Five Design Principles for Crowdsourced Policymaking: Assessing the Case of Crowdsourced Off-Road Traffic Law in Finland

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ABSTRACT

This article reports a pioneering case study of a crowdsourced law-reform process in Finland. In the crowdsourcing experiment, the public was invited to contribute to the law-reform process by sharing their knowledge and ideas for a better policy. This article introduces a normative design framework of five principles for crowdsourced policymaking: inclusiveness, accountability, transparency, modularity, and synthesis. Inclusiveness, accountability, and transparency are overarching principles for crowdsourced policymaking. Modularity and synthesis support these overarching principles and are instrumental in achieving the main goals of crowdsourced policymaking, namely, an efficient search for knowledge and democratic deliberation among the participants. These principles apply to both the design of the process and the medium that the process takes place in, i.e., the technology facilitating crowdsourcing. This article analyzes the design of the crowdsourced off-road traffic law experiment in Finland using the five principles described above and provides a future research agenda for examining design aspects in crowdsourced policymaking.

KEYWORDS

Crowdsourcing, crowdlaw, crowdsourced policymaking, deliberative democracy, participatory democracy, direct democracy, large-scale idea management, online deliberation

INTRODUCTION

Crowdsourcing has become a more common method for engaging citizens in democratic processes (Aitamurto, 2012). In crowdsourced policymaking, citizens are invited to share their ideas and knowledge about a policy, including the laws that are instrumental to it. Crowdsourcing thus can give citizens an opportunity to have an impact on policies and even laws before institutional bodies, such as a local government or a national parliament, decide on them. In these processes, the citizens—the crowd—generate ideas and work together on online platforms. A largely unexplored question is how crowdsourced policymaking (including the medium it uses) should ideally be designed. In particular, what are the design principles that should inform successful crowdsourced policy reform? Here, we define a successful process to be one that, first, effectively engages citizens in active participation. Second, the success is measured by its epistemic properties, namely the extent to which it generates useful knowledge and information for the decision-makers, including new ideas, solutions, and proposals, which can help in creating better policies.

This paper addresses the following research questions: What design principles should govern crowdsourced policymaking processes? And, more specifically, what principles should be embedded in the medium that is used in crowdsourcing initiatives? The paper introduces an aspirational five-point framework for designing crowdsourced policymaking processes. We propose that three ideal principles derived from the normative literature in deliberative and epistemic democracy can be usefully applied in crowdsourced policymaking processes and embedded in the technology accompanying them. These ideal principles are inclusiveness, accountability, and transparency. Drawing on a crowdsourced law-reform process in Finland, we also identify two pragmatic principles—synthesis and modularity—as key factors for ensuring that the process meets its deliberative and epistemic goals. Finally, the paper analyzes the crowdsourced law-reform in Finland in light of the five design principles.

The paper is structured in five sections. First, we review the necessary key concepts for understanding crowdsourcing in policymaking and democratic deliberation. We also review some examples of argumentation and deliberation technologies. In the second section we introduce our case study: The crowdsourced off-road traffic law process in Finland. In the third section we introduce the five design principles mentioned above. In the fourth section we analyze whether and how these principles were evident in the Finnish case. In the fifth and final section,

we conclude with a discussion of the Finnish experiment and introduce a future research agenda that focuses on examining the optimal design for crowdsourced policymaking.

KEY CONCEPTS

Crowdsourcing in public policymaking

Crowdsourcing for policymaking in government, and particularly in law making, is a relatively new phenomenon. Crowdsourcing is an open call for anyone to participate in an online task (Brabham, 2008, 2013; Estelles-Arolas & González-Ladrón-de-Guevara, 2012; Howe, 2008) by sharing information, knowledge or talent. Unlike outsourcing, in which a task is assigned to a specific agent, crowdsourcing has no target group defined ex ante. "The crowd" refers to the group of individuals that self-select to participate from a large pool of people—in theory the entire pool of people who have access to the internet and are aware of the task and the possibility of participating in it.

Crowdsourcing can be roughly divided into three types, depending on the kind of goal it primarily pursues: idea generation, argumentation, and microtasking. Crowdsourcing for idea generation has been widely used by companies, for instance through innovation intermediaries such as InnoCentive. Crowdsourcing enables companies to identify solutions for research and development challenges. Crowdsourcing for argumentation is facilitated by technologies like Consider.it and Deliberatorium, which allow users to map out the pros and cons of a particular position in a debate. In crowdsourcing for microtasking, private companies or public organizations seek to outsource (sometimes for a monetary compensation, sometimes for free) simple or easily performed "micro" tasks to large groups of people. Microtasking for monetary compensation happens on virtual labormarkets such as Mechanical Turk or oDesk. An example of voluntary (without financial compensation) microtasking is so-called crowdmapping, often used by governmental agencies after natural disasters to map affected areas as accurately and quickly as possible. For instance, after Hurricane Sandy in the United States in 2012, the Unites States Geological Survey asked the crowd to compare before and after pictures of coastal areas to map the consequences of the hurricane (Liu, 2014).

National and local governments across the world are increasingly using crowdsourcing as part of their open government practices (Faria, 2013; Yu & Robinson, 2012). The open government practices enhance principles of good governance, including inclusiveness, accountability, and transparency (Fung & Weil, 2010; Piotrowski & Van Ryzin, 2007; Chun, Shulman, Sandoval & Hovy, 2010). One of the best-known instances examples of the governmental use of crowdsourcing occurred in Iceland in 2011, when the country utilized crowdsourcing in its constitutional reform process. The Constitutional Council, appointed by the Parliament to draft the new constitution, invited Icelandic citizens to comment on constitutional drafts regularly published on a dedicated website and a Facebook page (Landemore, 2014). In addition to the iconic Icelandic experiment, there are many more instances of crowdsourcing in both local and national governance across the world. Many federal agencies in the United States have been crowdsourcing information and opinions on their strategies for several years. For instance, the Federal Emergency Management Agency (FEMA) crowdsourced the reform of the National Incident Management System.

