

Another main point for anonymity is that it provides security and personal privacy, both representing conditions which may give users confidence to engage in discussions. Being able to hide behind the cloak of anonymity, users are free to express their views without the burden of nonverbal politics [38]. Anonymity can thus liberate people from identity constraints; including being prejudged based on differences (e.g. race, gender) as well as inequities [39]. Particularly in political contexts, users may prefer to be anonymous in order to be able to "safely" espouse views unpopular with the majority or a powerful minority [28].

Anonymity has been shown to indirectly influence social interaction and intergroup comparisons via social presence [23, 40]. Yet, there is still a grave discrepancy in opinions on how anonymity effects participation. The discrepancies show that the effects of anonymity on users' reactions are context-dependent [41]. We hence argue that investigating the role of anonymity in digitally mediated public participation is of high relevance.

### 3. Participation application

The "b-Part" project aimed to investigate the requirements, opportunities and impacts of implementing pervasive participation concepts in urban governance. The vision behind the project was to create an engaging and continuous dialogue between a city (represented by city officials and urban planners) and its citizens around decision-making processes through mobile devices. For this purpose, we developed a sophisticated mobile application, named Täsä. The core part of the project involved a living lab in which the application was trialled in the city of Turku, Finland over a duration of five months. During that time, the mobile application was recognized as an official channel to communicate with the local city administration as well as urban planners.

Inspired by the participatory sourcing approach, Täsä facilitates discussions both via top-down as well as bottom-up participation. The application centers on the concept of so-called contributions, which are geo-located pieces of content. Depending on the content, contributions can take the form of either *Ideas*, *Issues* or *Polls*. An Idea could, for instance, be a

citizen proposing to add more benches to a local park. Contributions are displayed both on a map and a list. They consist of a title, description as well as optionally a point of interest and picture. Being publicly visible to all citizens as well as city representatives, users can both comment as well as vote on contributions. Replies from the city, either city officials or urban planners were publicly visible as well. The following exemplifies an envisioned dialogue:

A citizen thinks the central square in town needs more bike racks. Hence, she creates an Idea with the Täsä application requesting more opportunities to leave bikes in that specific location. Another citizen agrees with that idea and adds a comment arguing why the bike racks are needed. Some time later, a city official replies to the contribution stating that he has forwarded the request to the responsible department who will look into this topic.

When registering, potential users were asked to choose a username and enter their e-mail address. Upon entering a username and email, users instantly gained access to the content. Once registered, usernames cannot be changed. Usernames were displayed next to each content the user authored (e.g. contributions, comments, missions). We opted for a light-weight registration process that would not put potential participants off but still allow us to identify users across multiple interactions.

Based on the assumption that people would feel more exposed and hence would be more considerate about their input when their real names are displayed, we opted for first/last name to encourage citizens to participate 'seriously' in the debate. In the registration form, the placeholder in the field for username read "FirstnameLastname" ("sukunimi" in Finnish). While this suggested for entering one's real name, the system did not refrain users from entering pseudonyms. The only restriction users had when choosing names was filtering for special characters (e.g. "-", " "). Had the situation been reverse and we would have wanted users to choose pseudonyms, there really is no reliable way to refrain users from entering their real name in a text field. Some users even wanted to make sure that they were fully recognizable by the community and were irritated when the system would not accept special characters.

The app's content was only accessible upon registration. To that end, citizens could not browse content and also did not see what usernames others had chosen (i.e. culture of use). Throughout the trial, users and interested citizens kept asking for a way to

access Täsä via a desktop as well as browse content before registering. As the objective of the research project was to explore *mobile* participation but still wanting to respond to citizens' feedback, we developed a web-based read-only version of Täsä, which was introduced little over two months before the end of the trial. For active participation (i.e. writing comments), users still had to register through the app.

#### 4. Methodology

In order to gain insights on whether the five months of engagement had an impact on participants (e.g. attitude towards politics) and whether any design choices influenced participation, we implemented before and after measures.

