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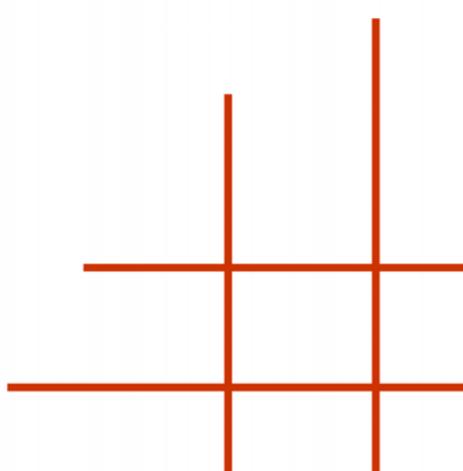
**Proceedings of the CSCW 2016 –  
Workshop: Toward a Typology of  
Participation in Crowdwork**

**Guest Editors:**

Karin Hansson  
Tanja Aitamurto  
Thomas Ludwig  
Michael Muller

**Editors:**

Volkmar Pipek  
Markus Rohde



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## Impressum

IISI - International Institute for Socio-Informatics  
Stiftsgasse 25  
53111 Bonn  
Germany

fon: +49 228 6910-43  
fax: +49 228 6910-53  
mail: [iisi@iisi.de](mailto:iisi@iisi.de)  
web: <http://www.iisi.de>

# Editorial for the workshop “Toward a Typology of Participation in Crowd Work”

Karin Hansson  
Stockholm University  
*khansson@dsv.su.se*

Tanja Aitamurto  
Stanford University  
*tanjaa@stanford.edu*

Thomas Ludwig  
University of Siegen  
*Thomas.ludwig@uni-siegen.de*

Michael Muller  
IBM Research  
*michael\_muller@us.ibm.com*

## **Introduction**

The present collection of papers forms the proceedings of a full day workshop on the topic “Toward a Typology of Participation in Crowd Work”. The workshop took place in conjunction with CSCW 2016 on February 28, 2016, in San Francisco, California, USA.

Participants were invited to examine different types of participation within crowdwork, levels of interaction, and to formulate a typology of participation in crowdwork described in terms of power and relations. The workshop was motivated in a need to understand power relations within crowd production and to examine how different tools handle participatory processes in the crowd. Modern technologies such as social media foster new kinds of collaborative information

production and crowd activities. Those kinds of production offer new potentials for transformative developments in government, work life, science, and emergency response. But nevertheless, current platforms for participation have not solved many of the typical problems regarding participation, such as lack of representativeness and flawed deliberative processes. The goal of the workshop was therefore to better understand the complex relations within crowd production and to examine how technology can foster or limit participatory processes in the crowd.

### **Contributions and influences of (types of) crowds**

We begin with a focus on the workshop contributions that emphasized the contributions of crowds, and the influences of crowds.

### **Collective action**

Hansson et al. (2016) applied Marxist theory (Marx, 1844) to analyze four potential types of alienation in six large-scale internet-mediated crowdsourcing websites: alienation between producer and consumer; between producer and product of the producer's work; between crowdworker and self; and between crowdworker and other crowdworkers. In crowdwork, Hansson et al. found four types of relationships that may operate in unitary or overlapping configurations: crowd capitalizing (in which individuals work in isolation); crowd instrumentalizing (in which individuals work with awareness of the work of other individuals); crowd deliberation (in which individuals are seen as experts and work with governing bodies); and relational crowd (in which individuals work in mutual knowledge and communication in a public sphere). Future work will examine how these different configurations interact with democratic ideals, such as transparency, inclusiveness and accountability.

Davidson (2016) also examined relationships between individuals and groups in the context of crowdfunding. He provided an example of how relations in the crowdfunding context take place in overlapping configurations, from a one-off opportunity for exchange of monetary support to an opportunity for stronger relations between a founder and a committed crowd allowing users to participate more actively in the production process. Similarly, Xia and Huang (2016) explored the question of why people participate in crowdwork in the set of cases in which there is no monetary incentives. They proposed that non-funded forms of crowdwork partake of components of both collective intelligence and collective action. Ljungberg (2016) took up similar questions in health-related crowd activities, describing collective action for social good. JafariNaimi (2016) used design criticism to ask similar questions of civic participation, focusing on the physical space and geographic social ties.

Aitamurto (2016) examined the definition, promise and challenges of crowdsourced democratic deliberation in open policymaking (Aitamurto and

Landemore, 2016). Crowdsourced democratic deliberation combines the fundamental features of both crowdsourcing and democratic deliberation, that is, self-selection, knowledge search and the ideals of democratic deliberation. Aitamurto found that while crowdsourced democratic deliberation holds the promise to scale deliberation to the masses, there are several challenges, including the lack of legitimacy of the self-selected, biased crowd.

### **Types of Crowds**

Some of the preceding studies could be understood to refer to particular types of crowds. Others seemed to apply quite broadly. In this section, we focus on the workshop contributions that moved toward analytical decompositions of different types of crowds.

Kelty and Erickson (2016) analyzed 102 websites designed for internet-enabled participation using a prior dimensional analysis of participation (Kelty et al., 2014) that described seven dimensions of participation: Education (provision of knowledge); Goals (direct democracy); Resources (co-construction of resource(s)); Exit (voluntary action); Voice (making "one's voice heard"); Metrics (measure impact of one's activity); Communication ("subjective, affective connection to a collective"). They concluded that there were two major modes at work in these organizations: Radical-direct mode, which emphasizes goal-setting, voice and autonomy of participants; and Experiential-affective mode, which emphasizes experience, affect, education and belonging.

In earlier work, Thom-Santelli et al. (2009) tried to distinguish between the wisdom of a poorly specified and generic "crowd," vs. the wisdom of each person's personal crowd or crowds, using a framework of partitioned crowds in organizations. Moncur has also considered distinct crowds for particular persons, using a concentric containment framework for internet notifications. In the workshop, Muller et al. (2016) continued this thinking about distinct personal crowds by distinguishing among different types of person-centered micro-crowds (social-network friends, managers, and people who report to the same manager) in a large-scale social network analysis of employee engagement in IBM.

### **Cities and Publics**

Public or civic crowds pose new challenges to developing taxonomies of crowds, in part because of the diversity among people.

Poblet and Fitzpatrick (2016) compared crowd-work cases of isolated, hierarchically structured micro-tasking vs. the more collective, less structured domains of collective innovation, emergency response, and multiplayer online gaming. They propose further study of the leadership and management issues in these contrasting attributes of diverse task-oriented crowdwork.

Clark and Brudney (2016) studied risks of overuse of citizen-services coproduction capabilities by a self-selected subgroup of citizens called "frequent

flyers"-- i.e., people who contribute to civic discussions much more frequently than the majority of their peers (Sharrock 2010). They found that this subcrowd of frequent participants is generally representative of their communities, and that the practices of frequent flyers may be socially (i.e., communally) shared, thus further breaking down barriers and distinctions between frequent fliers and other groups of citizens.

Penadés et al. (2016) took up an old PD question of effective citizen participation in government decision-making -- now with a focus on emergency-planning. Emergency management is often analyzed in terms of four cyclic phases: planning, responding, recovering, and preventing. Most CSCW and CHI work has focused using citizen information during the phase of responding during the emergency (Palen et al., 2007; Poblet and Fitzpatrick, 2016; Starbird; Sutton et al., 2008), or issues of two-way communication during the responding phase (Hughes). Penadés et al. turned to crowd and sub-crowd phenomena in the more deliberative and potentially more democratic phase of planning.

Finally, Shaffer (2016) extended questions of public participation directly into policy-making, focusing on the case of effective and on-going citizen participation in open data policies.

### **Online activities**

Østerlund et al. (2016) explored the seeming lack-of-fit between situated learning in communities of practice (e.g., Lave and Wenger, 1991), and the very limited opportunities to observe other people's activities in distributed groups of citizen scientists (Wiggins and Crowston, 2012). Using Sørensen's analysis of types of presence in learning (2009), they uncover diverse forms of learning in the crowds that are configured by online spaces of citizen science.

### **Conclusion**

To conclude, the workshop papers examines different types of participatory process, in crowd work such as crowdfunding, crowdsourced policymaking, crisis management, citizen science and paid crowd work. The scope of the papers span from workshop contributions that emphasize the contributions of crowds, and the influences of crowds; their relations, and incentives such as social ties and shared physical space, towards a more analytical decompositions of different types of crowds. Diversity, as a promise or a challenge, was another important aspect of the crowd especially in the context of citizen science, e-government and public policy-making.

Overall, these articles contribute to giving us a better vocabulary when examining and developing different types of participatory process in crowd work, especially relations and power dynamics within and beyond the crowds.

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# From alienation to relation: Modes of production in crowd work

Karin Hansson  
Stockholm University, Stockholm, Sweden  
*khansson@dsv.su.se*

Tanja Aitamurto  
Stanford University, Stanford, CA, USA  
*tanjaa@stanford.edu*

Thomas Ludwig  
University of Siegen, Siegen, Germany  
*thomas.ludwig@uni-siegen.de*

Michael Muller  
IBM Research  
*michael\_muller@us.ibm.com*

**Abstract.** While crowdsourcing has proved to be a useful method in several contexts, the power relations in crowdsourced processes remain largely unexamined. For designing better crowdsourcing technologies and processes, it is important to understand those power structures and relations within the crowd itself as well as between the participants: who has the power, what is being produced through crowdsourcing and how. Therefore in this paper we develop a typology of participation in crowdsourcing by examining crowdsourcing tools framed by Marx theory of alienation. We show how these types of crowd work can be described as levels of alienation where the worker, the consumer, their relations, and products are connected in modes of production representing different ontologies.

# 1 Introduction

Crowdsourcing and especially crowd work enables a division of labor on an unprecedented scale, which often drastically reduced the individual's ability to monitor and control the results of her own work. We therefore suggest that crowdsourcing platforms exemplify Marx's theory of alienation, which was central to his analysis of capitalism. Crowdsourcing settings like those in Amazon Mechanical Turk (ATM) have striking power differences between the crowd of workers and the "sourcers" (Felstinerf, 2011; Silberman, Ross, Irani, & Tomlinson, 2010), which also has resulted in collective action by crowd workers (Salehi et al., 2015). Lack of transparency and an asymmetry in the information access were also shown in Gupta et al's (2014) study of workers at the Amazon Mechanical Turk as well as by shown by Ludwig et al. (2016) in mobile contextual studies. Digital literacy and infrastructure are other aspects of participation that can affect crowd workers' ability to control their work. Other ways to control crowd work are enforced by the rules, the technical system (Irani & Silberman, 2013), and the economic means (Bederson & Quinn, 2011). However, the technologies facilitating crowdsourcing initiatives also enable stronger communities and direct relations between consumer and producer. Parts of today's network-based creative economy are characterized by the humanistic values, that scholars claim Marx was looking for when he formulated the theory of alienation (Michael Hardt & Negri, 2000). For instance, Hardt and Negri (2000) argue that the new economy of affective labor and networked relations amounted to 'a kind of spontaneous and elementary communism.'

The tensions between on one hand an extreme alienation due to the division of labor in micro tasks enabled by crowdsourcing tools, and the humanistic values in peer-produced commons (Benkler, 2002) have also gained attentions from Marx scholars (Scholz, 2013). Media and communication scholars have used Marxist terminology to examine social networking sites more closely (Beverungen, Bohm, & Land, 2015).

Especially the definition of productive work in social media has been problematized, whether this should be consider free communication or a valorized social labor (Beverungen et al., 2015; Dean, 2005; Scholz, 2010; Stacey, 2008). Exploitation of workers in crowdsourcing is another theme where Marx theories have been used (Busarovs, 2013; Fuchs, 2014). However, there is a lack of a more structured analysis of crowdsourcing and commons-based peer production that focus on power relations from this perspective. Therefore in this position-paper we applied Marx theory of alienation to analyze a select number of platforms for crowd work to create a lens for understanding the particularities of different crowdsourcing contexts.

## 2 Marx theory of alienation

The capitalist system Marx described when formulating his theories was based on nineteenth-century industrial capitalist society. Marx (1844) argued that industry capitalism created alienation in society that operated on several levels:

- *Alienation between the producer and the consumer.* Instead of producing something for another person, the worker produces for a wage.
- *Alienation between the producer and the product of the work.* As the production is split into smaller parts and the worker becomes an instrument that makes a limited part of the whole, the pride and satisfaction of work is lost.
- *Alienation of workers from themselves,* since they are denied their identity. By losing control over the product of work and thus pride in labor, the worker is deprived of the right to be a subject with agency.
- *Alienation of the worker from other workers,* through the competition for wages, instead of working together for a common purpose.

A capitalist society, divided into classes of bourgeoisie and proletariat, stands in contrast to the ideal of communist society where there is no need for the state and class differentiation; instead everyone owns the means of production, and the principle of distribution is famously:

“From each according to his ability, to each according to his need.”(Karl Marx, 1875)

This has often been interpreted to mean that everything should be shared equally, but Marx says nothing about equality, rather he emphasizes the relationships between people and their abilities to contribute to production and society. A ‘communist society’ is a society where everyone is linked in a mutual interdependency with others and nature, and self-actualization is the driving force. In this perspective, production is a mutual exchange that strengthens individuals. The producers are strengthened by expressing themselves through their work, where the product is an expression of their subject and position in the world, and thus expands their power and range. As this expression of their identity is put into use, and used by other individuals, the producers also get the satisfaction of seeing their products in use, as a response to other people's human needs.

When considering modern crowdsourcing applications that are designed for “participative online activity in which an individual, an institution, a non-profit organization, or company proposes to a group of individuals via a flexible open call, the voluntary undertaking of a task” (Estelles-Arolas & Gonzalez-Ladron-de-Guevara, 2012), on the one hand, those technologies can further alienate people as the social production of data becomes commodified (see eg. the discussion about

communicative capitalism by Dean, 2005), but on the other hand they can also bring about the possibility of reducing the alienation between producer and consumer in certain areas of production by establishing direct links without any tangible intermediary (e.g. Wikipedia), and thus provide tools that destabilize capitalism (Stacey, 2008). Those applications can be seen as an expression of the talent of the producer and the needs of the consumer, but also as an act of recognition between humans, that is, a social relationship. To translate this into Marx's terminology, instead of alienation, stronger relationships are created:

- The relationships between the producer and the consumer. Instead of producing work for a wage, a direct relation to another person is developed.
- The relationship between the producer and the product of the work. As the product and the producer is the same person, and the producer has total control over her own work and can feel proud of this work.
- The relationship with herself. When production is mainly about expressing oneself and creating one's own community of followers, the worker is no longer a stranger to herself.
- Relationships between workers. By not competing for the salary, but working together for the common network that everyone depends on, relationships are strengthened.