Drafting policies in wiki-style with the help of constituents is also becoming more common, as on the Madison Platform [1] or in Assemblyman Mike Gatto's wiki-law project in California. [2] In these experiments the crowd collaborates in real time to revise a policy through an online platform. This method is called commons-based peer production (Benkler, 2002) and is widely used in collaborative writing projects, such as the online encyclopedia Wikipedia, and in open and free software production. However, commons-based peer production and crowdsourcing are not equivalent methods. In crowdsourcing the crowd is asked to participate by completing a task, whether that task is sending a picture, submitting ideas or opinions, or sharing their geographic location on a map. The task is typically a one-time contribution that does not involve working with other contributors. In commons-based peer production, by contrast, members of the crowd collaborate together to create something, merging their contributions rather than merely aggregating them. For instance, crowd members might draft a policy on Google Docs or an Etherpad [3] type of platform.

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[1] See http://opengovfoundation.org/the-madison-project/

[2] See http://www.dailynews.com/government-and-politics/20140313/state-assemblyman-mike-gatto-uses-wiki-to-draft-laws

[3] Etherpad is an open-source software application for collaborative real-time writing. http://etherpad.org/

Idea crowdsourcing has proved to be an effective method in several contexts. Primarily crowdsourcing efficiently extends the knowledge search to a functionally limitless number of problem solvers (Aitamurto, 2014). In the Icelandic case, it arguably made it possible to introduce greater cognitive diversity into a traditionally closed and secretive deliberation over constitutional matters (Landemore, 2014). By crowdsourcing knowledge from citizens—the crowd—the government can gather large amounts of information for improving policy and reach information sources that would not be easily accessible otherwise.

Crowdsourcing can also serve the goals of deliberative democrats (e.g., Cohen, 1989; Guttman & Thompson, 2002) — including fostering the public exchange of arguments amongst citizens and ensuring the fair representation of all-affected interests. Mostly, crowdsourcing is likely to serve the goal of epistemic deliberative democrats, who emphasize the knowledge-aggregating and truth-tracking properties of democratic deliberation, (e.g., Goodin, 2005; Estlund, 2008; Landemore, 2013; Ober, 2009). Crowdsourcing makes it indeed possible to bring the dispersed and often unheard knowledge and voice of the people into the public sphere. This ensures the fair consideration of all affected interests as well as at institutions more likely to enact better laws, policies, and decisions. Crowdsourcing can finally generally serve as a tool for participatory democrats (e.g., Pateman, 1970; Barber, 1984; Fung &Wright, 2001), who specifically stress the educative properties of political participation.[4]

Idea crowdsourcing and deliberation technologies

There are two sets of technologies that are used for crowdsourced policymaking: technologies for large-scale idea crowdsourcing and technologies for certain types of online deliberation and argumentation. The aim of the first category of technologies (large-scale ideation) is primarily an efficient knowledge search. For instance, technologies called IdeaScale and Spigit Engage allow users to submit, discuss, and vote on different ideas. These technologies are often first designed for the private sector and then adapted for public institutions. Ideation technologies have been used widely in crowdsourced policymaking processes, including citywide and nationwide processes in Italy (Cindio & Stortone, 2013); in a statewide process in California, United States (Nelimarkka et al., 2014); and in citywide processes in Vallejo, California and Vancouver, Canada.

The second category of technology is argumentation tools, which seek to draw out arguments and justifications for opinions and proposals (Kirschner, Buckingham-Shum & Carr, 2003; Moor & Aakhus, 2006). Argumentation technologies typically strive for large-scale online deliberation and are thus more often used in deliberative contexts in which participants self-select. This is in contrast to online "invited spaces" (Kersting, 2013), which have traditionally been used in deliberation, such as in Deliberative Polls, where a limited number of participants (often randomly sampled) are chosen by the organizers to form statistically representative "mini-publics" (Goodin, 2005).

Digital argumentation technologies enable both the modularity of the crowd's input and the synthesis of that input. A modular process distinguishes sequences in crowdsourced policy making. In synthesis, the crowd's input is analyzed and summarized. These features make the processes easier for the users to comprehend and thus increase their accessibility. Users are encouraged to provide evidence, logic, and justifications for their preferred choices (Kirschner et al., 2003). Consider it, for instance, is a deliberation technology that encourages the user to consider tradeoffs for a specific issue (Kriplean, Morgan, Freelon, Borning & Bennett, 2012); the process measures a participant's opinion about the issue using a scale of "support," "neutral/undecided," and "oppose." This first poll provides a baseline assessment of each participant's initial position on a topic, which is measured again after deliberation. When a user enters the deliberation mode, the program provides a pro/con list of the issue, based on the user's initial opinions. Thus, the technology clearly visualizes if the user has a biased view, that is, has only pros or only cons. The process also helps users listen to one another by allowing them to adopt points from other users' pro/con list. When a participant adopts a point, the user is comparing her or his views to others' opinions and thus listening to someone else.

Deliberatorium, another deliberation technology, uses argument mapping to foster argument exchange between participants (Klein, 2011, 2012). In a Deliberatorium, the participants propose solutions to societal issues such as climate change. The solutions are then presented visually as an argument map, which reduces redundancy in the input and allows users to develop the ideas further in modular threads. Another deliberation technology, Open Town

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[4] While participatory democracy is now often subsumed under the deliberative democracy umbrella, it maintains the slightly distinctive notion that political participation is good essentially for the way it shapes better citizens if not better human beings altogether.

Hall, allows ideation and public commenting on policy issues. As in a face-to-face town hall meeting, participants are only allowed to post one statement but can continue to engage by responding to others' ideas and comments. In this respect, Open Town Hall resembles large-scale ideation technologies. The Open Town Hall platform maps the frequency and location of particular suggestions (Vogel, Moulder, & Huggins, 2014).