**Pre-survey:** This in-app survey was displayed upon registering with the system and loosely structured into three parts: i) socio-demographics (e.g. age, gender, level of formal education); ii) experience with and usage of mobile applications; iii) previous political engagement and general attitudes towards politics (i.e. trust in institutions, satisfaction with political institutions). Unless not stated otherwise, all questions were assessed with Likert-scales. Despite the survey continuing to reappear until submitted, only 24% of all registered users responded to it.

**Usage logs:** The backend of the mobile application provided data for assessing levels of participation and usage patterns in general. While we did not log specific interactions within the application (e.g. click of a button), activities such as voting on posts as well as generated content (i.e. comments and contributions) were logged in the system backend. By the end of the living lab, the system counted 172 contributions, 142 comments and 554 votes in total. 41% of the votes had been on contributions.

**Post-survey:** A second questionnaire was distributed via e-mail after the trial period. It contained questions regarding users' experiences with the mobile application, their acceptance of the concept in general and their view on included features and discussed topics. The post-survey further inquired participants' motivation to contribute and their preferences regarding modes for communicating with city authorities. Similar to the pre-survey, answers were assessed using Likert-scales. The response rate was again relatively low with only 16% of participants filling it in.

Both surveys used established measures, among others from the European Social Survey<sup>1</sup> and the American National Election Survey<sup>2</sup>.

<sup>1</sup><http://www.europeansocialsurvey.org/>

<sup>2</sup><http://www.electionstudies.org/>

**Participants:** A total of 780 people registered with Täsä over the course of the living lab. Due to the light-weight registration process and less than a third of users replying to our pre-survey, we do not possess detailed information (i.e. demographics) about all users.

According to results from the pre-survey, participants were between 17 and 73 years old, with a mean age of 37.47. 58% were male and 42% were female. With only 43% participants not holding a university degree, the level of formal education was considerably higher than for the overall population of Turku (23%). Participants were quite confident in their skills of using mobile applications, 47% even indicated to have "excellent" mobile skills. 60% further stated to be heavy users of social media, whereas only 10% use these networks less than "often" and 6% do not use them at all. The vast majority of participants (87%) had engaged in public discourse in some way in the twelve months prior to the living lab.

**Coding usernames:** Usernames were coded individually by three persons, two native Finnish-speakers and one fluent in Finnish who had lived in Turku for ten years (Krippendorff's  $\alpha = .67$ ). The compilation of the individual coding was done by an author of this paper. Usernames were coded as *pseudonym* in case they fulfilled one of the following criteria:

- i) does not include parts of a citizen's real name in any way (e.g., "HappyCat").
- ii) includes only the first name plus an arbitrary number of additional characters (e.g., "Susi500").

Usernames that included citizens' last names and hence made them identifiable to some degree (e.g., "bObama"; "obama15") were coded as real names. We posit that those users wanted to be recognizable to at least a subgroup of participants. A first indication of whether a username was a pseudonym was to check whether it included a (fairly common) Finnish last name. This first test was complemented by comparing their username with their e-mail address. These two steps were necessary as we did not have citizens' real names.

We decided on manual coding and against contacting users, as we had promised at several points (e.g. app description, in-app disclaimer) that data would be kept anonymous at all times. Now asking for users' real names would violate this promise.

#### 5. Results

We structure our findings in two parts. First, we compare users having opted to register with a pseudonym with real name users. Next, we present findings regarding the influence of pseudonymity

(points on Likert scale)	User names (M & SD value)	
	Pseudonym	Real Name
Age	38.6 (14.45)	42.6 (11.59)
Gender	85% (male)	68% (male)
Education (5)	2.62 (1.66)	2.52 (1.23)
Mobile Skills (5)	3.0 (.91)	3.42 (.67)
Social media use (5)	4.19 (.95)	4.31 (1.4)
Interest in politics (4)	3.23 (.92)	2.69 (1.32)
Interest in urb. plan. (4)	3.69 (.480)	3.74 (.514)
Internal pol. efficacy (5)	3.46 (1.28)	3.77 (1.05)
External pol. efficacy (5)	2.95 (.99)	2.63 (.93)
Trust in loc. govt. (10)	4.54 (2.3)	5.87 (2.05)
Horizontal trust (10)	6.62 (1.76)	7.58 (1.46)

Table 1: Overview of characteristics of pseudonymous users and real-name users. No significant differences were found,  $p > .05$ .

on involvement in the digitally mediated public participation process.