In this perspective no one can own anyone else's work, or even their own work, as their own subject is dependent on all the others, and cannot therefore exist outside of this relationship.

### 3 Analysis framework

To identify a range of typologies useful for identifying relations, we have analyzed crowdsourcing platforms, focusing on how these tools support the relations in the crowd production. These roles can be clearly divided, as in the working relations on a crowdworking platform such as the AMT, or they can be the same as in a collaboratively developed Wikipedia post, where the consumer also can be the worker.

We start with a very broad definition of a crowdsourcing tool as an *ICT enabled, often large scale, collaborative production*. To enable a comparison of some crowdsourcing platforms from a participatory perspective, we started with fundamental questions focusing on worker and owner positions, description of the outcome of the work what we chose to call products, and how community is supported. The analysis addresses the following questions regarding relationships:

- Between the producer and the consumer: Is it a separation between the worker collecting the data and the consumer of the data, or do they know each other?

- Between the worker and the product: What is the underlying ontology? Is the result described as bits and pieces, a discussion, or an expression by a subject?
- Within workers; worker identity: Is the crowd worker an object that provides data without much control, or an active subject?
- Between workers: What is the available tool support for community? Does the interface express certain group awareness? Can workers communicate shared interests or establish a community?

We then adjusted these definitions to better mirror the practices in the cases and to develop typologies grounded in the empirical contexts. We have in this pilot study analyzed six cases that were chosen because they represent a diversity of crowdsourcing tools and contexts:

1. In OpenStreetMap (OSM) participants contribute to the development of an online map and also to the development of the mapping tool.
2. In Waze participants contribute to a real-time navigation application with traffic information collected through their mobile devices, active sharing of traffic situations and also to the development of the map by editing e.g. roads and houses.
3. In the citizen science framework PartS participants contribute by capturing data with their mobile devices during long time studies.
4. In the case of crowdsourced law reforms in Finland participants were invited to contribute with their knowledge on law reforms about off-road traffic and housing company management.
5. In the case of Råntekartan (mortgage interest rate map) journalists used a crowdmap on leading daily newspaper's website to crowdsource mortgage interest rates in Sweden. The information is displayed on the crowdmap, and the journalists published dozens of news articles based on the crowdsourced data.
6. In Amazon Mechanical Turk, participants are in fact part of a crowdsourced labor market, create knowledge, produce data, solve problems as well as act as test subjects in crowdsourcers' projects (for instance, for behavioral studies).

## 4 Preliminary result

Most of the aforementioned tools provided multiple types of worker positions. When we compare the different types of information that are produced by these means of production, we identify different ways of looking at the data and the production process. In the case of driving around with a mobile device producing GPS coordinates, the facts are rather simple and undeniable. Anyone with the same device could get similar data driving the same way. On the other hand, also

geo-mapping tools like OSM need a diversity of users to cover the map collecting multiple facts from different locations and experiences.

On one level worker's identity can be seen as a mere passive object whose movement or surrounding becomes recorded with geo-mapping or sensing functionalities, while moving or driving around. On another hand users also create legitimacy: The more contributors or participants in data collection, the more trustworthiness is created for the result. Users can also contribute more actively with data, like in the citizen science project PartS, where users not only provide with sensor data, but also acts like instruments contributing information via questionnaires, or like in the case of *Räntekartan*, where journalists crowdsourced mortgage interest rate information from over 50,000 participants. In Waze the constraints to what the user actually can do are also precise. The aim is to improve a map and there is a toolbox of shapes and categories to add on. The participant is an instrument that submit/develop documents. However, within these constraints the participant is seen as an actor with expertise about a certain area and that is the expert that controls the quality of the map. In the case of crowdsourced off-road traffic law and limited liability housing company law in Finland the workers/contributors can for example be instruments that provide information for a better policy: writing down their knowledge about the issue by addressing the prompt on the crowdsourcing platform.

The constraints are, however, not always absolute, but something that can be negotiated and developed in a process. The instrument can also be an active subject that communicates and co-produce the process with others on the platform, including peer-producers and crowdsourcers such as civil servants in crowdsourced law-reforms. Likewise, the development of OSM takes place in discussion forums and conferences. Also within the application every edit is negotiated in comment functionality. In the PartS tool, participants are also consumers, having the option to create empirical studies by their own, which capture as well as analyze mobile device data, thus taking the role of owner/researcher controlling the process.

The relation between the worker and the consumer varied a lot in the analyzed cases. One position was to not provide any mean of communication or information about users, like in the citizen science project where this was avoided for ethical reasons. In AMT, users are seen as competitors, and the tool a market mechanism that distributes the work provided by a client. Another position is that communication means are not provided, but users reputation is known, and users might participate due to a common denominator. In PartS the researcher can also communicate directly and anonymously with the contributors. Other tools put a lot of effort into developing bonds between workers, and workers and consumers. In Waze, in addition to the map there are a discussion forums that provides support to a large community of Waze workers, and it also enables Waze users to

bond with users in other social networks. Workers have a public profile that shows their activity on the discussion forum.

On the actually map it is all about helping strangers, and thus to contribute to an abstract community.

In Waze, even though anyone can contribute to the map, there is an idea that people with real experience of a site are more experts than others. The products of the work can best be described as reports and edits, where the editing is a potentially deliberative dialogue with everyone else that contributed to the post. In the case of the crowdsourced law reforms the production of data takes place in idea and comment submissions and in the dialogues and negotiations that develop knowledge about the consequences of the law reforms. In these deliberative

Mode of production	Worker – consumer	Worker – products	Worker identity	Worker – worker
Crowd capitalizing	Separation	Bits and pieces	Passive object	Alienation
Crowd instrumentalizing	Reputation	Contributions	Instrument	Common denominators
Crowd deliberation	Recognition	Dialogues	Expert	Public
Relational crowd	Bond	Agenda	Subject with agency	Community

Table 1 **Worker relations with corresponding modes of productions**

processes transparency is important, the OSM for example describe every edit in history and any conflicts are handled after an open protocol. In PartS secrecy is instead essential for participation.

These different relations to the consumer, product, self and other workers, can be described as different ontologies or modes of productions. From an idea of *crowd capitalizing* where the worker as a random *passive* object from which a bits and pieces are sourced, to *crowd instrumentalization* where the crowd provides data from multiple realities, to *crowd deliberation*, to a performed reality of the *relational crowd* where the worker is the consumer and the owner of the means of production, and the product is an expression of self identity. Table 1 summarizes these relations with corresponding modes of productions.

## 5 Conclusion

In this position paper, we are examining the role of the crowd workers, the crowd work consumers, the nature of their relations, and the crowd-produced product, using Marx theory of alienation, to identify a vocabulary to express types of participation in crowdsourcing.

We suggest that these types of participation can be described as different levels of alienation where the worker, the consumer, their relations, and products are connected in four modes of production:

- **Crowd capitalizing:** A functional mode of participation, where the participant is viewed as a random object, that provides facts and lend legitimacy to the process. There are no channels of communication.
- **Crowd instrumentalizing:** In this more instrumental mode of participation, production is enabled by the tool, where participants are instruments that make contributions for a certain cause. The individual is aware of the crowd.
- **Crowd deliberation:** In a more consultative mode of participation, participants are viewed as experts and participation is a way to get in tune with public views and values, garner good ideas, and develop consensus through deliberative dialogues. The individual has a communication channel to the group, be it a newspaper, a mailing list or similar forum that makes communication with the group possible.
- **Relational crowd:** In a more performative transformative mode, participants are both producers and consumers, as well as owner of the means of production, peers that co-produces new theories and have political capabilities. The community is mediated in a public sphere and participants are connected in mutual relations.

These different modes are, as our cases show, not mutually exclusive, but co-exist within the same tools and processes. However, these concepts express different aspects of participation. In our ongoing work, we will expand the case base to more realms and develop our model further, to identify similarities and differences between contexts. We will also examine the impact of the crowdsourced production modes for democratic ideals, such as transparency, inclusiveness and accountability.

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# Participatory Urban Media: Promises and Challenges

Nassim JafariNaimi

Assistant Professor, Digital Media Program, School of Literature, Communication and Culture

*nassim@gatech.edu*

**Abstract.** What vision of social interaction is sought and advanced through participatory urban media? In this workshop paper, I put forward two dominant ways that social interaction is characterized in the discourse around the design of participatory urban media, broadly construed as *material* and *political*. Each of these visions is illustrated through a recent case that reveals its strengths and limitations. I further draw on these cases to highlight the potentials and challenges of the kinds of social interactions that are sought and cultivated through the integration of digital media on physical spaces.

## 1 Introduction

More than thirty years of research on networking technologies has shown that the relationship between communication and community is broad and complex leading to more nuanced understandings of mediated social interaction. This is manifest, for example, in case studies of crowd-based and participatory digital applications with aims as varied as learning, civic engagement, journalism, or collective intelligence. This research has challenged the notion that social interaction and community engagement are unconditionally improved with access

and use of digital technologies and points to some of the challenges such as privacy, exploitation, groupthink, or alienation.

Participatory urban media are a relatively recent addition to the social media landscape. These applications enable people to share and access locally relevant information in situ, adding a digital dimension to the urban environments. In doing so, it is argued, they have the potential to change how people connect with their local community by raising awareness, and changing perceptions (e.g., Dalsgaard, and Halskov 2010; Foth 2008; Schroeter et al. 2009; Salim and Haque 2015).

Participatory urban media are gradually finding their way into the mainstream media partly due to the ubiquity of smart phones equipped with high-resolution cameras and wireless access. For example, German Green Party's Berlin chapter launched a mobile app that enabled people to see videos linked to political billboards throughout the city specifically related to the city's environmental issues (Kirkpatrick, 2011). People were encouraged to comment on these locations and engage in exchanges with the party on specific issues related to those locations. AR Occupy Wall Street (2011) is a Mixed Reality (MR) application that was developed during the 2011 Occupy Wall Street movement in the United States, enabling users to post political banners in locations that were closed to protesters such as the New York Stock Exchange.

The above are examples of a range of experimental applications that seek to connect individuals, foster collective action or facilitate social interaction through the design and deployment of urban media. As expected, these applications advance a diversity of visions about what forms of social interaction are desired, ideal or worth cultivating. But are these applications part of the solution to the problems of communication and community? Or, do they instead suppress communication and further distance and disintegrate communities?

## 2 Material & Political Visions of Social Interaction

The approaches toward facilitating social interaction in urban participatory media are diverse with subtle differences that warrant careful consideration on a case-by-case basis. At the same time, finding similarities and mapping thematic connections of specific cases has the potential to reveal patterns and highlight what may be broadly missing or underrepresented in mainstream discourse. Looking closely, we might observe a grouping of design cases based on visions of social interaction that are central to their design. More specifically, in contemporary experiments the social is often framed in either *material* or *political* terms – broadly construed as illustrated in the following examples.

One understanding of social that animates many participatory urban media experiments is the possibility of connection and information exchange through urban networks; and the potential of crowds to contribute data in various forms to be then aggregated and used for multiple (local) purposes. In doing so, it renders it in material terms. This approach is exemplified in a project titled *Give a Minute* (2010) by *Local Projects*. *Give a Minute* launched in Chicago in November 2010 and subsequently extended to several other cities. *Give a Minute* is positioned as a *digital town hall meeting* but one that is *more accessible and efficient*. Through signs and billboards distributed in the city, the project invites citizens to respond to an issue or question using Twitter as the main channel of communication.<sup>1</sup> The campaign is promoted through transportation networks, newspapers, and public billboards, soliciting ideas from citizens about strategies that affect how they navigate the city in the future. The project's website describes it in the following manner:

*Give a Minute is a new kind of public dialogue. It only takes a minute to think about improving your city, but your ideas can make a world of difference. Give a Minute is an opportunity for you to think out loud; address old problems with fresh thinking; and to enter into dialogue with change-making community leaders. (2010)*

The dialogue envisioned by *Give a Minute* is minimal, with a focus on quick provocations for feedback and ideas. Questions such as “Hey Chicago, What would encourage you to walk, bike and take Chicago Transit Authority more often?” are posed. Viewers are encouraged to respond to these questions with the aim of informing the decision makers in the city. Aligned with an understanding of social interaction as connectivity, *Give a Minute* takes its starting point in the recognition of disconnect between city officials and citizens. This disconnect is framed as lack of time, access, and interest, and seemingly overcome through technological means.

*Give a Minute* is representative of a class of applications that seek to transcend the limitations of time and space, connecting individuals and groups networking and crowdsourcing mechanisms. In this model, locative participatory media are regarded as an extension of the networking infrastructure. The consideration of social interaction is left at the technical level, broadly understood as *connectivity* and remaining agnostic to specific applications and their social and cultural setting.

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<sup>1</sup> To date, there have been no published reports documenting how widely this project was used by the citizens or whether or not the local governments found useful information or acted on any of the ideas submitted through the application.

Another common understanding positions the social as the capacity to voice individual and collective narratives; to form new alliances and question common beliefs or practices; and to facilitate encounters as a way to challenge hierarchical social and organizational structures and their practices. Here, it is argued that participatory urban media enable the recording and retelling of interpretative commentary about place, such as street corners, pathways, and communities that are generally hidden or underrepresented in the mainstream media or popular narratives of these locations. It is also a suitable medium for fostering new modes of encounter or even political dissent, especially ones that challenge common practices or foster critical reflection.

Yellow Arrow is one of the classic cases exemplifying this perspective. Created by Christopher Allen, Michael Counts, Brian House, and Jesse Shapins, its aim was to “give voice” to hidden stories and interpretations of a city, referred to by some as a platform for a kind of geographic blogging.