Ideally, argumentation technologies should foster democratic deliberation, defined as the public use of arguments and reasoning among free and equal individuals (adapted from Cohen, 1989).[5] For many participatory and deliberative democrats of both the procedural (e.g., Cohen, 1989; the early Habermas, Gutmann & Thompson, 2002) and epistemic kind (e.g., Estlund, 2008; Landemore, 2013), democratic deliberation is a generally desirable social goal for both intrinsic and instrumental reasons. Crowdsourcing for public policymaking ideally incorporates the two aspects of knowledge gathering and democratic deliberation. By so doing, crowdsourcing channels in knowledge for policy creation and creates spaces for public debate. Ideally, crowdsourcing in policymaking simultaneously produces useful information about the issue at hand and a deliberative democratic setting, both of which are beneficial for society at large.

CASE PROFILE

The off-road traffic law in Finland

In this section we introduce the case study of this article: crowdsourced off-road traffic law reform in Finland. Off-road traffic laws regulate traffic beyond established roads, e.g., motor-powered transportation in nature, mainly with snowmobiles in the winter and all-terrain-vehicles (ATVs) in the summer. The Ministry of Environment currently regulates off-road traffic in Finland under a law that came into effect in 1995. The law was perceived to be in need of reform for several reasons, including the increased volume of off-road traffic.

The previous government of Finland, in power from 2010 to 2011, proposed a bill to the Finnish Parliament to reform the off-road traffic law in 2010, but the bill expired after causing some controversy. The Ministry of Environment decided to experiment with crowdsourcing as a public engagement tool in the law-reform process (herein referred to as the Finnish Experiment). The process, which was decided on in 2012 and started in January, 2013, aimed to search for ideas, knowledge, and perspectives from online participants and to enhance the general public's understanding of the law. The Committee for the Future in the Finnish Parliament partnered with the Ministry of the Environment to run crowdsourced law-reform as a pilot project to test and learn about new methods for civic engagement and knowledge search.

Crowdsourcing in off-road traffic law reform

The process began in the spring of 2013 on the online platform www.suomijoukkoistaa.fi (user interface is presented in Figure 3 in Appendix). The crowdsourcing software was produced by IdeaScale. Participants could propose ideas on the platform, vote ideas up or down (Figure 4 in Appendix), and comment on each others' proposals (Figure 5 in Appendix). The users gained points by participating, and the points turned into badges on the online platform (Figure 6 in Appendix). Points were gained by submitting ideas, voting, and commenting, so the badges show the level of the participants' activity. The information on the platform and the crowd-generated input were accessible and visible online. In order to leave a comment, propose an idea, or vote (thumbs up/down modality) on the platform, users had to register on the site. They could choose to stay anonymous, use their real names, or create a nickname. A verifiable email address was required for registration.

The Ministry also set up a website (www.maastoliikennelaki.fi) to provide more information about off-road traffic law. The off-road traffic law, the expired bill, and research on off-road traffic were published on the website. A video with the Minister of Environment Ville Niinistö explaining the goals and reasons behind the crowdsourced process was published on the website. The website was also used for publishing updates about the proceedings and included widget integration in the crowdsourcing platform.

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[5] The "use of arguments and reasoning" is an exchange of arguments in which the participants attempt to convince their interlocutors of the validity of a claim or deny a claim. Deliberation thus requires a reasoned exchange of arguments; democratic deliberation also requires equal standing among autonomous participants ("free and equal") as well as the "public" aspect of the exchange. Even in processes in which deliberation was the goal rather than knowledge search, information sharing usually occurs as a by-product of deliberation.

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The authors of this article participated in the crowdsourcing process by designing and leading the operation. The Finnish-speaking author moderated the online platform with two others. The authors thus applied the methodology of action research, or actively interacting, producing, and creating the research site (Gustavsen, 2001; Ladkin, 2004). Once crowdsourcing began, the authors took the role of participant-observers (Hansen, Cottle, Negrine, & Newbold, 1998). The participation of the researchers allowed them to gain a better understanding of the design and technical aspects shaping the process. The design principles that are introduced in this article did not guide the design process. Rather, the three design principles (inclusiveness, accountability and transparency) are derived, for the purpose of this article, from theories of deliberative and epistemic democracy, and the two other principles (modularity and synthesis) are based on the authors' experience with the case.

Two sequences of idea crowdsourcing and the evaluation phase

The crowdsourced parts of the process included two distinct phases or sequences, as illustrated by Figure 1. In the first phase, civil servants in the Ministry of Environment along with the researchers defined ten main areas in which problems could be identified through crowdsourcing. The civil servants were experts on off-road traffic law in the Ministry and also wrote the expired bill. The ten areas included the following topics: problems related to off-road traffic, moving the decision-making from local to the state level, age limits for off-road traffic, the environmental impact of off-road traffic, registration procedures for off-road traffic vehicles, the rights of the indigenous people, and regulation of the route and track establishment procedures. The first phase of the process began in January, 2013 and ended at the end of March, 2013.
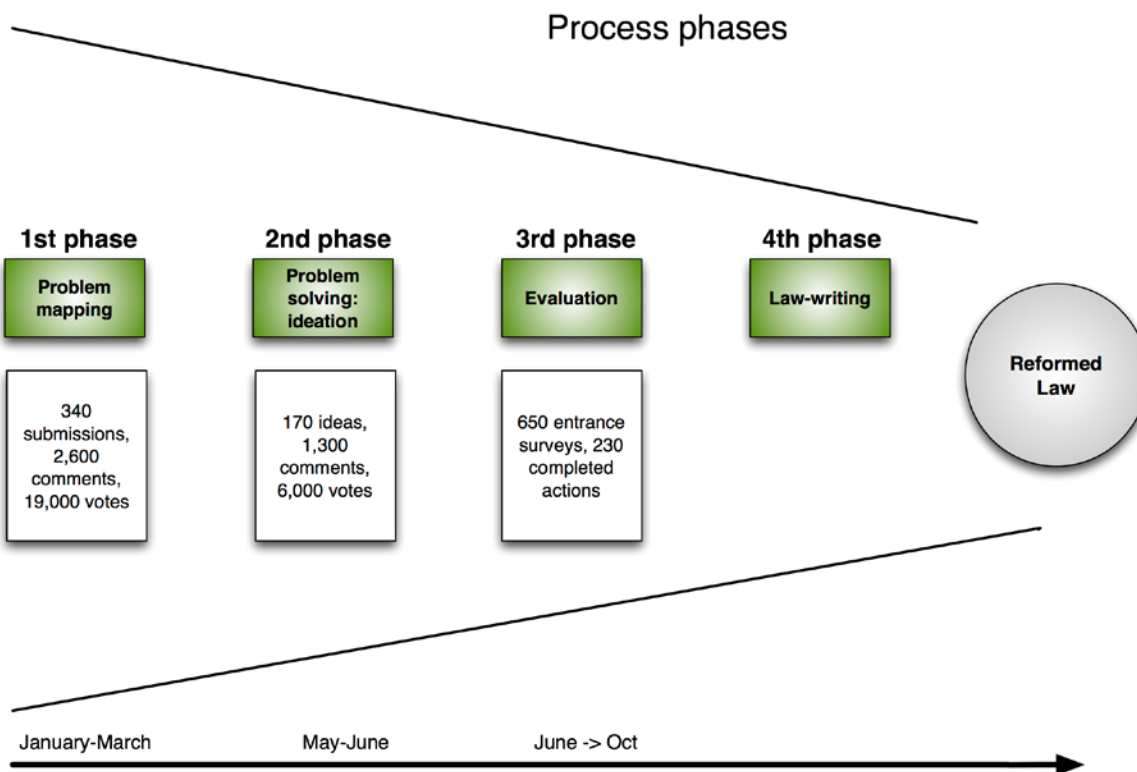