To avoid confusion of having various sample sizes, we opted for analyzing only those cases for which we had responses to both surveys. This decision implied a significant reduction of the overall sample size for this analysis and left us with 117 cases in total.

Of those 117 participants, 77 (65.8%) had chosen to go by their real name. 99 participants had entered an email address that (most likely) did not contain their real name. The vast majority (87%) of users registering with their real name also used an email matching their real name. 32 participants chose to only be anonymous in the Täsä application (80% of those with pseudonyms; 27.4% of all coded).

### 5.1. Characterizing participants

Rather than focusing on effects of anonymity, this section compares participants that choose to be pseudonymous and those that used their real name during the Täsä trial. We used independent-sample t-tests to investigate potential differences between those two groups (see Table 1 for an overview).

Participants registering with their real name did not differ from those having chosen a pseudonym in terms of their socio-demographics (i.e. age, gender, education; see Table 1). This also applies to their perceived mobile skills, their usage of social media and their interests in both politics and urban planning. Further, both pseudonymous users and real-name users expressed similar levels of internal and external efficacy.

Non-pseudonymous and pseudonymous users had similar original motivations for downloading Täsä and

Variable	Pseudonym (N=40)		Real name (N=77)	
	Total	Mean (SD)	Total	Mean (SD)
Activity sum	110	2.68 (4.97)	154	2.03 (3.67)
# contributions	29	.71 (1.83)	30	.39 (.89)
# comments	20	.49 (1.23)	21	.28 (.93)
# cast votes	49	1.2 (2.14)	84	1.11 (2.10)
# received votes	31	.76 (2.25)	42	.55 (1.50)
# received comments	19	.46 (.98)	40	.52 (1.29)

Table 2: Overview of in-app activities for both user types. No significant differences were found,  $p > .05$ .

engaging in public discussion. There were also no significant differences regarding aspects that had motivated them to use the application during the study. Real name users ( $M = 2.88$ ,  $SD = 1.05$ ) were slightly more motivated by the opportunity to meet and socially interact with fellow citizens (pseudo.  $M = 2.57$ ,  $SD = 1.04$ ). Overall, personal interaction was of minor importance to all participants. They were more motivated by gaining access to information and the possibility to bring their opinion to the attention of the city administration.

To summarize, no significant differences between pseudonymous users and those who chose to register with real names were found.

### 5.2. Influence of Pseudonymity

This section explores differences regarding participation behavior between non-pseudonymous and pseudonymous users. For this purpose, we draw on data from logs documenting in-app activities (e.g. contributions, comments).

**Participation.** We did not find any significant differences between username types regarding their participation behavior. Users with pseudonyms and those using their real name contributed equally to the participation platform (see Table 2).

We further looked at non-actives, those participants who had not become active in any way during the trial (i.e. post something, vote). 51 real-name users (67.1%) can be classified as non-actives compared to 30 pseudonymous users (73.2%). This difference in proportions is not significant ( $p = .498$ ) indicating that those revealing their identity were not more likely to remain inactive than pseudonymous users.

Next, we explored relationships between social appreciation and pseudonymity. Here, we looked at commenting and voting behavior in response to others. There was no significant difference in the

Variable	Received votes		Received comments	
	Pseudo	Real	Pseudo	Real
Activity sum	.725**	.541**	.674**	.484**
# contributions	.635**	.593**	.982**	.793**
# comments	.532**	.696**	.399**	.425**

Table 3: Summary of the effects of social appreciation and feedback on participation.  $p$ -value  $< .001$

number of votes or comments sent and received between real-name and pseudonymous users (see Table 2). The likelihood of being responded to in the Täsä trial hence did not seem to depend on the choice of username. In contrast, social appreciation as well as feedback were found to be strongly linked to public participation. The more votes a user received, the more contributions and comments this user posted ( $r(774) = .531, p = .000$ ; see Table 3). While this applies to both pseudonymous and non-pseudonymous, these effects were more pronounced for pseudonymous users. The only exception is for comments; receiving votes and comments seemed to encourage real-name users even more to write comments than pseudonymous users.