Originally introduced in New York, a series of arrow-shaped yellow stickers were placed on street signs, storefronts, buildings and monuments, each displaying a unique code. Viewers could post and retrieve messages, tagging locations with poetic or informational snippets with the aim of sharing and experiencing *the secret life of the city*. The stickers were regarded as an opportunity for people to shift their and others’ relations to the urban space by engaging with those who experience the same spaces in ways that are both similar and different. The collection of annotations sought to re-imagine the urban landscape as a living site of reflection and storytelling about the many ways that the urban environment interacts with individual and collective histories and stories, while at the same time enabling new ways of touring and experiencing the city.

Yellow Arrow is illustrative of a class of urban participatory media that seek to capture, collect, and share diverse voices and/or provide the occasions for encounter with others who are the same and different. The aims of open interpretation, critical reflection, encounter, and political dissent continue to be seen throughout the multiple variations of artistic practices of urban participatory media applications.

### 3 Questions and Challenges

The examples in part 2 are by no means exhaustive of the range of ways that participatory urban media have been positioned in relation to social interaction. However, they are illustrative of two interpretations of social interaction that are dominant in discourses around them: The first has a broadly technological focus and posits social interaction in terms of extending networks of communication to enable crowd-sourced data and applications. In so doing, it renders social

interaction in material terms. The second views social interaction in political and critical terms, focusing on giving voice and fostering critical reflection with the aim of challenging dominant structures of power and facilitating more egalitarian, even non-hierarchical social forms. It is clear that each of the above visions has limitations, some which are surfaced in the above examples. However, each of the two visions can also be seen as a starting point for opening up the discussion of participatory urban media in more nuanced and engaged ways.

More specifically, the material interpretation of locative participatory media, I argue, positions it as an extension of networking technologies, thus pointing us to the ways that it can be understood as *infrastructure* linking it to the body of literature in STS. As infrastructure and not unlike roads and bridges it has the ability to both *fragment and recombine* the social fabric of neighborhoods, communities, and cities. In doing so, the understanding of participatory urban media as infrastructure foregrounds questions related to access and equity. For example, we might ask how this new infrastructure relates to the existing terrain and other infrastructures already in place and in what ways the introduction of this new infrastructure disrupts and reinforces existing patterns of connectivity and interaction.

The political interpretation of locative participatory media views it as an instrument for voicing alternate views and facilitating critical reflection. In so doing, it positions it as a *medium* to bring marginalized voices, themes, and stories to the center of attention while at the same time decentering those themes, stories and voices that are most common, powerful, or mainstream. This understanding of participatory urban media foregrounds questions related to framing, transparency, and (digital) literacy. For example, we might ask how the form and placement of the artifact shapes who participate in the content creation and how, bringing to fore many issues that have been well-researched and recognized in the context of other non-locative applications such as Wikipedia.

## 4 Moving Forward

Locative participatory media are a new addition to a range of digital products that aim to facilitate social interaction through the use and deployment of networking technologies in location. However, conception of social interaction vary significantly from case to case, with stark contrast in what is achieved socially, for whom, and toward what purposes. A close reading of cases confirms that location-based technologies do not unconditionally produce social ties or foster the desirable qualities often associated with social connections such as learning, civic capacity, or the will and the way to participate in collective action and problem solving. There is indeed no simple recipe for cultivating democratic ways of being and working together.

With this understanding, the key question at the forefront of design and criticism as we deploy and employ such technologies is: **What vision of social interaction is sought and advanced through this design and does this vision appropriately characterize and address the problematic situation at hand?**

Foregrounding the above question compels us to derive insight from the plurality of conceptions of social interaction developed in other spheres to advance the design and criticism of locative participatory media. Moreover, we might view them as rich sites of discovery and inquiry about community engagement and participation. Viewing locative participatory media as such is also an invitation to devise and adapt methodologies that we employ to study them, especially those that enable us to ask questions about both their short and long term effects to engage their social, political, and cultural impact.

## 5 Acknowledgements

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# Typologies of Learning in Open Online Collaborative Communities

Carsten Østerlund,\* Gabriel Mugar, Corey Jackson, Kevin Crowston  
Syracuse University School of Information Studies

*Email: costerlu@syr.edu\**

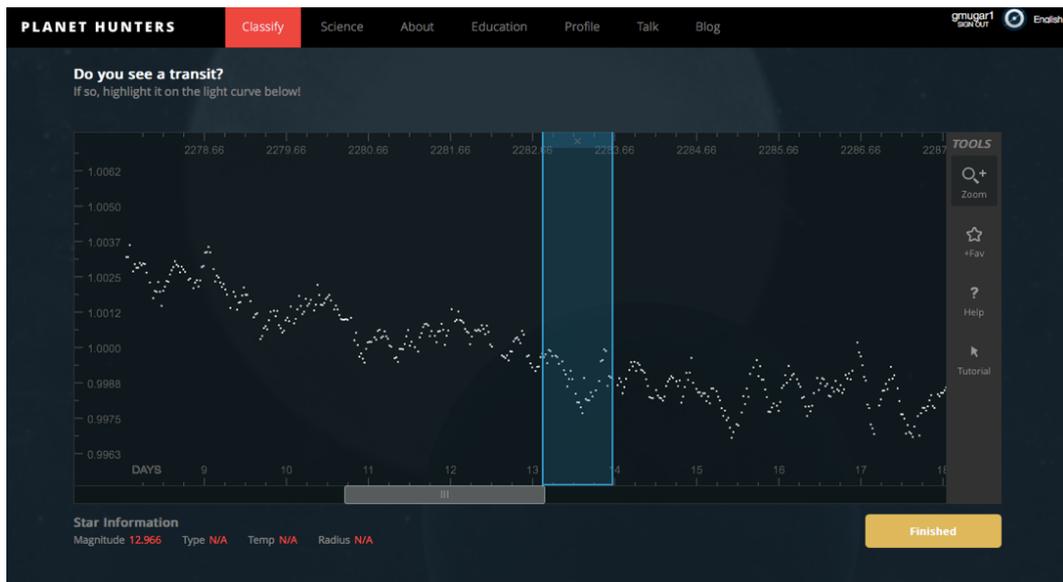
**Abstract.** How online community members learn to become valuable contributors constitutes a central question if we want to map participation in crowdwork. The literature tends to highlight participants' access to practice, feedback from experienced members, and relationship building in peer production sites. However, not all crowdsourcing environments offer participants opportunities for access, feedback, and relationship building (e.g., Citizen Science). We study how volunteers learn to participate in a citizen science project, Planet Hunters, through participant observation, interviews, and trace ethnography. Drawing on Sørensen's sociomaterial theories of presence, we extend the notion of situated learning to include several modes of learning. The empirical findings suggest that volunteers in citizen science engage more than one form of presence. Communal relations characterize only one form of learning. Equally important to their learning are authority–subject and agent-centered forms of presence.

# 1 Introduction

How new contributors to open online collaborative projects learn to participate is a long-standing and central question in the context of digital labor. Many of these studies draw on situated learning, which emphasizes learning that is contingent on novices observing and participating in practice as well as interacting with journeymen. For example, Bryant, Forte, & Bruckman (2005) examines how new Wikipedia editors spend their time observing the work of other editors before participating. Halfaker, Kittur, & Riedl (2011) explores how feedback from experienced editors can predict the quality of long-term participation, and Ducheneaut (2005) questions how newcomers' relationships with experienced participants impacts long-term participation.

While many peer production projects like Wikipedia fit nicely within such a learning framework by allowing newcomers to interact with journeymen and observe and participate in practice, this model becomes problematic when applied to online projects where there is limited access for observing practice or interacting with journeymen. We are prompted to ask how learning takes place in projects where newcomers cannot easily interact with journeymen or observe practice and receive feedback.

To explore this question, we turn to Planet Hunters, an online crowdsourced citizen science project at Zooniverse.org. In Planet Hunters, laypeople are tasked with analyzing light curve data from the Kepler space telescope for the presence of orbiting planets (see figure 1). Unlike Wikipedia, participants in Planet Hunters are not able to see the work that other users have done. This lack of access to observe others' work is a deliberate design by the Zooniverse developers to ensure independent responses, eliminating the possibility that one user's classification decision could affect the decisions of others. Indeed, this model of eliminating bias extends to the majority of the over 40 projects at Zooniverse.org. Furthermore, there are a limited number of journeymen in the project to guide the work of new participants. Given the inability to observe work and the scarcity of journeymen, we investigate how participants learn to contribute to the project where key features of situated learning are absent.



**Figure 2 Classification Interface**

Taking our point of departure in practice theory (Feldman & Orlikowski, 2011; Østerlund & Carlile, 2005), we combine insights from studies of learning in online communities with a sociomaterially informed theory of learning articulated by science and technology studies scholar, Sørensen (2009), as a way to consider how situated learning may develop beyond the formation of communities of practice. By drawing on sociomateriality to explore how learning can extend beyond communities of practice, we consider multiple forms of learning that include many types of relations, some relying on human interaction and some not. This also allows us to reach beyond studies of intersubjective meaning or meaning produced between humans towards studies of how humans are with materials in the context of open online collaborative communities.

## 2 Theory

Drawing on the work of Law and Mol (1994) Sørensen proposes a theory of presence, which examines the sociomaterial arrangements through which certain modes of participation are made available (Sørensen 2009:138). In her research on a blended learning classroom, where students participate between a traditional classroom setting and an online virtual world, Sørensen identifies three modes of participation or presence: Communal, authority–subject, and agent-centered presence.

Communal presence is most similar to the theory of situated learning, where knowledge and learning are validated through joint engagement in practice and where participants become increasingly engaged in a community as they become fluent in tasks, vocabulary, and organizational principles. Communal presence reflects prominent approaches taken in current research on newcomers to online

communities that focuses on participants' access so they may observe ongoing practice, feedback, and relationship building with experienced members. The second form of presence is authority–subject, where the learner occupies a subordinate and fixed position in relationship to experts. For example, Sørensen demonstrates how authority–subject presence is performed in a classroom, with the teacher occupying the front of the classroom, controlling the chalkboard and the textbooks, and the students facing the teacher, following instructions written on the chalkboard and reading the books they are told to read. Finally, in agent-centered presence learners are engaged in a form of playful exploration or bricolage, where students bring together various resources from different environments to impact their participation in the project. With agent-centered presence, each previous step influences the next and no single authority dictates the broader experience of the learner.

### 3 Data Collection

The empirical data is from a multi-year NSF-funded research collaboration with Zooniverse, a collection of online citizen science projects with over 40 projects and 1.4 million volunteers. Drawing on the practice perspective in social theory (Reckwitz, 2002; Schatzki, 2001), we conducted a qualitative analysis of the six months of participant observation data, trace data, and 21 semi-structured interviews with newcomers, experienced participants, and project scientists, focusing on the nexus of participant work practice in which social and material entities are entangled in the enactment of learning. In particular, we focused on data from interviews, traces, and observations that reflected the changing roles of artifacts and people as participant practice changed over time. Data from the ongoing study were independently analyzed by three doctoral students and then compared to identify themes about newcomer enactment of learning. These findings were discussed at weekly research meetings where results from the various data sources were triangulated.

### 4 Findings

**AUTHORITY–SUBJECT PRESENCE:** We observe the production of an authority–subject presence between the citizen scientists and the project scientists when newcomers express a need for expert guidance on how to contribute. For instance, we see newcomers moving back and forth between doing the work of analyzing light curves and, when they are uncertain about how to do work, revisiting the tutorial, reviewing the science page (see figure 2.), or looking for quick answers in the help feature. The tutorial, science page, and help feature are all resources managed exclusively by the science team, allowing the citizen

scientists to imitate and reference this tested knowledge in their work. The science team keeps tight control over this immutable region of knowledge, which then allows them to make scientific knowledge claims as they turn the citizens' work into scientific articles. Likewise, newcomers' engagement in the main classification interface often takes the form of authority–subject presence. The focus of the volunteers is drawn to a space controlled by the project experts, guiding and constraining the activities of newcomers by giving them instructions on what data to look at and options on how to classify the data. By contributing exclusively through the classification interface, newcomers are isolated in their work, oriented only towards the instructions of the scientists and not interacting with one another.

**COMMUNAL:** Whereas some participants appear to limit their work to answering a set of questions predetermined by the classification interface, some, prompted by their own curiosity, expand their range of activity by leaving comments and questions in the talk and discussion features. In our interviews, we found that for some participants, the talk feature played a role in what they describe as an indirect collaboration with the science team by building and organizing knowledge artifacts that are useful for the scientists. To these participants, Talk serves as a space where they present their evidence and reasoning to other participants about why particular data objects may be worthy of further investigation.

In the performance of communal presence, participants break from the isolated activity of authority–subject presence and reorient their attention towards a setting in which participants become mutually aware of each other's work and work towards building upon one another's efforts. However, in some talk situations, we found that the same participants may oscillate between authority–subject and communal presence. For example, while many experienced users see a significant decrease in their use of Help and the science page, Amy, a participant with over 10,000 classifications, occasionally refers to the science page as a reminder of project practice rather than as a learning resource. Other shifting relationships include how the classification interface remains the workplace monitored by the authority of the science team, but also becomes a source of images around which discussion and talk can resonate.

The Science

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## Transits

**The Transit Technique for Hunting Planets**

Transits occur when a planet passes in front of its host star as viewed from the Earth. A portion of the star's light is blocked out, and the brightness observed decreases. The Kepler mission measures the brightness of stars with such incredible precision that it is sensitive enough to detect transits of planets approaching the size of the Earth. At Planet Hunters, we need your help in the hunt for extrasolar planets (exoplanets) by highlighting potential transits in a star's light curve, the time series measurements of the star's brightness, in the web interface. We use the combined assessment of several volunteers reviewing the same 30-day segment of a Kepler star's light curve to identify transits.

Get Involved

Join us in finding the many worlds out there. Are you ready?

[Get Started](#)

Connect

Follow the [Planet Hunters Blog](#), [@planethunters](#), and the [Facebook Page](#) to keep current with the latest findings. Share and discuss your work with others with [Planet Hunters Talk](#).

Figure 3 Science Page

**AGENT CENTERED:** By taking part in Planet Hunters, many of the longtime amateur astronomers that we interviewed encounter aspects of astronomy research that they are not familiar with. Referring to the tutorial on using the classification interface or reading the science page to learn more about the process of planet hunting is helpful, but many of the participants we spoke to use such moments of unfamiliarity as opportunities to expand their knowledge about astronomy. For example, some users will use Google, visit Wikipedia, or go to an astronomy education website hosted by a large state university to examine key terms. Some go so far as to take open online courses to address particular facets of the Planet Hunters project and then return to apply what they have learned. In all of these examples, we observe how Planet Hunters motivates participants to learn more about astronomy so that they can be more knowledgeable about the project they are participating in.