Figure 1. Phases in the crowdsourced law-making process

The participants were asked to propose ideas and share their perspectives within the problem areas of their choice. The prompts for the participants included questions about the topic. To cite one example, in the prompt about age limit, the participants were asked if the current age limit of 15 years was sufficient or whether the age limit should

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be lowered to 12 years. The prompts also provided information about the current regulation. A category called "Propose your own topic," which allowed the participants to make suggestions outside the provided framework, was added by public demand soon after the launch, so that the participants could contribute ideas beyond the pre-determined categories.

The first crowdsourcing phase generated approximately 340 ideas and conversation starters, 2,600 comments in reaction to the ideas and conversation starters, and 19,000 votes from approximately 700 users. The researchers analyzed the participants' input by summarizing the ideas and problems in the submissions. They then organized the ideas and comments into categories alongside the civil servants. These categories consisted of larger "challenge areas," which were then refined and used to guide the design of the second phase. The analysis of the ideas was conducted in teams, and the interpretation of these ideas was then cross-checked within the team. Nevertheless, the task was obviously not fully objective and if it had been performed by a different team or in a more transparent manner, the result would likely have been slightly different.

It is notable that the participants shared ideas and concerns regarding off-road traffic beyond the pre-defined categories. This reflects the extension of the knowledge search from the traditional participants, e.g., interest groups, to the undefined crowd. As a result, the first phase served to map problems and identify needs, fulfilling problem-mapping and need-sensing functions beyond those of the traditional experts.

In the second phase, the participants were invited to propose solutions to the problems identified in the first phase. To do this, the broad challenge areas were divided into more narrow topics. For instance, the "Safety" category was divided into the subfields of "Improving Safety in Off-road Traffic" and "Safe Transition Traffic Off- and On-road." The participants could also propose their own topic in the "Propose your own topic" section. The second phase generated approximately 170 ideas, 1,300 comments, and 6,000 votes. The researchers analyzed the crowd's submissions when the second phase concluded. The second phase started in April, 2013 and ended in June, 2013.

During the two idea crowdsourcing stages, 700 out of 7,000 visitors registered on the site, in keeping with the predictions of the so-called 1-9-90 rule in online participation. The rule states that typically 90 percent of the visitors only observe the online activity and 10 percent participate more actively. Out of the 10 percent, 1% produce most of the content.[6] In keeping with this trend, most of the ideas proposed in the Finnish crowdsourcing process were generated by a minority of registered users. In the two phases, 23.46% of the participants produced at least one idea, and 46.44% of the ideas were produced by the ten most active ideators. Most of the ideators produced only one idea: out of 175 idea producers 121, i.e. 69%, produced one idea, as illustrated in Figure 2.

The crowdsourced off-road traffic law process was designed explicitly for crowdsourcing knowledge. However, while there was no designed incentive for deliberation or collaborative problem solving, the crowd nevertheless deliberated about the issues by exchanging arguments. They also actively shared information about the topic by posting links, pictures, videos, and documents as attachments to their comments and ideas. Thus, the crowdsourced process functioned both as a knowledge search and a space for democratic deliberation.

There was very little moderation on the platform. Rather, it manifested as follow-up questions and clarifications by the moderators. A comment was removed if it was insulting to other participants or if it was inappropriate. From the total of 4,000 comments, approximately ten comments were removed in each phase because they were deemed inappropriate in content or tone.

In the third phase, ideas were assessed by crowd and expert evaluation. Crowd evaluation was conducted on a specific online platform in which the participants assessed the ideas generated in previous stages. The participants signed up on the platform and received a random sample of ideas to be evaluated. They then used two evaluation methods: rating and comparison. In a rating evaluation, participants rated an idea on a scale from 1 to 5. In a comparison evaluation, participants were asked to either choose a favorite idea out of two in a pairwise comparison or to rank several ideas in the order of their preference. The ideas came from eleven categories, and the participants had no choice in the category from which the ideas came. The participants did not see the full pool of ideas, nor did they see other participants' evaluations. Each idea's popularity was then analyzed and ranked (see Lee, Aitamurto, Landemore, & Goel, 2014 for more on the crowd evaluation process).