**Trust.** When asked at the beginning of the trial, both pseudonymous and real-name users reported, on average, to have moderate levels of trust towards their local government, with those using real names ( $M = 5.87, SD = 2.05$ ) trusting their government slightly more than pseudonymous users ( $M = 4.54, SD = 2.30$ ). Furthermore, real-name users tended to trust fellow citizens more. A Mann-Whitney U test was run to determine if there were differences in levels of trust towards the local government between those users who chose a pseudonym and those who used their real name. Distributions of trust levels for the two user groups were not similar, as assessed by visual inspection. There was no statistically significant difference in trust levels between users who chose a pseudonym (mean rank = 18.43) and those who used their real name (mean rank = 27.00),  $U = 153, z = -1.950, p = .051$ .

The same results apply to levels of trust measured after participants had used the participation application; the level of trust for both the users with pseudonym (mean rank = 24.89) and those with their real names (mean rank = 23.62) remained similar,  $U = 243.5; z = .296, p = .768$ .

A third Mann-Whitney Test was run to determine whether the levels of trust towards the local government had changed over the participation in the living lab and whether these changes differed for users with pseudonyms and real names. It was found that there was

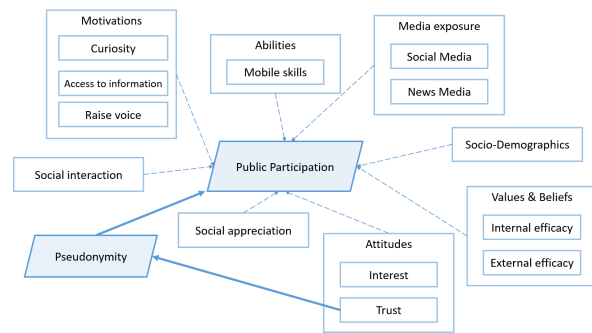


Figure 1: Overview of tested relationships between pseudonymity and e-participation. Bold lines indicate significant effects.

a significant difference regarding the effect participating in the trial had on pseudonymous and real-name users. While those with real names (mean rank = 20.48) lost trust in their local government, those using pseudonyms (mean rank = 32.29) actually gained trust;  $U = 347, z = 2.780, p = .005$ .

We further explored the effects of attitudes on public participation. An earlier investigation showed that participants interested in urban planning were not significantly more active than those less interested [42]. We found that real-name users' interest in urban planning encouraged participation ( $r(31) = .481, p = .006$ ), a finding that does not apply for pseudonymous users. While we did not find a significant correlation between trust in local government and activity in the platform, there was a weak, negative correlation between real-name users' trust and the number of comments posted ( $r(67) = -.274, p = .025$ ).

Moreover, there was no significant difference for preferred username type for future e-participation contexts. 40 real-name users (58.8%) indicated to prefer a pseudonym in the future and 22 pseudonymous users (64.7%) stated to want to remain pseudonymous.

## 6. Discussion

Summarizing this analysis, we did not find any evidence suggesting differences between users that chose to be anonymous and those registering with their real name. We did, however, find tendencies that pseudonymity can affect engagement in participatory processes and how this engagement influences their personal attitudes.

We found that real-name users were less likely to post their views regarding local topics in comments when they have high trust in their local government. It

could be that fear of consequences (e.g. being shunned by their social circle [8]) wins over trust when engaging in an online participation platform. Alternatively, real-name users might feel more incitement towards voicing their opinion if they do not trust their local government to take care of things. The latter might point towards the emerging trend of grass-root initiatives [43].

There was a significant difference in how the trial impacted users' level of trust towards local government. While those participating pseudonymously gained trust, the other group lost trust. Trust is the only variable found to significantly mediate participation through pseudonymity (cf. Figure 1). None of the other factors analysed in this work were found to impact engagement or relate to a user's choice in username.