Learning to participate in Planet Hunters is therefore not uniquely bound to the authority of the Planet Hunter scientists that manage the project. Rather, in the broader practice of amateur astronomy and citizen engagement in scientific research, we observe the newcomer as bricoleur, building their learning experience across multiple sources in a variety of settings, such as in interpersonal interaction with other citizen scientists, searching the web for definitions of terminology, and taking open online courses. This activity of bricolage is what Kallinikos would describe as a “playful exploration” in which the bricoleur draws

on past solutions and a “miscellaneous toolbox” to address new problems and challenges (Kallinikos, 2012).

When we observe how Planet Hunters is situated within a broader practice of amateur astronomy, we decenter our focus on the project and find the agency of participants as it relates to their motivation to learn more about, and contribute to, astronomy research. In such a setting, we find that participants in Planet Hunters are not defined solely as citizen science volunteers functioning within the project platform; rather, they are amateur astronomers, moving back and forth within the project to learn more about their passion and apply what they know.

## 5 Discussion

The present study suggests that there exists not one but multiple and overlapping forms of presence in crowdsourcing environments. We believe that this calls for additional research into the particular ways participants tie together their presence in and across those settings.

For example, while our findings unpack a well-defined periphery of participation, where learning and involvement are tightly controlled by experts, we also find that newcomers exert agency and control over their participation when they described to us how they situated the project within their broader objectives for contributing to and learning more about astronomy research. The co-occurring power dynamics, where a user is at once a subject to the authority of experts but also an active learner who repurposes the scientists goals to fit their own needs, suggests a compelling tension in both the newcomer experience and management of the project that needs further exploration. Indeed, we believe it should encourage researchers to operate with more than one unit of analysis as they explore participants’ learning. In other words, we may analyze learning from the unit of the individual as well as the unit of the community. One does not exclude the other. For instance, future research in Planet Hunters could investigate how participants engage more broadly in science. What are the places they go to, and how do they bring those together with their communal and authority–subject forms of presence? For instance, several participants described how they stumbled upon Zooniverse and Planet Hunters as part of their interest in science, which involves a continuous exploration of various resources and settings, including magazines, news media, web resources, articles, and local astronomy clubs. An outside authority does not guide this playful exploration, but rather, it is their own process. In short, further research is required to fully understand how participants manage to integrate multiple forms of presence to stimulate their desires and goals.

Finally, it is worth noting that crowdsourcing projects like Planet Hunters are qualitatively different from peer production projects like Wikipedia, which have been covered extensively in newcomer research. As Brabham (2013) points out,

peer production projects like Wikipedia are managed by the volunteers who can determine the direction and purpose of the project while crowdsourced projects are driven by a small group of experts who determine the work that the crowd will engage in. While our analysis does not explicitly compare learning between crowdsourced projects and peer production projects, the key features of newcomer learning established in current research that we identify as missing from the newcomer experience in Planet Hunters does imply a key difference across project governance typologies.

## 6 Acknowledgments

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# A Collective Action Inspired Motivation Framework for Crowdsourcing

Huichuan Xia  
Syracuse University  
[hxia@syr.edu](mailto:hxia@syr.edu)

Yun Huang  
Syracuse University  
[yhuang@syr.edu](mailto:yhuang@syr.edu)

Jennifer Stromer-Galley  
Syracuse University  
[jstromer@syr.edu](mailto:jstromer@syr.edu)

**Abstract.** In this paper, we propose a framework of motivations about why people participate in crowdsourcing without monetary incentives. The framework is based on the four pillars of crowdsourcing as well as the motivations referenced from collective action studies. We argue that crowdsourcing is not only about collective intelligence but is also similar to collective action, particularly when there is no monetary incentive. We discuss the commonalities between crowdsourcing and collective action. The framework provides a different research lens on crowdsourcing relative to the prevailing economic, psychology, and information system perspectives that form prior scholarship in this area.

# 1 Introduction

Crowdsourcing as an approach to activate or use the wisdom from a large group of people to solve problems has existed for a long time. For example, the collaborative effort by hundreds and thousands of amateurs to create the Oxford English Dictionary under the appointee of James Murray in 1879 could be regarded as a primitive crowdsourcing project (Sally Ellis 2014). However, as a concept, crowdsourcing has only recently been defined (Howe 2006). Howe (2006)'s definition, which is proposed in the context of business, implicates that participants to crowdsourcing activities may have heterogeneous backgrounds and diverse purposes other than for mere commercial interests. A more recent and integrated definition in academia on crowdsourcing is coined by Estellés-Arolas, E. and González-Ladrón-de-Guevara, F. (2012) who explicitly point out that participants in crowdsourcing will receive “*the satisfaction of a given type of need, be it economic, social recognition, self-esteem, or the development of individual skills.*” It further assumes that participants' motivations to crowdsourcing are multi-faceted than merely money oriented.

Monetary incentives are typically used to encourage people to participate and contribute to crowdsourcing (Frei, B. 2009). However, people's motivations are often more complicated than just money. Kaufmann et al. (2011) find that monetary payoff only constitutes a small portion of motivations for people to do crowdsourcing task on Amazon Mechanical Turk (AMT). Besides money, there are intrinsic motivations like the sense of enjoyment and community; and extrinsic motivations such as commendation from the task initiator (Kaufmann et al. 2011). There are a few studies that have proposed motivational theories for crowdsourcing activities, and they aim to adapt theories from various disciplines, such as the transaction cost theory in economics. As an example, it is found that in paid crowdsourcing, such as AMT, workers' reservation wage (the smallest wage a worker is willing to accept a task) is log-normally distributed (Horton, J. J. and Chilton, L. B. 2010). However, we believe that crowdsourcing is more like an umbrella concept or a generic phenomenon that have several variables or sub-categories, such as different types of crowdsourcers, for-profit vs. non-profit, monetary vs. non-monetary incentives. Hence, it could be a problem to implement a specific theory from another discipline to explain crowdsourcing as a generic phenomenon. There are also studies that examined non-monetary incentives for people to participate in crowdsourcing activities yet they tend to fall into too narrow contexts and are primarily empirical based, such as the work from Alam, S. L. and Campbell, J. (2012), who theorize crowdsourcing incentives in the context of GLAM (galleries, libraries, archives, and museums).

There are studies that relate crowdsourcing with collective intelligence and argue that crowdsourcing is an instance of collective intelligence. For instance, Eric Bonabeau (2009) put crowdsourcing as an application under collective

intelligence. But in our paper, we propose that crowdsourcing not only can be seen as collective intelligence but also can be investigated from a collective action perspective, which to our knowledge, is under discussed. We posit that collective action and crowdsourcing share several commonalities and the motivational factors in collective action could inspire and help theorize motivations for crowdsourcing. We hope that our work could contribute to the discussion in Starbird's (2012)'s paper about what "crowdsourcing obscures" and resonate with her argument that "current understanding of crowdsourcing may not be broad enough to capture the diversity of crowd work in disaster" (Starbird's 2012).

## 2 Comparing collective action and crowdsourcing

Collective action is interpreted as "people doing something together, and it is assumed that this involves their having a collective intention to do that thing together" (Margaret Gilbert 2006). Collective action is a broad term usually used in social and political science. An important feature of collective action is that usually it is not self-interest or money driven but is carried out for public good or group interest (Mancur Olson. 1965). As aforementioned, crowdsourcing can also be initiated without monetary rewards and it also can be implemented for public good and social betterment (Alam, S. L. and Campbell, J. 2012) (Starbird, K. 2012). Apart from this general commonality between collective action and crowdsourcing, we compare them in detail in four aspects: the initiator(s), the participants, the task, and the platform. These four aspects correspond to the four pillars of crowdsourcing: the crowd, the crowdsourcer, the crowdsourcing task, and the crowdsourcing platform (Hosseini, M. et al. 2014).

### The initiator(s)

There are salient similarities between initiator(s) of a collective action and crowdsourcing. Both can be initiated by an organization or by individuals. For instance, a collective action can be initiated by an organization such as the American Legion, or it can be initiated by individuals, even a single person, as can be seen on the MoveOn.org - an online platform for various petitions. Likewise, a crowdsourcing activity can be initiated by an organization, such as Ushahidi - a crowdsourcing platform for social movements, or it can be initiated by individuals, such as researchers who publish a survey on Amazon Mechanical Turk.

### The participants

There are five distinctive features of the crowd (participants) in a crowdsourcing activity: diversity, unknown-ness, largeness, undefined-ness, and suitability (which means suiting a given purpose, occasion, condition etc.) (Hosseini, M. et al. 2014). From these features, we could also see several similarities between participants in collective action and crowdsourcing activity. First of all, both of them could have a large number of diversified and un-defined

participants. For example, Wikipedia is created by a large number of contributors with various backgrounds, and Civil Right movement in the 1960s had participants from different demographics. Secondly, by unknown-ness, the participants to a crowdsourcing activity are usually anonymous (Hosseini, M. et al. 2014), which is also common in collective action, such as on MoveOn.org, where many petitions signed by people are in anonymity.

#### The task

We compare the task for a collective action and a crowdsourcing activity in the following respects: purpose, solvability, contribution type, and driven force (Hosseini, M. et al. 2014). First, the purpose for both collective action task and a crowdsourcing task can be diverse and multiple, ranging from social issues to individuals' requests to solve some problem they concern about. Second, in terms of solvability, a crowdsourced task is usually simple enough for humans to solve but might be too complicated for a computer to solve. For collective action, likewise, the task usually needs human effort and devotion, which cannot be substituted by technology, because collective action usually calls for participation in person at scene.

Third, in terms of contribution type, both crowdsourcing activity and collective action could be contributed from individuals, or by a group of people as a team, e.g., a branch of advocacy campaign in a certain district and a team of contributors to a certain article in Wikipedia. Also, the content of the contribution in both crowdsourcing task and collective action usually involve human intelligence, effort, donations, and time. Finally, in terms of driven force, crowdsourcing is user-driven, which means that it is powered or controlled by participants (Hosseini, M. et al. 2014); in parallel, collective action driven by traditional organization is more or less eclipsed by those driven by individuals or groups of advocates (Karpf, D. 2012).

#### The platform

The platform of collective action and crowdsourcing activity can be roughly the same, as both of them can be supported by and launched on the Internet or mobile devices. For example, collective action such as political campaign is transforming from professional lobbyists relying heavily on the relationship between advocacy elites and politicians, to net-roots who are more likely to be in a networked community of online political activists (Karpf, D. 2012). Similarly, crowdsourcing can take place on the Internet, or on a smartphone.

### 3 A Motivation Model for Crowdsourcing

According to the similarities between crowdsourcing activity and collective action, we propose a framework for crowdsourcing activity based on the four pillars as well as the motivations for individuals to participate in collective action. To start with, we propose that the four pillars of crowdsourcing should not be

independent to each other, but inter-related with each other. If initiator(s) and participants are not closely connected with other, it would be hard for initiator(s) to communicate the task clearly to participants, and what participants do may not very well fit the goal of initiator(s). If crowdsourcing task and initiator(s) are not closely integrated, there would be a danger that the result of crowdsourcing strays from the task plan. If task is just loosely connected with participants, the engagement of crowdsourcing would be low and quality of outcome cannot be guaranteed. Finally, if platform is not firmly integrated with the other three pillars, the communication of people in crowdsourcing and implementation of task would be impeded.

Second, several motivational factors from collective action could bridge these four pillars together. Personal factors motivate initiator(s) to setup a crowdsourcing activity, which might be for public good, advocacy campaign, or non-profit. Such factors might be altruistic e.g., personality of empathy, compassion, and concern for other people (Batson, C. D. et al. 1995); and might be for “universal orientation” e.g., compassion for strangers, or even humanity as a whole (Omoto, A. M. 2010). These factors would attract participants to engage in the crowdsourcing activity and connect them with initiator(s). As an example, Causes (<https://www.causes.com>) is a crowdsourcing platform that aims to gather people’s intelligence and action for various advocacy purposes. Individuals, political agency or non-profit organization could all start a campaign free of charge, and we can see many participants join Causes out of empathy for various inequality issues such as women’s rights.

Interpersonal factors such as reciprocity (Kahan, D. M. 2003) that drive collective action, could also motivate initiator(s) and participants to engage in crowdsourcing activity and attach them more closely to each other. Interaction between initiator(s) and participants, as well as within participants themselves would blur the boundary and let them be more committed to the task (Bimber, B. et al. 2012). For instance, Waze users interact to each other in real-time traffic and could help figure out the best route. In this case, the boundary between initiator and participants themselves are blurred, and they are motivated by and benefited from reciprocity.

Finally, the contextual factors, which we primarily refer to technology and organization, act as a catalyst for people to initiate and participate in crowdsourcing. For example, both Ushahidi and Causes have integrated with popular social media such as Facebook, Twitter etc. These social media could bind the participants together and enable them to communicate with each other more easily. To some degree, these social media could also be regarded as a platform that organize the participants together as a group. It would give initiator(s) and participants a sense of group identity and consciousness, which again will function as a sort of personal factors to motivate them to engage in the task.