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[6] For more about the rule, see http://en.wikipedia.org/wiki/1%25_rule_%28Internet_culture%29
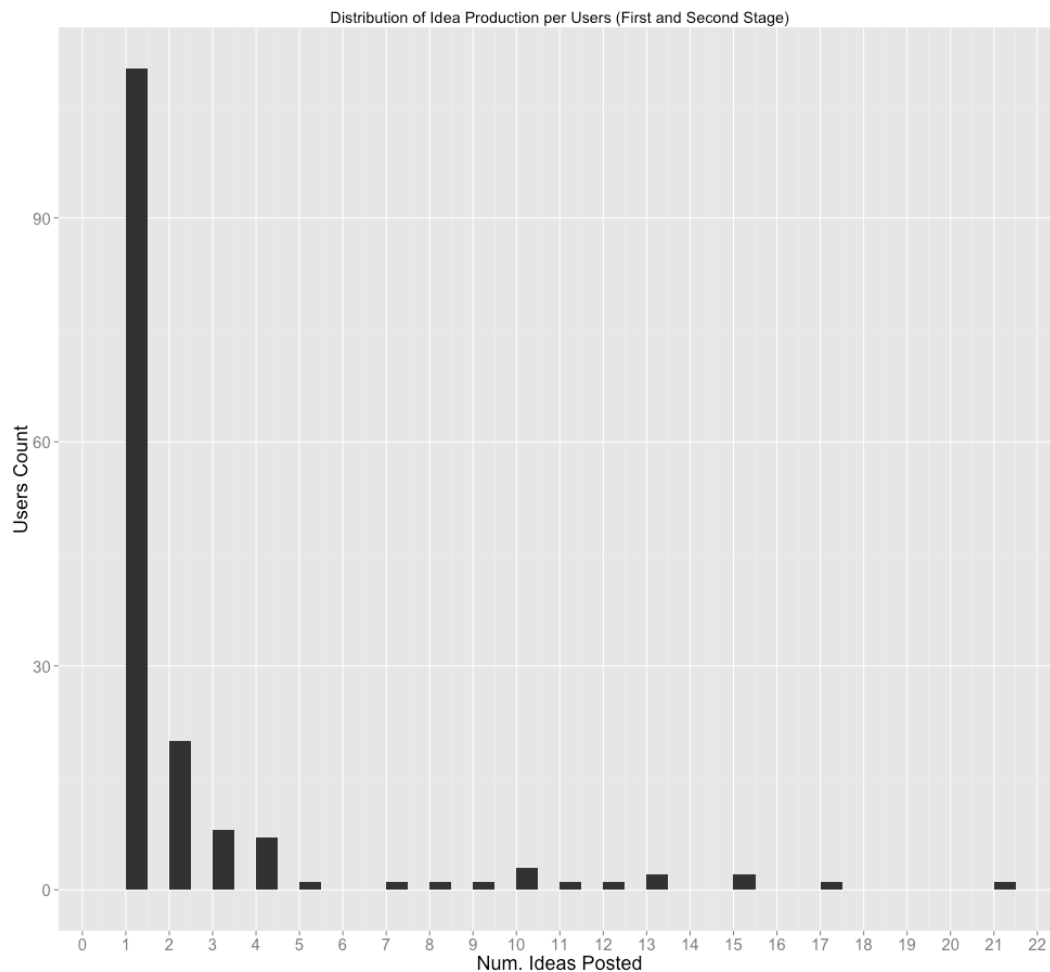
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Figure 2. Distribution of idea contribution activity among the users in the two crowdsourced ideation stages

Evaluation by an expert panel was simultaneously performed through eleven online surveys administered to 34 experts in Finland, the United States, and Estonia. Each survey consisted of ideas in each of the eleven categories. The respondents were asked to rate ideas according to four different criteria (feasibility, efficiency, cost-efficiency, and fairness) along a 7-point scale. They were also asked to provide the reasoning for their evaluation. [7] The reports about crowd and expert evaluation were given to the Ministry of Environment, with recommendations for the next steps in the process. Because the law reform process is not complete, we leave the analysis of the future end result, i.e., the reformed law, out of this article. [8]

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[7] A more detailed description of the evaluation methods can be found in a report about the crowdsourced off-road traffic law reform to the Committee for the Future (Aitamurto, Landemore, Lee & Goel, 2014).

[8] Next parliamentary elections will take place in Finland in 2015, and if the law reform is not completed by then, it will most likely expire.

DESIGN PRINCIPLES FOR CROWDSOURCED POLICY MAKING

In this section we introduce five design principles for crowdsourced policy making that are directed toward information gathering and democratic deliberation. These design principles are inclusiveness, accountability, and transparency, modularity, and synthesis. The authors developed the principles by responding to the question: What should be the essential characteristics for a crowdsourced policymaking process and the medium facilitating it? The first three — inclusiveness, accountability, and transparency — are guidelines developed in the contemporary literature on democratic theory, specifically deliberative and epistemic democracy, as well as in existing practices such as the Open Government Initiative.[9]

The first one, inclusiveness, is a general democratic principle. The second one, accountability, is a condition of political legitimacy. The third one, transparency, is a recently re-emphasized component of democratic legitimacy, designed to ensure accountability. The last two — modularity and synthesis — are more pragmatic principles instrumental for achieving the goals of efficient knowledge search and democratic deliberation and more generally supporting the ideals of inclusiveness, transparency, and accountability. They are derived from the experience of designing and executing the crowdsourced law-making reform in Finland.

There are many other principles we could have used as normative ideals. Among them, equality, diversity, participation, and collaboration come to mind. We considered that the principle of inclusiveness was itself relatively inclusive and a good proxy for equality (inclusion in the crowdsourcing process is after all done on an egalitarian basis in the larger context of a democratic society). We figured that diversity was also partly promoted by inclusiveness and in any case could not be the normative guideline of a process where self-selection of the participants is the rule. Participation and collaboration are obvious motivations for the crowdsourcing experiment and thus so integral to the experiment that they do not helpfully serve as design principles. Notice also that the ideal of participation tends to emphasize actual and mass participation of the targeted community. It is a high democratic bar. Inclusiveness is less demanding in that it simply requires that the door be open to willing participants, even if we know or can expect that only a certain fraction of the targeted group will ultimately choose to participate (as predicted by the 1/9/90 law). Regarding the pragmatic principles, experience simply taught us that modularity and synthesis were helpful in ways that seemed more important than other contenders.