Within public participation, trust is closely linked to external political efficacy. Accordingly, if citizens believe that their input is being considered, they trust their government to act upon it. In order to know whether input will be considered, feedback from the governance side is needed. In the case of this living lab, we did not find differences pertaining to the frequency of authorities or fellow citizens responding to users with either real names or pseudonyms. Furthermore, these two groups reported similar levels of efficacy and trust before the trial. Not having found any differences in the amount of replies users received, we conclude that the difference of effect on trust was not (at least not directly) linked to participation in the application. What might have impacted the found difference is that users with real names might have expected more from being part of the participation process; for instance more tangible outcomes (e.g. new bike racks) or city officials directly contacting individual citizens. The lack of this interactivity might have disappointed users that were ready to disclose their identity.

The identified changes of trust in local government could have also been inflicted by other events taking place during the five month period. Although there was no election or anything similar politically related happening during that time, external events or circumstances might have affected citizens' level of trust. The significant connection between pseudonymity and levels of trust might therefore be influenced by other variables that were beyond our control.

Our findings highlight that providing feedback is important as it encourages participation. Reactions to posts signal to users not only that others are also using the platform (= social presence; [23]) but also that there is some progress which boosts users' efficacy (i.e. belief that one's contribution will make a difference; e.g [44, 45]). Our analysis shows that receiving responses from the city administration, but also from fellow users,

is particularly important in sustaining participation for pseudonymous participants. Responses from fellow citizens are less important due to their socializing value, but more to confirm and validate own opinions as well as gain support for ideas.

The placeholder "FirstnameLastname" certainly influenced our results. Mistaking it as a requirement, this placeholder might have discouraged people with privacy concerns from signing up in the first place. In this respect we jeopardized our initial aim of not wanting to put potential users off with the registration process. Yet, only very few actually followed the recommendation represented by the placeholder (7 of 117; 6%). A considerable number of users chose their lastname (plus a varying number of characters in the beginning or end) to register. It remains unclear to what extent the placeholder influenced the choice in username and how many turned away because of it. A previous study argues for a general tendency of using real names in e-participation settings [46]. If that holds true in our case, the amount of people being put off by our indirect request for real names might not be that large.

Only eight people attempted to remain truly anonymous by also using an e-mail address not containing real names. The others might have only wanted to keep their identity hidden from other users but not from the system (i.e. us researchers). This ratio somehow contradicts our finding that pseudonymous users had more trust in their fellow citizens than the local government. We informed users that their personal information (incl. contact details) would not be shared with anyone and hence only be available to the research team. While we did not assess their trust in researchers, the majority of pseudonymous users seemed to be more confident to share their real name (via their email address) with us researchers but less confident when discussing their opinion regarding urban issues with fellow citizens and officials. It should be noted that we can only speculate about the real reasons for choosing usernames as we did not assess this choice. As mentioned earlier, this analysis had not been planned before the field trial.

Our data shows that the majority of both real-name and pseudonymous users would prefer to hide their identity in future e-participation initiatives. Contrasting [46], it seems that citizens prefer to cloak their real-world identity when discussing views and ideas regarding urban topics. Considering there having been both pseudonymous and real-name users, some real-name users might have felt more exposed and at a disadvantage with undisclosed identities. While building identities has been shown to be important in online communities [27], this does not seem to extend

to real-world identities. A previous evaluation of this field trial has shown that users rather liked the reputation system [42], a feature that allowed users to collect stars based on other users' appreciation of one's content. To that end, citizens do seem to care what others think of their ideas and views. Although real-name users were not less likely to remain in-active compared to pseudonymous users, we posit that including structures that help users build and strengthen social ties (e.g. based on reputation levels) could help decrease lurking behavior (see [37]). Such features could, for instance, include something similar to the mentioned reputation system or a user profile (optionally) allowing to disclose more private information (e.g. interests, age; [47]). To that end, establishing an identity in an online community does not require users revealing their real-world identity. Rather, these features may provide social cues that are otherwise missing in pseudonymous contexts [33].

Data from this trial points in two directions regarding this aspect, while appreciating the opportunity to gain reputation (visually represented by stars) in the app, features allowing social interaction (e.g. commenting) were rarely used. This combination of individualized use and being motivated by social appreciation, leads us to posit that within (e-)public participation contexts the social aspect remains important but takes on a different role. Rather than looking for social interaction (i.e. networking, socializing), users look for validation and/or support of their own views. This reflects findings that one of the factors sustaining participation in an online environment is the individual's need for validation of one's practice as well as gaining a better understanding of the field [48].