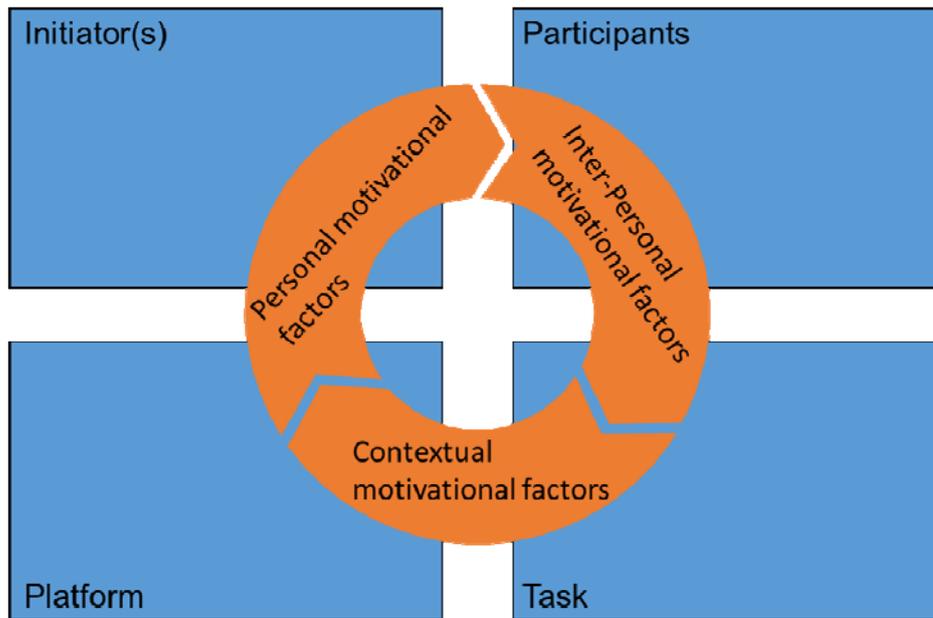


Fig.1 A collective action inspired motivation framework for crowdsourcing

## 4 Conclusion

Our proposed framework with motivations for crowdsourcing is still primitive and needs further investigation and refinement. However, we hope that it might shed some light on crowdsourcing related studies that motivations for crowdsourcing could also be referenced from collective action. In future, it might be useful to apply this framework to a concrete case to illustrate how such a re-framing could be used to understanding crowdsourcing in a new way.

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# The role of the public in the improvement of emergency plans

M. Carmen Penadés<sup>1</sup>, Adriana S. Vivacqua<sup>2</sup>, Marcos R.S. Borges<sup>2</sup>,  
José H. Canós<sup>1</sup>

<sup>1</sup>ISSI-DSIC

<sup>2</sup>PPGI/DCC

Universitat Politècnica de València

Universidade Federal do Rio de Janeiro

{mpenades/jhcanos}@dsic.upv.es    avivacqua@dcc.ufrj.br, mborges@nce.ufrj.br

**Abstract.** The emergency plan is a key element to consider in the emergency response because contains the response procedures to be executed and the information required to make decisions. We believe the citizens have valuable information (*tacit knowledge*) which may be analyzed and incorporated to the emergency plans to improve them and reduce the information handled during the emergencies. In this paper we propose a public participation approach for eliciting information from the citizens using collaborative tools and improve the emergency plans.

## 1 Motivation

Emergency response is among the most critical activities performed by humans: it involves processes where decisions affecting lives and property must be made in a short amount of time. These decisions are based on information coming from different sources, which must be accessed and combined adequately to avoid both information gaps and overload. Moreover, different decision makers may require different information elements or different views of information.

The basis of decision making and action during emergency response is the emergency response plan (or emergency plan, for short), a document that includes procedures to be executed in response to the event of an incident, plus all the

information required to make decisions (such as maps, pictures, videos, etc.). The emergency plan directs respondents towards the event location, defines the procedures in response to each possible incident, and provides the information needed to perform the response actions.

However, having an emergency plan may not be enough. As pointed out in (Palen 2007) a critical part of the response efforts lies with the individuals affected by the emergency. In most cases, the very first response actions are performed by in-place victims or passers-by. They are on location at the emergency site, and their actions may make rescue efforts easier or harder depending on what actions they take. Unfortunately, and despite best efforts by emergency management teams, citizens are usually not well acquainted with emergency plans, and do not have knowledge that may be helpful in case of crises.

While respondents get technical knowledge about the emergency site and response procedures from the emergency plan, individuals living in the area have a different type of knowledge: as they inhabit these spaces on a daily basis, they will likely develop an instinctive response to emergency situations based on their daily interactions with the environment. In other words: they have knowledge different from, and possibly more accurate than, the knowledge contained in the emergency plan. We believe this tacit knowledge is valuable for emergency response, and should therefore be gathered from them to aid in response efforts.

We have been studying ways of filling the gap between the knowledge contained in the emergency plan and the one provided by individuals. Our main goal is to investigate and devise methods to obtain information from the public during the planning process. To that end, we rely on Public Participation mechanisms. These are usually applied by the government to elicit opinions or desires of the population, using different strategies such as panels, surveys, public hearings, and others (Abelson 2001). We believe that the implementation of public consultation processes may generate information not included in the initial version of the emergency plan, which may lead to an overall improvement and a higher familiarity of individuals with it.

During emergency response, affected citizens can generate fresh information from the location of an incident. This type of contribution has been shown to play a key role in large natural disasters such as the Katrina hurricane (Palen 2007) or wildfires in the USA (Sutton 2008). On the other hand, public contribution may also be used to improve response plans and overall safety conditions: those who inhabit the space on a daily basis can provide valuable feedback about the emergency plan for that space, and its applicability. These individuals can generate important contextual information (called local knowledge in (Brabham 2009)) that may lead to improvement of the emergency plans and safer conditions long before the occurrence of actual emergencies.

To reduce information overload and simplify context management during emergency response, it is necessary to pre-select from the multiple information sources. Contextual information is not part of the abstract level emergency plan, but could be incorporated to the emergency plans before an emergency occurs. For instance, consider a street map, included in an emergency plan, with instructions for mobile rescue teams to get to a specific building. These directions may be obtained from a navigation application. However, there may be some objects on the street (e.g. large recycling bins) that may make the route unsuitable for large trucks. If this issue is not verified beforehand, it will appear as contextual information when an emergency happens, requiring on the fly decisions and associated delays. Obviously, performing exhaustive local checks is difficult and costly, but can easily be done by the people residing in the area. Unlike information generated during the response stages, this type of contextual information may be analyzed and eventually incorporated in a revised version of the emergency plan, reducing the amount of information that needs to be handled during response.

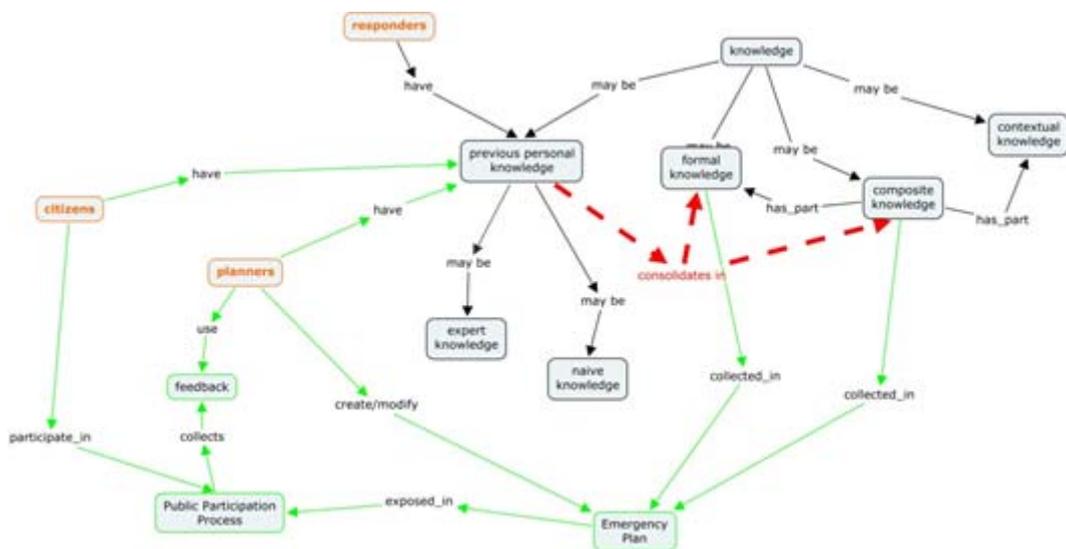
## 2 Public participation for emergency plan improvement

Rowe and Frewer (Rowe 2000) point out that citizens' views of risks often are different than that of risk management experts, and consider this alternative viewpoint valuable in several stages of the risk management process. We believe this also holds for the emergency management field. Thus, we want to take advantage of citizens' contribution at different stages of the emergency management lifecycle. So far, most attempts to use knowledge generated by the public have focused on the response phase, with numerous studies about the use of social networks as the main communication channel (a selection can be found at the *idisaster 2.0* blog, <http://idisaster.wordpress.com/bibliography/>). Public participation in other stages of the lifecycle, especially planning, has not been extensively explored.

Our approach is summarized in the concept map of Figure 1, which extends the taxonomy described in (Diniz 2008). Black nodes and edges represent the different types of knowledge handled during emergency responses. Formal knowledge is explicit in different forms, particularly the emergency plan. Contextual knowledge is gathered during the response from the emergency scenario (e.g. number of people affected, status of a bridge, and the like). Emergency planners design and implement emergency plans as the aggregation of formal and contextual knowledge elements (Canós 2010). Individual experience and know how is called previous personal knowledge, and is tacit in nature. We have divided it in two types, namely expert and naïve knowledge: the former is

the one of respondents, and the latter that of the citizens that inhabit in the emergency plan's area of influence. These are the main actors of the public participation processes. Citizens have personal knowledge that they use in the public participation activities, but this knowledge is of a different nature than that of respondents: it relates to "local" aspects of specific area the citizens live in. Of course, both knowledge sets may overlap in some cases.

The bottom part of Figure 1 (in green) summarizes the outcome of public participation in emergency plan improvement. The emergency plan is initially built by experts, who integrate the formal and composite knowledge elements of the emergency plan. The emergency plan is then exposed to citizens who can, in turn, produce feedback that may eventually be used by planners to improve the emergency plan. From a different perspective, a public participation process transforms citizens' knowledge into formal and/or composite knowledge, as the thick dotted red line in Figure 1 illustrates.



**Figure 1.** Public participation processes in the improvement of emergency plans

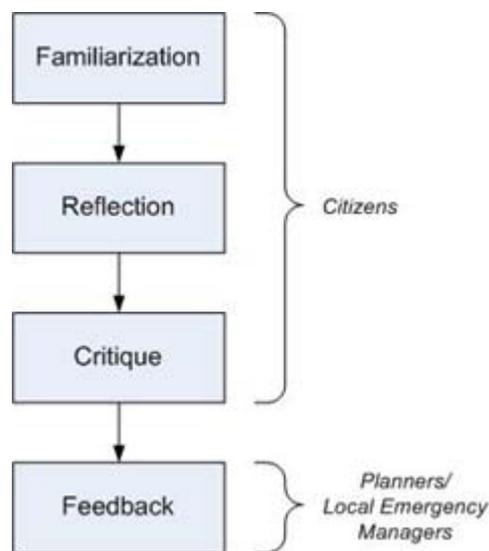
### 3 A process for eliciting information from the public

Public participation involves citizens in a process to elicit feedback from them, which can then be used by emergency planners. Citizens, however, may have little or no knowledge of the emergency domain. Thus, it is desirable to have them familiarize themselves with disaster situations, reflect on emergencies, in order to be better prepared to criticize and provide feedback to the planners. Additionally, given the potentially large number of people involved, this process should be supported by appropriate tools. Collaborative tools that allow interaction between participants are better, as they enable participants to discuss and reflect about each

other's suggestions. Therefore, we designed a four-step process to elicit information from naïve respondents, shown in Figure 2.

Our first concern was that naïve respondents would be unaware of the processes and potential emergency situations they may be faced with. A frequent issue with emergency response is that no one really worries about an emergency until it actually happens. This makes it harder for people to respond when it does happen.

Thus, our process starts with a familiarization stage, in which participants are led to think about emergencies and how they would act in certain situations. A reflection stage follows, where participants reflect about their chosen actions; think about alternatives and whether they should have done something different.



**Figure 2** *Knowledge Elicitation Process*

Hopefully, these two initial stages should provide them with enough material to exercise criticism in the following stage: critique. Critique is the stage where participants actually provide feedback on the emergency plans. They use what they have learned and reflected about, and their newly acquired awareness of these situations, to provide critical comments on the emergency plan itself. These comments are then organized and given to experts to improve the emergency plans.

Given the amount of information that may be generated, this process should be supported by group interaction systems. There are different ways of gathering information from large groups of people, such as statistical, markets, deliberation and volunteerism (Sunstein 2006). Deliberation seems to be appropriate in this case, as it enables interaction between participants, including debate, improving reflection and collaboration.

## 4 Conclusion

We believe that non-expert knowledge can bring new insight to emergency planning processes. As a consequence, we are studying how citizens can cooperate to improve emergency plans by providing feedback. By doing so, we hope that significant pieces of previous personal knowledge become consolidated formal knowledge, reducing the amount of context to be handled during emergencies.

We devised a knowledge elicitation process to help participants reflect of the problem and learn something of the domain. We ran a preliminary case study using three different tools to gather public feedback on emergency plans. Results show that regular individuals have relevant information pertaining to emergency plan improvement. Not only are they capable of providing useful information, but also, through interaction and reflection, they became aware of what they did not know, and suggested improvements for emergency plan dissemination and security design, improving preparedness overall.

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# A task-based crowdsourcing typology

Enrique Estellés-Arolas  
Catholic University of Valencia  
*enrique.estelles@ucv.es*

**Abstract.** When trying to develop a typology about how the crowd works on the Internet, different points of view can be applied. A typology can be developed based on the kind of crowd that participates, the specific area in which the crowd is going to work on, the kind of reward the crowd obtains in exchange, etc. It's also important to have into account the process in which the crowd gets involved. The crowd can participate, for example, in open-innovation or co-creation initiatives. Each one will have its own particularities that will determine the resulting possible typologies. In this paper, a task-based approach to crowdsourcing is exposed and reviewed.

## 1 Introduction

Among the many effects the Internet development has had on today's society, it's important to highlight the enhancement of many collaborative processes. In some cases, these are not new. They existed previously and have been boosted. One of such processes is Collective Intelligence.

According to Malone et al. (2010), "collective intelligence makes reference to groups of individuals doing things collectively that seem intelligent". This process, which has existed since people relate to each other, has changed from involving a few hundred people to involving hundreds of thousands thanks to the Internet.

This collective intelligence can manifest itself through the Internet in various ways such as open innovation, co-creation or crowdsourcing. In the latter case, the phenomenon of crowdsourcing has become increasingly popular in the last years.

Jeff Howe coined the term crowdsourcing in 2006. This journalist defined crowdsourcing as “the act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and general large) network of people in the form of an open call”. After this first definition, other authors like Brabham (2008) or Estellés-Arolas & González-Ladrón-de-Guevara (2012a), detailed different aspects of crowdsourcing. Estellés-Arolas & González-Ladrón-de-Guevara (2012a), for example, identified eight elements that should appear in any crowdsourcing initiative: a crowd, a crowdsourcer, an open call, a task to be done with a clear objective and participative nature, a reward and the use of the Internet.