The five normative principles are meant to assess both the crowdsourcing process and the medium, i.e., the technology that make crowdsourcing possible. Existing frameworks for designing online deliberation are scarce, and mostly focus on the practical "how-to" guidelines of designing the technology (c.f. Towne & Herbsleb, 2012). Instead, the principles introduced in this article are a normative theoretical framework. They are aspirational insofar as they can only be fully met in an ideal policy making process. Table 1 summarizes the design principles and the aspects of the principles.

Inclusiveness

Inclusiveness is a key democratic principle underlying the very ideal of democracy and its various institutional expressions, including universal suffrage.[10] From our point of view, crowdsourcing in policymaking can serve inclusiveness in two ways. First, it can increase inclusiveness at the process level, by opening the door of participation to a potentially large number of citizens. From that point of view, the larger the crowd the better, in part because a larger crowd is more likely to contain a greater degree of cognitive diversity with respect to the set of issues at stake (Landemore, 2013). Second, crowdsourcing can increase inclusiveness at the systems-level by creating a new space within a "deliberative system" (Parkinson & Mansbridge, 2012) for individuals, ideas, issues, and interests that are not necessarily represented, discussed, or welcome elsewhere.[11]

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[9] Launched on December 8, 2009, the Open Government Initiative aims to foster the principles of transparency, participation, and collaboration. See http://www.whitehouse.gov/open/documents/open-government-directive, last checked December 5, 2014.

[10] One of the authors has argued that inclusiveness is valuable not only for its intrinsic properties, as expressing our commitment to democracy generally speaking as well as our respect for the equality, dignity, and autonomy of all citizens, but also for its instrumental value, in the sense that it can be expected to increase the quality of the policies, laws, or decisions (Landemore, 2013).

[11] Issue representativeness is particularly important. While the participant crowd will most likely not be a statistically representative sample of the population due to the self-selective nature of crowdsourcing, the issues that are relevant in the debate might still be present in the crowd's input.

Table 1. Design principles for crowdsourced policy making

Principle	Goal of the principle	Process design	Design of the medium
Inclusiveness	The process is designed to include a large number of people from a diversity of backgrounds, which improves the knowledge search and enhances the legitimacy of the crowdsourced process.	The design strives to reach large numbers and maximum diversity in participation by attempting to get as much publicity as possible. Publicity and attention are reached by an efficient communication strategy, which involves many avenues for communication, including social media.	The process is communicated so that it is widely comprehensible and the barrier for participation stays low, regardless of the participants' demographic, socioeconomic, or technological background. The platform allows access from any device, browser, and operating system and provides human translation or automated translation.
Accounta-bility	Accountability ensures the justification of authorities' decisions and actions to the public, and their answerability to the citizens.	Accountability is built into the process design in every sequence so that decisions, justifications, and actions taken are communicated to the participants.	Horizontal and vertical communication on the platform supports accountability. The platform enables quick feedback loops to the participants with summaries of the outcomes.
Transparency	Transparency enables the participants to follow the policymaking process and peer communication, building trust and legitimacy in the process.	The process is transparent throughout, including both horizontal and vertical transparency.	The platform allows peer-to-peer communication and provides information equally to all participants.
Modularity	Modularity enables the comprehensibility of a long policymaking process, enables participation in several parts of the process, and enables ad-hoc and long-term participation. It also fosters a sense of accomplishment.	The process is divided into several meaningful sequences. Within the sequences the tasks are divided into smaller modules.	The sequences and tasks are visualized and displayed on the platform to ensure the crowd's ability to follow the process. The tasks are divided so that it is possible to participate in one or many.
Synthesis	Synthesis provides summarized outcomes and makes it possible to follow the developments in the process. In this way, it is also a part of the accountability feedback loop.	The process has moments for synthesis in which the crowd's input is collated, summarized, and shared with the public. The moments for synthesis naturally appear between stages.	The platform supports synthesis during and after the process. These features are key word tagging, showing negative and positive support for the idea, automated recognition of duplicate content, and the ability to merge duplicates. It also presents the synthesis on the platform and tracks the content in the synthesis to the crowd's feedback.

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From an applied point of view, inclusiveness first translates into accessibility. A more accessible process and platform lead to greater inclusiveness. An increased variety of platforms, including mobile and wearable devices, desktops, and tablets may also increase accessibility. Inclusiveness also requires ensuring that the process and platform be free from language barriers and provide human or automated translations. Technology (devices, browsers, and operating systems) should thus facilitate, rather than restrict, access. Access should similarly be equalized regardless of demographic profile, socioeconomic background, geographic location, and language skills.

Accessibility also demands clarity in the ways the goals and the structure of the process are communicated. The greater clarity of communication, the easier it is for the crowd to comprehend the meaning of the process, lowering the threshold for actual participation. Clear communication means keeping the crowd informed and maintaining contact with it throughout the process. The constructive presence of the organizers on the platform creates trust, ensures a peaceful participation environment, and mitigates the actions of potential trolls.

Finally, inclusiveness translates into modularity. Good process modularity means more accessibility because the participants have multiple entry points to the process and can join a deliberative scene throughout several stages.

Accountability

Accountability is another cornerstone of democracy that ensures the normative legitimacy of democracy as a political system. The concept refers both to the answerability of the authorities to the crowd and the enforcement mechanism through which this answerability is ensured (Offenhuber, 2013; Offenhuber & Schechtner, 2013; Schedler, 1999). Answerability demands that decision makers offer a public justification for the decisions and actions taken. Enforcement is the actual use of mechanisms and instruments that keep decision makers responsible for the consequences of their actions.