Mirroring individualized use, participants indicated to be mostly interested in getting their message across to authorities. Considering that over half of all participants consider themselves heavy users of social media, which are platforms living off both self-representation and social interaction [49], we deem it fair to assume that generally our sample is interested in socializing; maybe just not in the context of public participation [50]. According to participants' responses to motivations to start as well as keep using Täsä, e-participation systems (should) serve other purposes than getting to know the opinion of one's neighbors. It should be noted that participants of this trial were slightly biased in that regard as they also indicated to be fairly engaged in public discourse outside and prior to this trial. In order to test whether the reason for social interaction being limited was not due to over a third of participants using pseudonyms, future work should compare completely anonymous and pseudonymous public participation platforms with those requiring an identification in terms

of occurrence of social interaction. Linking back to the Social Identity model [51], without (distinguishable) user handles it would be difficult to link statements to individual users, recognize real people behind the handle and even less so to establish an identity and social ties. Not knowing who is in the community might have rendered citizens hesitant to reach out to other users or even start discussions [27].

On the other hand, our findings show that it did not seem to matter to citizens whether users displayed their real name or not in order for them to react to content. Similarly, there was also no difference in commenting behavior; neither did pseudonymous users receive less votes or comments nor did they cast less votes or gave fewer comments than real-name users (Table 2). In contrast to anonymity, pseudonymity thus seems to not decrease responses to content [52] nor is pseudonymous content less often read [32]. Summarizing, we can say that social appreciation plays a role in pseudonymous contexts and that content from those users disguising their identity is not perceived as less relevant in mobile e-participation contexts.

## 7. Limitations

This work is certainly not without limitations. The way we phrased the username placeholder surely influenced people's choice. Having been advertised as an official communication channel might have further encouraged people to enter their real name as username. Furthermore, the cultural setting might have also had an effect not only on participation but also on attitudes and how they impacted behavior. In Finland and Turku in particular people tend to be very reserved. Had we conducted the study elsewhere (e.g. in a southern European city), we might have gotten different results.

Further, the classification of usernames as pseudonyms was not cross-checked with personal information. Thus, some may have been misclassified, for instance, if a user used a real name as a pseudonym. However, had we asked the users, some may still have answered untruthfully in order to preserve their privacy. Similarly, those wanting to remain anonymous may have been less likely to fill out the survey on which the majority of the analysis is based. It is difficult to estimate how these privacy-seeking users would have responded and whether it would have affected the results. Assuming that one reason for hiding one's identity is low trust in political associations, our finding of trust declining for pseudonymous users might have been even stronger.

This work only looked at quantitative data. Examining the content of posts would potentially

provide us with even richer insights into the impact of pseudonymity on engagement. For instance, it would have allowed us to infer which comments were replies to other comments, enabling us to see if other users responded differently towards anonymous users.

## 8. Conclusion

This work set out to investigate effects of pseudonymity on engagement in a public participation context mediated by a mobile application. In response to our research question, we argue that (1) people choosing to participate with a pseudonym do not differ from those registering with their real name and (2) pseudonymity did not negatively affect nor promote (quantitative) participation in our trial. Our data also showed that real-name users lost trust in the local government after their participation in the trial and would choose to register under a pseudonym in the future. While we could not confirm findings that pseudonymity has a negative impact on social appreciation in terms of commenting and voting behavior, our findings suggest that social aspects are less important in terms of socializing, instead they seem to be valued as validation of and support for own ideas.

Based on this preference for pseudonyms and not having found evidence for pseudonymity affecting participation, we posit that citizens should be allowed to choose their (type of) username. It is important to distinguish between various types of anonymity. To that end we are ambivalent to generalizing our findings to all forms of anonymity and outside this trial. Yet, we propose that design choices such as the registration process should focus on other factors that have been found to impact participation. As long registration processes might refrain people from signing up, they should be kept light-weight unless there are clear benefits or legal requirements that mandate authenticating users' identity.

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