Because crowdsourcing is a way of managing Collective Intelligence, these elements overlap with those proposed by Malone et al. (2010) when defining the genome of Collective Intelligence.

This genome suggests a number of genes that may associate in different ways, resulting in different initiatives of Collective Intelligence.

These genes correspond to four basic questions: what task is going to be done (with two genes: "create" or "decide"), how it will be done (with two genes: "collaboratively" or "individually"), who will do the task (with two other genes: "the crowd " or "a certain group of people ") and why the people will do the task (with three genes: "glory", "love" and "money").

In an effort to clarify and delimitate the crowdsourcing term and the different kind of crowdsourcing initiatives that can be done, different typologies have been proposed. These typologies have been elaborated following different approaches. Different typologies have been elaborated on the basis of different elements of crowdsourcing initiatives: Schenk & Guittard (2009) propose one typology based on the composition of the crowd (that corresponds with the Malone et al. (2010) question “Who”); Corney et al. (2009) propose another one based on the reward element (that corresponds with the Malone et al. (2010) question “Why”). Others are based on the specific area of application: Ooman & Aroyo (2011) propose a typology of crowdsourcing activities used in art galleries; Geiger et al. (2011) propose a typology from an organizational point of view.

In the present paper, a typology based on the task to be done (Estellés-Arolas & González-Ladrón-de-Guevara, 2012b) is going to be reviewed and detailed.

## 2 Typology and Examples

Estellés-Arolas & González-Ladrón-de-Guevara (2012b) propose a crowdsourcing typology based on five different types. Each type differs from the others in the task that the crowd has to carry out.

This typology was developed integrating other task-based crowdsourcing typologies previously elaborated (Reichwald & Piller, 2006; Howe, 2008; Brabham, 2008; Kleeman et al., 2008; Greets, 2008; Burger-Helmchen & Penin,

2010). The objective was to create a general task-based typology that could be used in any case.

The typology proposed comprises the following types:

### 1. Crowdcasting

This is one of the most accepted, an easy to identify, crowdsourcing type. In this case, a crowdsourcer (a person, a company or an organization of any kind) proposes the crowd a problem or a specific task to be done, being rewarded that who solves it first or do it better. It is a competition-like event. InnoCentive<sup>1</sup> is a paradigmatic example of crowdcasting: in this platform anyone can expose problems (i.e.: “finding a more efficient way to collect aborted small oranges” or “finding a method or technology that could maintain a localized area on the body at a low temperature for a long period of time”) rewarding its solution with money. In this platform, the crowd provides his specific knowledge in a particular area, solving problems individually (Doan et al., 2011). Other platforms are focused not on solving problems but on doing more creative tasks. 99designs<sup>2</sup> is a platform in which people is rewarded for designing logos or webs, for example.

### 2. Crowdcollaboration.

In this crowdsourcing type, unlike crowdcasting, there is a communication between the participants of the crowd, whereas the crowdsourcer (the initiator of the process) does not get too involved. The crowd brings its knowledge to solve problems or raise ideas collaboratively. Normally, there is no financial reward, being the intrinsic motivation the key. Two different subtypes can be found, which differ in the ultimate goal to achieve.

2.1 Crowdstorming. It’s about online brainstorming sessions. Different ideas are proposed and the crowd participates with their comments and votes. This happens in the Ideajam Platform<sup>3</sup>. These sessions are usually organized by major institutions (i.e.: IBM, Boston University’s School of Management, etc.). They usually look for ideas to improve performance, products, services, etc.

2.2 Crowdsupport. In this kind of initiatives, customers themselves solve the problems or doubts of other customers. Therefore, they don’t have to resort to after-sales services. The main difference in these initiatives is that they seek for help, as in the case of GetSatisfaction<sup>4</sup>, a platform that allows companies like

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<sup>1</sup> [www.innocentive.com](http://www.innocentive.com)

<sup>2</sup> [www.99designs.com](http://www.99designs.com)

<sup>3</sup> [www.ideajam.net](http://www.ideajam.net)

<sup>4</sup> [www.getsatisfaction.com](http://www.getsatisfaction.com)

Microsoft to perform these tasks. Others build their own platforms, like the Indiana University (Latimer et al., 2009).

### 3. Crowdcontent.

In these tasks, the crowd share their workforce and knowledge to create or find content of different kinds. Crowdcontent differs from crowdcasting because it is not a competition: each individual works individually and in the end, individual results of everyone are joined together. So three subtypes that differ in relation to the contents can be found:

3.1 Crowdproduction. The crowd must create content, either collaborating with others, as in the case of Wikipedia, or individually, performing tasks of various difficulty as the translation of short fragments of text or image tagging, as in the case of some tasks of Amazon Mechanical Turk<sup>5</sup>.

3.2 Crowdsearching. In this case, the partners will search for content on the internet for a specific purpose. There are big projects such as Peer to Patent Review Project<sup>6</sup>, but there are also smaller tasks, as those proposed in microtasking platforms as Microtask<sup>7</sup>.

3.3 Crowdanalyzing. This case is similar to crowdsearching, with the fundamental difference that the search is not performed on the Internet, but in multimedia documents as images or videos. An example would be the stardust@home project, in which anyone can find samples of interstellar dust analyzing 3-dimensional images taken by the space probe Stardust.

### 4. Crowdfunding.

In these initiatives, an individual or organization borrow money from the crowd, giving a reward in exchange, to carry out a project. The project to be funded can be of any kind: financing a soccer team<sup>8</sup>, publishing a book<sup>9</sup>, creating or boosting a start-up<sup>10</sup> or even absurd ones as cooking potato salad<sup>11</sup>.

Within crowdfunding, different types that vary mainly in the way of rewarding the contributions of the crowd can be found. If we focus specifically on the task (giving money), we can distinguish three types. In the first place, there is the

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<sup>5</sup> [www.mturk.com](http://www.mturk.com)

<sup>6</sup> [www.peertopatent.org](http://www.peertopatent.org)

<sup>7</sup> [www.microtask.com](http://www.microtask.com)

<sup>8</sup> [www.myfootballclub.co.uk](http://www.myfootballclub.co.uk)

<sup>9</sup> [www.libros.com](http://www.libros.com)

<sup>10</sup> [www.crowdcube.com](http://www.crowdcube.com)

<sup>11</sup> <https://www.kickstarter.com/projects/zackdangerbrown/potato-salad>

crowdfunding in which the crowd gives money waiting a reward (i.e. merchandising, shares, products, etc.). In this case, an amount of money is given obtaining a reward in exchange for a different given the same reward. This kind of crowdfunding comprises pre-sale, reward-based ([www.kickstarter.com](http://www.kickstarter.com) in both cases) and equity-based<sup>12</sup> crowdfunding. In the second place, the donation-based crowdfunding<sup>13</sup> can be found, focused on charity projects in which there is no reward for the donators. So the crowd is really donating its money. Finally, the lending-based crowdfunding can be found. In this case, the crowd lends money, being the reward the recovery of that money with interest.

#### 5. Crowdopinion.

These initiatives try to get the feedback from users about a topic or product. One example is Modcloth<sup>14</sup>, an online store where any registered user can review products that have not yet gone on sale, obtaining information about their potential market acceptance. The crowd gives its opinion or judgment to make assessments (Doan et al., 2011). Market research can also be englobed inside crowdopinion initiatives. In this the user's opinion is not manifested by a vote but by buying and selling shares linked to the result of an upcoming event, like the possibility of being chosen as a candidate for presidential election. For this type of initiatives, specialized platforms called "online prediction markets" are used. Some examples of these platforms are Intrade<sup>15</sup> or Inkling Markets<sup>16</sup>.

### 3 Conclusion

The result of the paper, as can be seen, is the elaboration of a typology consisting of five excluding types. Describing it as "excluding" means that each type can be carried out independently, although different platforms can use different types of crowdsourcing simultaneously. For example, Threadless uses crowdopinion and crowdcontest in different areas of its website or business model.

Despite the evolution of crowdsourcing, this typology is still useful, as can be shown in Estellés-Arolas et al. (2015). However, this development calls for a constant review to adapt to the reality of the phenomenon.

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<sup>12</sup> [www.sociosinversores.com](http://www.sociosinversores.com)

<sup>13</sup> [www.hazloposible.org](http://www.hazloposible.org)

<sup>14</sup> [www.modcloth.com](http://www.modcloth.com)

<sup>15</sup> [www.intrade.com](http://www.intrade.com)

<sup>16</sup> [www.inklingmarkets.com](http://www.inklingmarkets.com)

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# Microtasking models and managerial challenges

Marta Poblet and Mari Fitzpatrick

RMIT University

*marta.pobletbalcell@rmit.edu.au, mari.fitzpatrick@rmit.edu.au*

**Abstract.** This paper offers a brief overview of basic microtasking models and connects its developments with emerging management challenges that will need to be addressed in order to fully harness the capacities and skills of the crowd in different domain areas..

## 1 Introduction

In a number of domains, innovative and self-organising work units have developed that now utilise the ‘cognitive surplus’ of the crowd and ‘aggregated intellectual skills’ to gather and process critical information. The transition from hierarchies to distributed networks, from proprietary ownership to open-source standards and models that include contributory as well as market transactions (Rejeski, 2012; Benkler et al., 2013; Bauwens and Kostakis, 2014) is underwritten by a multiplicity of established rules and yet-to-be regulated practices.

Recent research tends to focus on the role of ICTs in microtasking. Yet, less attention is devoted to the social implications of digital labour. In this paper we briefly consider two different types of microtasking and its impact in terms of new managerial practices.

## 2 Microtasking models

Microtasking has been sometimes conflated with terms such as ‘crowdsourcing’, ‘microwork’, ‘crowdwork’. Likewise, the term crowdsourcing has been approached with the lens of human computation, collective intelligence, or social computing (e.g. Quinn, 2011; Michelucci, 2013). The intersections between these domains have been noted as they coincide in their focus on horizontal processes that engage large groups of individuals towards clearly defined goals.

Research on crowdsourcing has already provided comprehensive reviews of the many definitions of the term (e.g. Estellés-Arolas and González-Ladrón-de-Guevara, 2012; Hossain and Kauranen, 2015). Yet, microtasking as a specific modality of crowdsourcing procedures has received attention only recently. Microtasking entails the modularisation of problems into microtasks of varying granularity that are processed by a distributed digital labour force. These microtasks are then published through computational platforms (e.g. Mechanical Turk, CrowdFlower or ShortTask) which distribute them through a crowd of workers.

Two basic types of microtasking practice can be differentiated on the basis of task definition, process management, participant incentives, and the nature and purpose of the final product (Novak, 2013: 422-425). The first model invites participants to conduct ‘small-scale, granular tasks for a few cents apiece’ (Bollier, 2014: 33). This model is structured as a linear workflow system whereby distributed individuals execute basic tasks or ‘atomic units’ requiring minimal skills or ‘little cognitive effort’ for financial reward (Novak, 2013: 422, 431-33). The tasks are predetermined and conducted independently as ‘parallel work’ and in some cases are then aggregated afterwards towards a larger task (Novak, 2013: 423). ‘Atomic’ tasks occupy a problem area that is ‘well-structured’ with modes of execution that are ‘well mapped out’ and require little interactivity between individual workers (Franzoni and Sauermann, 2013: p. 10). The purpose of this form of microtask is to minimise costs but obtain ‘high quality results’ (Saito et al., 2014: 401). However, the emphasis on labour flexibility as a cost-saving strategy has drawn criticisms that this type of crowdwork is ‘exploitative labour’ (Kittur et al. 2013) and may be regarded as the reinvention of digital/virtual ‘sweatshops’ (Blumberg, 2013a: 3; Bollier 2014: 34), a new form of Tayloristic assembly line production (Novak, 2013: 422) or unsatisfying ‘assembly-line piecework’ (Kittur et al., 2013: 1). Nevertheless, basic microtasking platforms can offer marginalised populations employment opportunities (Bollier, 2014b: 35). Samasource acts as a broker between companies and ‘people in poverty’ who are employed on platforms to conduct less skilled tasks such as photo-tagging and image identification for remuneration (Bollier, 2014: 6).

Platforms such as UpDesk allow skilled individuals to access fee-for-service projects, and InnoCentive, invites participants to select research and technical tasks for payment as a form of ‘enterprise crowdsourcing’ (Bollier, 2014: 6, 34). The tasks offered on these platforms conform to the definition of ‘macro’ tasking as specified by Saito et al. (2014: 400). The atomic/primitive microtask requires individual participants with basic skills to perform simple tasks that are centrally managed as commercial projects (Novak, 2013: 422). While these projects solicit open mass participation both their processes and products are closed and subject to intellectual property agreements (Franzoni and Sauermann, 2013: 9).

Blumberg (2013b: 6-7) identifies a set of common characteristics for atomic microtasks: (i) tasks are simple and repetitive; (ii) task workers are single-user; (iii) task execution is non-interactive; (iv) tasks do not require expertise or high-level skills. He also contrasts these features with an evolved form of crowdsourcing that entails recruiting ‘many minds’ for sophisticated problem-solving projects (2013b: 5-7).

The second modality of microtasking requires multiple participants driven by non-pecuniary motivations to work collaboratively on a particular online project through an ‘interactive problem solving process’ (Franzoni and Sauermann, 2013: 10). In interactive microtasking approaches task modularization tends to be limited. Tasks are interdependent, complex, and ill-structured, with no obvious parameters or solutions. Likewise, task workers, with specific skills/knowledge, interact and collaborate sequentially toward a resolution.

This second modality harness ‘large scale thinking systems’ with technology to address complex problems that are beyond the competence of computers alone or sole individuals (Blumberg, 2013a: 3). It also entails a collaborative approach that is more suited to solving ‘wicked’ or ‘ill-structured’ problems that cannot be solved by a ‘single computational formulation’ or through stakeholder consensus on the parameters of the actual problem and attendant solutions (Introne et al, 2013). Examining crowd-science projects, Franzoni and Sauermann (2013) argue that ‘ill-structured’ problems are complex, require a degree of interdependency and thus cooperation between participants who address these sub-tasks. It is not a clearly predetermined process either, since the ‘problem space becomes clearer as the work progresses’ and as knowledge contributions accumulate (Franzoni and Sauermann, 2013: 10).