In crowdsourced policy making, accountability (as both answerability and enforcement) manifests itself first as a so-called "participatory contract" and second as a feedback loop in each stage of the process. A participatory contract lays out what is expected from all parties in the crowdsourcing process (nature of the participation, type of proposals and results expected, rights and duties of all involved, timeframe etc.) All sides, but mostly the side of the organizers, can thus be held accountable to a pre-defined set of promises and expectations. The feedback loop ensures that when part of a process concludes, the participants are informed about the next steps and given reasons for the decisions made and courses of action taken. The accountability loop should be closed in each stage of the process.

Transparency

Transparency is a more recent normative requirement of democratic legitimacy and, to a degree, a specification of the principle of accountability. Representative governments were long considered democratic to the extent that accountability was ensured through electoral and other mechanisms, even though representatives' decision-making processes were generally left closed-off and opaque. However, a loss of trust in representative institutions, combined with the emergence of new technologies allowing for easier data-sharing, has led to a renewal of emphasis on this principle, as in the recent Open Government Initiative, which puts emphasis on transparency as an integral condition for legitimate representative government. We follow suit by adding transparency as an additional and separate principle that should guide the design of a truly democratic crowdsourcing process.

Transparency refers to both (what we call) horizontal and vertical transparency. Horizontal transparency means transparency between participants. The profiles of the participants — whether anonymous or not — are visible for the participant crowd; they are also visible to the non-participant crowd. The crowd input is trackable by their profiles on the platform (though the profiles themselves can be anonymous) so that each input can be linked to a person. Transparency between the participants increases the likelihood for trust and levels the playing field by providing fair rules. This horizontal transparency cultivates peer-to-peer interaction and enables deliberation between the participants.

Vertical transparency refers to the transparency in the whole policymaking process, of which crowdsourcing is a part. In vertically transparent policy reform, all necessary information is publicized, including information about the organizers, the division of responsibilities, goals, and potential impacts. Vertical transparency enables the crowd to follow the process even after crowdsourcing is over.

While full transparency is the current ideal of crowdsourced policy making, it is very likely that future research will show how transparency can be selectively applied in crowdsourcing. There could be, for instance, moments in the process in which full transparency might hinder efficacy in policy making and is thus not desirable. While admitting this possibility, however, for simplicity's sake we use the transparency principle as a guiding line for the analysis.

We now turn to the two pragmatic principles: modularity and synthesis. These principles aim to render the normative guidelines more directly applicable for facilitating the direct goals of knowledge-aggregation and democratic deliberation. They also reinforce the norms of inclusiveness, transparency, and accountability. We offer them on the basis of lessons-learned from the experience of the Finnish law-reform process.

Modularity

Policymaking can take a long time. The preliminary research period in reform processes takes several years; it can take even longer before the law is decided in Parliament. Therefore, it is important to modularize the process, i.e., to distinguish clear stages in crowdsourced policy making so that the crowd knows which part they are invited to attend, what the previous stages were, and how the process will continue. Completing one stage at a time gives a sense of accomplishment. The stages can be visualized as a diagram, and the current stage can be highlighted. The diagram helps the participants to see the status of the process and the timeline going forward, helping to set the right expectations. In a similar vein, within each stage it is important to modularize the tasks that the crowd is invited to participate in. This can be accomplished by dividing the task of reform into several stages, each addressing different questions and accomplishing different things. The questions within each stage can be divided along topical categories and then further divided into several questions that the crowd is asked to respond to. Modularity can therefore allow participants to quickly understand what type of information is sought and evaluate their potential to contribute to the knowledge search. Modularity also fosters deliberation by providing clearly structured access points for argument exchanges.

Synthesis

Synthesis means the analysis and summary of the crowd-generated input. It also encompasses the overall analysis and synthesis of the proceedings and outcomes of the crowdsourcing process. Synthesis functions as a foundation for deliberation during and after the process. If it is effective, participants are better able to deliberate in an informed manner about the process. The process includes clear moments for synthesis in which the crowd's input is collated, summarized, and shared with the public. The moments for synthesis appear by construction between stages. The platform should have features that support synthesis during and after the process. These features are key word tagging, the ability to show negative and positive support for the idea, automated recognition of duplicate content, and the ability to merge duplicates. It should also present the synthesis on the platform and track its content to the crowd's input, for instance, tracking the evolution of an idea. Synthesis requires analysis, which can be done by using quantitative and/or qualitative methods. The platform should also provide automated synthesis tools. Importantly, synthesis provides summarized outcomes of the process and is thus also part of the accountability feedback loop. In an ideal process, synthesis is done in collaboration with the crowd so that the participants can impact its design and procedure.

Relationships between the design principles

It is assumed here that the five design principles are causally related to each other. These relationships and specific mechanisms assumed to link each principle are as follows:

1) The more transparent the process and platform, the greater the likelihood for inclusiveness. When the participants understand what participation means and what they might get out of it, they may have greater motivation to participate. Furthermore, the more transparency there is, the more trust there is in the potential to have an impact. This may also increase participation.

2) The more transparency there is in the process, the more likelihood there is for accountability because it is easier for the crowd to demand answerability and the harder it becomes for authorities to resist closing the accountability loop.

3) Accountability is linked to vertical transparency: the more vertical transparency there is, the easier it is for citizens to enforce answerability if needed. Horizontal transparency also increases the crowd's enforcement

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capacity because participants can rally their forces to pressure the authorities and demand answers if needed. Horizontal and vertical communication on the platform thus supports accountability.

4) Accountability is also linked to modularity and synthesis. A more modularized process supported by technology allows the authorities to have more meaningful opportunities for closing accountability loops. An improved synthesis creates a more holistic picture of the crowd's input and can provide more justification for the authorities' decisions. The better the synthesis, the easier it is for the crowd to judge whether their wishes have been reported and integrated in a satisfying manner. The crowd may also then demand answerability if the authorities do not appear to justify their decisions.

5) The more modular the process and technology are, the more likely the process is to be inclusive because it has several entry points for participation.

6) Similarly, the better the synthesis, the more transparency there can be because information is frequently and efficiently communicated to the crowd.