The central challenge with task decomposition or modularization is to fragment problems into modules in a way that facilitates the reconsolidation of solutions (Franzoni and Sauermann, 2013; Introne et. al 2013: 46). A high degree of modularization facilitates the participation of a greater number of contributors who can undertake independent parallel work, however, the characteristics of specific problems set limits to the extent to which problems can be modularized (Franzoni and Sauermann, 2013: 14). As a result, complex ill-structured problems can only be partially fragmented and require greater levels of collaboration with

no obvious hierarchy of labour and with components that cannot be easily reintegrated (2013: 14). In this regard task management as such involves modularising tasks structures and establishing groups of taskers to optimise the workflow toward solutions.

### 3 Managing digital labour

In the emergency management domain, digital volunteer organisations such as Standby Task Force (SBTF), Humanity Road (HR), Virtual Organisation Support Teams (VOST), or Humanitarian OpenStreetMap (HOT) have deployed either atomic or modular strategies when collecting, curating, or mapping crowdsourced information on disaster events (Buscher *et al.* 2014, Liu, 2014). Yet, the ‘management’ aspect of digital labour in the microtasking and virtual emergency management literature is under-emphasised and is often stylised as an oppositional format between hierarchical or lateral approaches.

The way microtasks are structured for information management, irrespective of complexity, requires collaborative interactions amongst volunteers and lateral structures so that reliable intelligence drawn from raw data can be rapidly produced in a fast-changing and uncertain environment. However, this process also requires a particular style of management or even *non-management*, that is, one that differs in style and execution from traditional authoritative models. Hierarchical or chain of command procedures requiring vertical lines of authorization are comparatively cumbersome.

At a theoretical level, Buscher *et al.* (2014) refer to the self-organising dynamic that emerges with processes of collective intelligence, and contrast modalities of self-organisation, orchestration and centralised control as management styles (2014: 248).

Using the example of online reality gaming practices whereby ‘careful orchestration’ encourages the attainment of goals, they suggest that with peer production and collective reasoning processes both self-organising and orchestration are complementary approaches.

Rahman *et al.* have suggested that ‘the transformative effect of ‘collaboration’ remains largely unexplored in crowdsourcing complex tasks’ (2015: 1). As they argue, the structure and maximization goals of basic microtasking for high-quality products with a rapid turnover are ‘inadequate to optimize collaborative tasks’ (2015: 1). At the same time there is little research on the human resource factors that influence the quality of group collaboration outcomes. For example, there are factors such as individual skills, group affinity and the ‘upper critical mass’ of group size for effective collaboration that require further investigation (Rahman *et al.*, 2015).

## 4 Conclusion

We have briefly traced the development of microtasking as an information management process for digitally generated data. Microtasking is approached as a means to systematise the often overwhelming volume of digitally generated data and to construct a ‘cognitive architecture’ to produce actionable intelligence. The relevant literature indicates that micro-practices that enable the mass participation of digital workers has now embedded a role for the crowd in domains such as emergency management.

Yet, there is a need to further understand what is specific to organisational forms and managerial practices that support peer production and collective intelligence processes that are flexible to context and operate in urgent timeframes. How can collaborative processes be optimised with local and globally dispersed volunteers, how can newly evolved regulations and governance protocols be introduced using managerial approaches other than those based on individual performance goals?

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# Crowdsourcing open data policies: Measuring impacts and improving outcomes

Gwen Shaffer  
California State University Long Beach  
*gwen.shaffer@csulb.edu*

**Abstract.** THIS RESEARCH EXPLORES BOTH THEORETICAL AND PRACTICAL ASPECTS OF DEVELOPING AND IMPLEMENTING OPEN DATA POLICIES PRODUCED THROUGH COLLABORATIVE GOVERNANCE. IT EXPLORES HOW CITY OFFICIALS CAN MAXIMIZE TIME AND RESORUCES INVESTED IN SEEKING PUBLIC INPUT THAT WILL RESULT IN BETTER OPEN DATA POLICIES. AS A KEY CASE STUDY, THE AUTHOR EXAMINES EFFORTS TO DRAFT AN OPEN DATA POLICY IN THE CITY OF LONG BEACH, CALIF., WHERE OFFICIALS HOSTED A SERIES OF OPEN DATA FORUMS AND DISTRIBUTED A SURVEY DURING FALL 2015.

## 1 Introduction

During the past few years, local governments have undertaken a host of efforts to crowdsource open data policies. This position paper calls for an exploration into both the theoretical and practical aspects of developing and implementing open data policies produced through collaborative governance. Since the 1950s, agencies at all levels of government have hosted citizen participation initiatives (Day, 1997). These practices are widely believed to boost public trust of government, as well as foster a stronger sense of community. Simply opening up the policymaking process can serve as a transformative tool for social change (Stivers, 1990; Oldfield, 1990; Nelson & Wright, 1995).

However, this paper highlights the distinct characteristics associated with participatory governance within the context of open data policies. It raises questions regarding when, and how, open data policies should rely on public participation. First, government officials typically initiate collaboration in an attempt to reach consensus in a controversy (Ansell & Gash, 2007) like raising property taxes or closing a library. By contrast, open data stakeholders are not attempting to solve a problem, *per se*. And while stakeholders who help shape open data policies have diverse agendas—running the gamut from an interest in developing mobile applications, to highlighting disparities in education spending—these actors are not adversaries. Finally, this paper questions the effectiveness of local government attempts to crowdsource open data policies through digital platforms, in light of research finding collaborative governance requires face-to-face interactions with the public (Ansell & Gash, 1997).

As of December 2015, about 55 U.S. cities had adopted open data policies, including Los Angeles, New York City, Chicago, Philadelphia, Boston, and San Francisco (Sunlight Foundation, 2015). Open data policies provide the public with guidelines addressing which data should be public and how to make that data public (i.e. standardized formatting, redacting personal information). Because it involves political processes, crafting an open data policy is more complex than publishing government data on a website (Shaw, 2015). Without a codified policy, a newly installed mayor can deem certain data sets sensitive—and remove them from an open data portal, or department staff can decide to stop updating particular data sets. Most significantly, however, open data policies explain the rationale for making government data available to the public. These formal guidelines justify stakeholders' rights to request access to data (Shaw, 2015).

## 2 Discussion

In the majority of policy contexts, collaboration involves soliciting input from residents who are most impacted by local problems, and who possess unique knowledge about these situations. For example, more than 300 stakeholders representing agriculture, forestry and land development attended meetings and provided feedback when California regulators updated the state's strategic water plan in 2013 (Beutler, 2014). In this scenario, the people most likely to be negatively impacted by water restrictions and rate hikes weighed in on the plan. The dynamics are different, however, in the context of shaping open data policies. For example, the city of Long Beach, Calif., hosted a series of open data forums during Fall 2015. About 70 attendees completed a survey inquiring about their interests and concerns surrounding open data. These respondents reported a range of occupations: web developer, college student, journalist, analyst, retiree, and community activist, among others (Long Beach Technology & Innovation

Commission, 2015). Nearly 60 percent of respondents said they had never downloaded a “local, state or federal government open data set.” While participants clearly had an interest in open data, they generally lacked first-hand experience engaging with open data. The city of Long Beach’s collaborative approach has multiple advantages—informing and empowering residents, as well as building trust—but it remains to be seen whether discussions that took place during open data forums will ultimately benefit Long Beach’s open data policy.

The city of Philadelphia (2015) has taken a different approach to participatory governance by creating an Open Data Advisory Group. In addition to staff from various city agencies (i.e. parks, streets, licenses and inspections), the advisory group includes representatives working in mass transit; healthcare; “good” government advocacy; and business. While each of these sectors anticipates using open data to meet their needs, they lack expertise with open data. This raises questions about how significantly the group’s recommendations will influence outcomes for Philadelphia’s open data initiative.

Still, good reasons for participatory efforts exist. Government officials may host forums and meetings in hopes of “demystifying” the term open data open, or in an effort to promote downloads from open data portals. Cities also seek public input as they struggle to prioritize the release of datasets. Therefore, future research should examine, do the time and resources invested in seeking public input into open data policies actually result in *better* policy? Currently, no formal tools or methods of evaluation exist to measure the benefits and outcomes achieved through public participation.

This paper also argues for distinguishing between “collaborative governance” and “crowdsourcing.” Previous research on open data stresses the need for users to provide feedback on the datasets they perceive as most valuable (Ubaldi, 2013; Kassen, 2013). In fact, most open data portals allow the public to suggest the release of specific data and to offer feedback on the portals themselves (NYC Open Data, 2015; City of Chicago, 2015; District of Columbia, 2015; Nashville Open Data, 2015). These opportunities certainly qualify as *crowd production*. However, it is debatable whether they meet the definition of *collaborative governance*, which typically requires face-to-face dialogue between stakeholders. Soliciting online feedback, hosting surveys, and conducting focus groups are not collaborative in the sense that they do not permit two-way flows of communication or multilateral deliberation (Ansall & Gash, 2007).

Even when local governments undertake efforts that are truly collaborative, downsides may emerge. In 2013 community members in Oakland, Calif., helped write a first draft of that city’s open data policy. The draft was shared through Google docs, and members of the public could mark it up. Following this public comment period, the city hosted an open data roundtable. This event included a Google hangout, allowing remote participation. In many respects, the process that took place in Oakland serves as a model for engaging the community in creation

of open data policy (Williams, 2013). But relying too heavily on public participation may inadvertently reinforce the preferences of people already comfortable interacting with government officials (Sunshine Foundation, 2015). Since the average person knows little about open data, meetings may be dominated by tech-savvy citizens or special interests who disproportionately influence decision-making (Irvin & Stansbury, 2004). In a landmark study on collaborative efforts to draft natural resource policy, Smith and McDonough (2001) found inequality in representation. Informants characterized public meetings as “orchestrated” and “loaded” (p. 245). The results of Long Beach’s open data survey back up these concerns. Among open data forum attendees who completed the city’s survey, 94% reported having at least some college education (Long Beach Technology & Innovation Commission, 2015). This raises the possibility of a small elite dominating a participatory process, unless the city modifies its method of soliciting public participation.

### 3 Conclusion

While some local governments are involving the public in creation of their open data policies, these efforts tend to fade after an open data portal goes online. This position paper argues that—just as public preferences should be incorporated into the development of an open data policy and prioritizing data sets for initial release—the public should remain involved in the ongoing assessment of the portal itself (Sunlight Foundation, 2014). Governments can crowdsource public feedback regarding data quality, quantity, selection, and publishing format. Of course, this feedback is meaningless if officials fail to incorporate it into policy revisions. Therefore, future research should examine whether cities are, in fact, addressing public concerns when open data policies undergo routine review.

Despite the challenges highlighted in this paper, collaboratively drafted open data policies have multiple potential benefits. They can increase public awareness, as well as empower residents. City officials who engage the public are positioned to develop better policy and make more informed decisions during later implementation phases (Irvin & Stansbury, 2004). As an increasing number of local governments undertake open data initiatives, officials must consider the contextual conditions likely to facilitate—or hinder—the desired outcomes of crowdsourcing policies. By conducting research that measures and clarifies the particular ways in which communities engage with open data, scholars can boost the effectiveness of collaborative governance. Therefore, future open data policies must include tools for evaluating public participation and its impacts. Ideally, these assessment methods will enable cities to reach out to underrepresented groups and obtain more diverse perspectives.

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# Crowdsourced democratic deliberation in open policymaking: Definition, promises, challenges

Tanja Aitamurto  
Stanford University  
*tanjaa@stanford.edu*

**Abstract.** While crowdsourced democratic deliberation is becoming more common in open policymaking, it remains unclear what its value and role is — and should be, and could be — in policymaking. This paper examines crowdsourced democratic deliberation and its features, comparing it to the traditional mini-publics approach in democratic deliberation and to general online deliberation. The paper shows the promise of crowdsourced democratic deliberation as a method for scaling up deliberation to masses, while also illuminating its challenges, rooted in the self-selected and distributed nature of crowdsourcing. The paper concludes that the value of crowdsourced democratic deliberation remains mainly procedural rather than instrumental in policymaking.

## 1 Introduction

Crowdsourcing has become a more common method in policymaking (Aitamurto and Landemore, 2015; Brabham, 2015; Noveck, 2015). National and local governments use crowdsourcing as a method for knowledge search and civic engagement, with the goal of developing stronger policies. While crowdsourcing as a knowledge search and discovery method in open policymaking has received

more scholarly attention, less attention has been paid on how crowdsourcing can serve as a method for large-scale deliberation, particularly for the more demanding forms of democratic deliberation. Therefore, this paper focuses on the notion of crowdsourced democratic deliberation, following the definition presented by Aitamurto and Landemore (2016). The paper examines the characteristics of crowdsourced democratic deliberation, and its value and role in crowdsourced policymaking.

The paper is structured as follows. The first part examines crowdsourcing as a method in policymaking. The second part discusses the notion of democratic deliberation, and the third part one about crowdsourced democratic deliberation. The last part elaborates the promise and challenges of crowdsourced democratic deliberation.

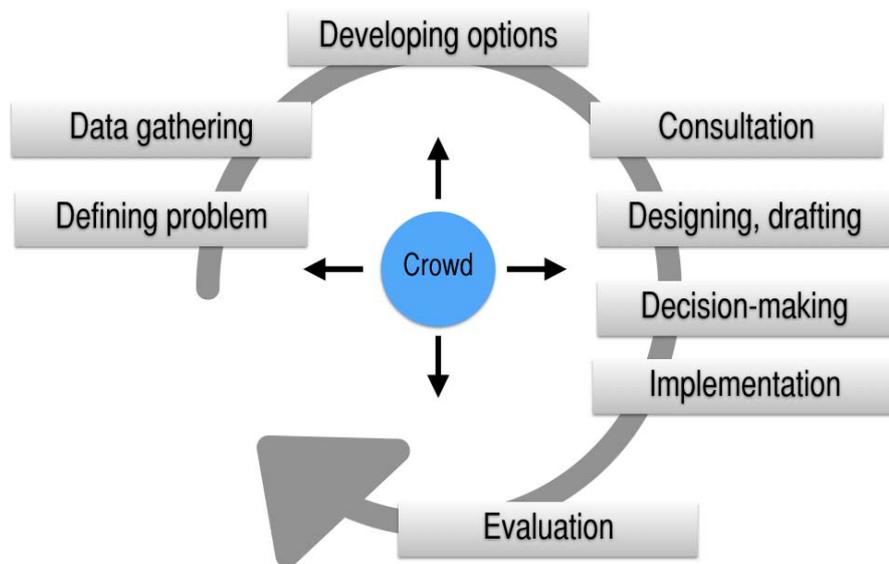
## 2 Crowdsourcing in open policymaking

Crowdsourcing is an open call for the crowd to participate in a policymaking process by submitting their ideas, knowledge or opinions. In the recent years, crowdsourced policymaking has become a widely used method across the world (Prpić, Taeihagh, and Melton, 2015). National governments in Iceland and Finland have applied crowdsourcing in law reforms (Landemore, 2014; Aitamurto, 2016), federal agencies in the United States have invited the crowd's input in strategy reforms (Aitamurto, 2012), and politicians such as the Lieutenant Governor of California, Gavin Newsom, has asked the crowd to submit ideas for the state's policy-agenda (Nelmarkka et al. 2014).

Public policymaking follows a cycle, which consists of several sequences: problem identification and definition, data gathering, developing options and proposals, consultation, designing and drafting the policy, decisions, and evaluation and implementation (Edwards 2001; Howlett et al. 1995; Peters 1999). Crowdsourcing can take place in several sequences of the policymaking cycle. The City of Palo Alto in California, for instance, is applying crowdsourcing in several parts of its Comprehensive City Plan update process. The crowd — the residents of Palo Alto — has been invited to provide ideas in the early stage of the policy update in a manner of an open call. After this initial period, the crowd has also been invited to contribute by commenting on policy drafts.

Crowdsourced policymaking is a method for participatory democracy (Pateman, 1972), not for direct democracy, unlike in participatory budgeting (c.f. Cabannes, 2004), because in crowdsourced policymaking the crowd doesn't have decision-making power.

Crowdsourcing is an online call for the crowd to participate in a task that is open online (Brabham, 2013; Howe, 2008). In crowdsourcing, the crowdsourcer



— **Figure 1.** Crowdsourcing in policy cycle. The crowd can be invited to participate in all parts of a policy-making process.

the leader of the crowdsourcing initiative, whether an individual, group or an organization — has the control over the crowdsourced process. The crowdsourcer decides what is being crowdsourced, when and how, and how the crowdsourced input is used. In contrary, in another popular mode of online collaboration, commons-based peer production, the locus of power is within the commons, the contributors. (Aitamurto and Landemore, 2015.)

Crowdsourcing can be applied in several ways in policymaking: as crowdsourced microtasking, crowdsourced ideation, and crowdsourced argumentation and deliberation (Aitamurto and Landemore, 2016). When crowdsourcing microtasking, the crowd is asked to conduct tasks that support policymaking, such as collecting data from the field with sensors or checking documents and then reporting the findings on the crowdsourcing platform, similarly to crowdsourced journalism (Aitamurto, 2015) and crowdsourced crisis management (Liu, 2014). In crowdsourced ideation, the crowd is asked to submit ideas for resolving issues in policy. If the policy regulates traffic, the crowd can be asked to provide solutions for instance about improving safety during heavy traffic conditions. The crowdsourced knowledge can be ideas, solutions, or situated knowledge expressed in of crowd’s experiences, which can help the policymakers to formulate a stronger policy. In crowdsourced argumentation and deliberation, the crowd is asked to exchange arguments about a given topic, as on

dedicated deliberation platforms such as Deliberatorium (Klein, 2011), Consider.it (Kriplean et al. 2012), and Regulation Room (Farina et al. 2013).

Each type of crowdsourcing can be a call for open participation, that is, the process is open for anybody to participate. That is called public sourcing. The call can also be limited to only for a specific, pre-determined group of people, based on their knowledge, geographic location, or other characteristics. That is called expert-sourcing.

### 3 Democratic deliberation

Democratic deliberation is “the public use of arguments and reasoning among free and equal individuals” (adapted from Cohen, 1989, c.f. Mansbridge et al. 2010). Deliberation requires a reasoned exchange of arguments, and democratic deliberation requires equal standing among free participants (“free and equal”) and a public, to a certain degree transparent exchange.<sup>17</sup> Democratic deliberation differs from general forms of discursive online communications and citizen engagement. The core features of democratic deliberation are the presence of arguments and critical listening among free and equal participants (Aitamurto and Landemore, 2016).

Deliberative democrats advocate for democratic deliberation for its epistemic and legitimacy-enhancing features (Marti, 2006). Democratic deliberation is argued to lead to a more informed and active citizenry, awareness of societal issues and learning, and the participatory nature of the process enhances legitimacy of the decision. As a result of successful democratic deliberation, the public is supposed to be thinking about societal issues in a more informed way than they previously were. The outcome of the deliberation should have more legitimacy because it has been preceded by a deliberation.

The golden standard for democratic deliberation has been set in the mini-publics approach in deliberation (Mansbridge, 1999). The mini-publics approach aims to detect the public opinion by gathering a group of citizens to deliberate about a given issue — for instance, about nuclear power. At the end, the participants’ opinions about the topic is measured, and the opinion is thought to represent the public opinion of a larger population. The mini-public approach is applied in deliberative polling (Fishkin, 2009), and other similar forms of deliberation such as citizen juries. The participants are recruited by random sampling, and the number of participants is typically at most in some hundreds, and the sample is divided to smaller groups for deliberation.

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<sup>17</sup> This definition for deliberation is more requiring than a mere “deliberation within”, that is internal dialogue, (Goodin, 2005) or cross-cutting exposure to others’ opinions (Mutz, 2006).

## 4 Crowdsourced democratic deliberation

Crowdsourced democratic deliberation, as introduced by Aitamurto and Landemore (2016), conceptualizes democratic deliberation taking place in crowdsourced policymaking in a novel way, combining the core characteristics of democratic deliberation and crowdsourcing. The features of crowdsourced democratic deliberation are presented in the following (ibid. pp. 15-16):

- Crowdsourced democratic deliberation is embedded in a larger process, which is governed and controlled by crowdsourcers. Crowdsourcing has a goal and a structure for reaching the goal, including a mechanism for synthesizing and analyzing the crowdsourced input. The goal of crowdsourced policymaking is typically a stronger policy, and the analysis mechanisms vary from manual analysis to natural language processing tools. The crowdsourcers can be government officials organizing the crowdsourcing initiative, or other entities, who have initiated and are leading the crowdsourcing exercise. The crowdsourcer has the say about how the crowdsourced input is used, how and when, if it is used at all. This feature follows the nature of crowdsourcing, in which the locus of power is always within the crowdsourcer.
- Crowdsourced democratic deliberation is always based on self-selection, because crowdsourcing as a method is inherently based on a self-selected group of participants as opposed to random sampling. This means that crowdsourced democratic deliberation doesn't attempt to recreate "the public opinion" — which would be a biased result due to the selection bias.
- Crowdsourced democratic deliberation includes reasoned argumentation, including critical listening between free and equals in public. *Equality* refers to the equal possibility to have an influence through crowdsourcing. That includes the access to the crowdsourced process, and the possibilities to act within the process, without anybody censoring or overriding the individual. *Publicity* means the horizontal transparency of the online exchanges; the participants can see what others are saying.
- Crowdsourced democratic deliberation is distributed, asynchronous, and depersonalized in nature. Crowdsourced democratic deliberation is distributed across time, place, and across viewpoints rather than between participants. The participant crowd is distributed

geographically, and their participation is distributed across time: the deliberative interactions rarely happen real-time, but they take place asynchronously. Crowdsourced deliberation is depersonalized in that it is distributed across viewpoints rather than between actors. This means that a participant can choose to respond to certain arguments that are presented in the deliberation, and another deliberator can take on a previous or earlier argument in the thread and continue from there. That differs from offline deliberations, in which the golden rule is to respond to previous argument first, and the arguments are exchanged between persons. In crowdsourced deliberation, we don't often even know if the participants are same or different, due to the anonymous nature of the crowd. This often leads to highly person-centric to the other participants' arguments, but they choose which arguments they care to respond to, build on, or to propose new ones.

## 5 Differences between crowdsourced democratic deliberation, mini-publics and online deliberation

As the aforementioned list of features show, crowdsourced democratic deliberation differs from the traditional mini-publics approach in several ways. Instead of random sampling, crowdsourced democratic deliberation is based on self-selection. Randomization, however, could be applied even within the self-selected crowd, assuming that the crowd is large enough to be divided to smaller groups, and the technology facilitating deliberation would meaningfully enable small group deliberations.

Crowdsourced democratic deliberation happens online, and allows mass-participation, instead of only small group of participants. Its asynchronous, distributed, and depersonalized nature gives more freedom to the participants: they can participate as much or as little as they want, and they can choose the place and time too. The mini-publics approach, instead, requires a physical presence, often times traveling to the location, and a continuous presence and participation before the deliberation is over. Crowdsourced democratic deliberation is typically also anonymous, following the nature of crowdsourcing, which is often based on anonymity.

Crowdsourced democratic deliberation differs from other types of online deliberation. Crowdsourced democratic deliberation is a part of a larger process, which is governed by the crowdsourcer, and the process has a goal. In crowdsourced policymaking, the goal is typically to develop stronger policy, and deliberation can support the goal with its epistemic qualities. Crowdsourced

democratic deliberation thus differs from discussions on newspapers' commenting forums, or other online forums, on which people exchange arguments. While these interactions may qualify even as democratic deliberation, they don't fulfill the criteria of crowdsourced democratic deliberation unless there is crowdsourcing activity, including a goal and structure in the process. Deliberation on platforms such as Consider.it and Deliberatorium could qualify as crowdsourced democratic deliberation, assuming that they meet the aforementioned criteria.

## 6 Promises and challenges of crowdsourced democratic deliberation

Now that we have established what crowdsourced democratic deliberation is, let us focus on examining the promises and challenges of this type of political communication. Crowdsourced democratic deliberation holds the potential for scaling up democratic deliberation from small group interactions with physical presence to mass-scale online deliberations. That means faster, cheaper and more widespread deliberations, because the participants don't need to travel to attend deliberations with physical presence but they can participate conveniently online. Empirical evidence shows that democratic deliberation takes place in crowdsourced policymaking (Aitamurto and Landemore, 2013; 2016), which shows promise to sustaining both large numbers of participants and the qualities of democratic deliberation.

Despite its promise, crowdsourced democratic deliberation faces serious challenges, the first one being its value in policymaking. Does crowdsourced democratic deliberation have any import to the actual policymaking process? Deliberative democrats would argue that yes, it does: it creates value with its epistemic and legitimacy enhancing qualities. Both of these are, however, debatable. First, while democratic deliberation may produce knowledge, does it produce more useful and usable knowledge than crowdsourced knowledge search through ideation or other type of knowledge sharing? In crowdsourced democratic deliberation, the crowd exchanges arguments about the given issue, resulting to long comment threads. The crowd is asked to express their opinions and share supporting arguments, not knowledge. Most likely there is knowledge shared too, but it is buried in opinions and arguments. While the quality of democratic deliberation may be high in these discussions, the amount of unstructured data can make the analysis process impossibly burdening to crowdsourcers. Even if the analysis could be automated, say, for instance, with sentiment analysis, it remains unclear what the value of the crowdsourced arguments are. As elaborated earlier, crowdsourcing is a self-selective method, leading to a non-representative sample of the population — not to the public opinion based on a random sample. The

self-selected crowd most likely has an interest bias (they participate because they have a stake in the issue, and are already active in the issue) and demographic bias (they have access to the online process) What is the value of aggregated preferences of a non-representative crowd?

When crowdsourcing for knowledge, instead for deliberation, the process is ideally designed for collecting solutions for defined problems, often giving a structure in which the solutions are proposed. That unifies the data and makes it easier to analyze, whether manually or automatically. Because the goal is to find knowledge — for instance, solutions — the crowd’s input is analyzed based on the knowledge value in it, that is, using criteria such as the feasibility, effectiveness and cost-efficiency of the solution.

To this end, crowdsourcing for knowledge should have stronger epistemic qualities in policymaking, but the legitimacy claims of crowdsourced democratic deliberation still remain. When citizens participate in democratic deliberation en masse, we could argue that the outcome of the process — the policy — has more legitimacy than a policy that has not been deliberated in public. However, how legitimate is a process, in which a self-selected crowd with most likely an interest bias and a demographic bias, has deliberated about an issue and expressed their opinion? Does the transparency and (assumed) large numbers develop the legitimacy, or should we expect some kind of representativeness of the participants? In traditional deliberation, the legitimacy is ensured by selecting the participants, either based on random sampling (public deliberations) or elections (deliberations among political representatives).

There is also an inherent discrepancy between the traditional use of deliberation and its role in crowdsourced policymaking. Traditionally, deliberation is often primarily tied to decision-making. In crowdsourced policymaking, instead, the crowd participates in the research and drafting parts of the process, producing options that are considered to the policy. That means there are often hundreds, and even thousands of options, in the form of proposed ideas and comments. There are not just two options that the crowd would deliberate about, and the crowd is not a part of the decision-making process. Therefore, even if the challenges with representativeness were solved, it remains unclear what role the aggregated preferences of the crowd should play in policymaking.

Deliberation, of course, can have other positive effects, such as peer-learning and social awareness, which should be taken into account when evaluating the value of crowdsourced democratic deliberation. These are, however, have more procedural than instrumental value in reaching the goal, a stronger policy.

There are other open questions too. One is about quality and scale. Can mass-scale deliberation be as high quality as small-scale, in-person, highly controlled democratic deliberations? How much reasoned argumentation and critical listening there has to be present so that a crowdsourced process qualifies as being crowdsourced democratic deliberation? How should the quality of deliberation be

measured? Crowdsourced democratic deliberation may have its own, inherent features that are distinct from democratic deliberation.

The latter set of questions can be addressed by smart design of the process. But the former ones are higher in priority, and we need to address those before moving forward with any design decisions. As is, crowdsourced democratic deliberation has primarily procedural value with its legitimacy enhancing qualities. Epistemic value remains unproved, and thus, the method lacks instrumental value: it is unclear if it helps developing stronger policies. Therefore, the main question remains: What is the role of crowdsourced democratic deliberation in open policymaking?

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