7) The better the synthesizing moments, the more accountability there can be because the crowd can then judge whether their wishes have been reported and integrated in a satisfying manner. They are then able to demand answerability if the authorities have not justified their decisions.

The design principles are manifested in several layers and sequences in the policymaking process. This means that while there might be effective levels of transparency in the beginning of the process, it might fade toward the end; alternatively, while synthesis may be lacking in the beginning, it may improve during the process.

ASSESSING DESIGN PRINCIPLES IN THE FINNISH EXPERIMENT

In this section we examine how the design principles described in the previous section were evident in the crowdsourced off-road traffic law process in Finland. The analysis is divided into the process and platform of each principle.

Inclusiveness

- **Process**: The process aimed for a large number of participants. The process was publicized by using the official communication channels of the Ministry of Environment, social media, and mainstream media, which covered the process several times as the first legislative pilot project involving crowdsourcing in Finland. Announcements about the process were distributed on mailing lists of interest groups, such as the Finnish Association for Nature Conservation and on the online forums of the various snowmobile and ATV riding clubs and hobbyist groups. The platform received about 10,000 visits during the process, and about 700 participants (slightly less than 10%) registered. Considering there are about 100,000 snowmobiles in Finland and thousands of snowmobile club members who are potentially interested parties and participants in the law-reform process, 700 people is not a statistically representative sample of Finns. However, the process is undeniably more inclusive than the traditional law-making process in which only a handful of civil servants and lobbyist group members draft the law.

  The analysis of the crowdsourced content showed that the main arguments typical of discussions about off-road traffic law were present on the platform. Therefore, the process was arguably sufficiently inclusive to present a diversity of views; yet whether it was comprehensive enough to identify all views or those more rarely expressed is not known.

- **Platform**: The crowdsourcing platform was device-inclusive i.e. it was accessible from laptop, mobile, and tablet devices. It was also accessible through all mainstream browsers and operating systems. The main language was Finnish, and automated translations could be found in Swedish, which is a minority language in Finland. The multi-language support provided was not particularly high quality, but the automated translation in the Google Chrome browser had better quality.

  The sign-up process to the platform was made as easy as possible so that the user could either create an account with their email address or use Facebook or other social network credentials to sign on. Signing up required a verifiable email address and could have caused difficulties for those not familiar with the internet. Having an email address was a differentiating factor and increased the threshold of participation in the process. For those

without an electronic address, it was unlikely that they would get one just to participate since it would also involve establishing a password.

In crowd-evaluation the participants were asked to sign-up on a different platform than that used in the idea crowdsourcing sequence. To sign up, a participant had to fill out an entrance survey, which inquired about the participants' demographic background. This requirement might have turned some participants away. Furthermore, the crowd-evaluation platform was usable only by a more recent browser updates, meaning that if the user hadn't updated their Mozilla Firefox browser, or other mainstream browsers, to the more recent versions, the evaluation platform was not accessible to them. The existence of two different platforms and the technical constraints associated with the second one caused confusion and criticism among the participants and are some of the ways in which the crowd-evaluation part lacked equal access, likely hindering inclusiveness.

Accountability

- *Process*: Aspects of accountability were weak. Accountability mainly manifested itself in communication after each stage in the process. The participants received emails from the organizers and the researchers, which informed them of the next steps, but the degree of accountability dropped over time. After the analyzed material was given to the government and the crowd's participation was over, communication with the participants became less frequent. Moreover, justification for the government's decisions in the reform process, which is taking more time than anticipated, has not been released to the participants or to the general public. In this way, the government has not performed its answerability function. Answerability is the core of accountability; the lack of answerability makes it challenging for the public to demand enforcement of actions or changes because the lack of information prevents them from knowing who to contact and what exactly to demand.

- *Platform*: The website for sharing information (maastoliikennelaki.fi) enabled sharing timely information about the process and thus enabled closing the accountability loop with the participants between the stages. The crowdsourcing platform did not enhance accountability in any particular way other than enabling horizontal communication among the participants, which increases transparency. As a result of that transparency, the participants can combine their forces and require answerability as a large group rather than as individuals, increasing the possibility that authorities might respond.

Transparency

- *Process*: The process was designed for information gathering, which included peer-to peer communication and communication with the organizers. Horizontal transparency was stronger than vertical transparency. First, authorities in the Ministry were primarily responsible for framing the process, meaning the description of the reasons for reforming the law. When comparing the crowd's input to the authorities' framework about the reasons for reforming the law, the perspectives differed significantly from each other. However, it was not communicated clearly who in the government was responsible for the framing or why the framing was done in a particular way. For example, criticism was raised by the public about the alleged need to accommodate more off-road traffic but not the need to ensure safety. In an ideally transparent process, alternative viewpoints and existing debates about off-road traffic laws would have been part of the communication from the very beginning.

There was a definite lack of transparency in communicating the full legislative plan. This was in part due to the nature of the pilot project; decisions about subsequent steps were made during the process itself, based on an analysis of the crowd's input, behavior and the evolving feasibility of proceeding. In an ideal case, a full plan, including all the idea crowdsourcing and evaluation stages that were implemented, would have been publicized at the beginning of the process.

Additionally, the process lacked transparency in that the participants were unable to communicate directly in public on the platform with the organizing authorities like the Minister or civil servants. Instead, communication with them went through the moderators, who gathered the participants' questions and forwarded them to the civil servants, who then responded selectively. The moderators then posted the responses to the participants. The mediation in the process added opacity and prevented direct deliberation between the participants and authorities. Transparency, however, is a continuum, and it is difficult, perhaps even impossible, to define an exact point where transparency becomes opacity and vice versa.

The crowd-evaluation stage also lacked transparency. In terms of vertical transparency, there was no information about the crowd-evaluation phase at the beginning of the idea generation stage. Hence the participants did not

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know to expect a subsequent participatory evaluation phase during the idea crowdsourcing. Furthermore, the participants did not get to see the full idea pool or each others' evaluations. Moreover, while evaluating the ideas in the crowd evaluation phase, they did not know how the actual score for each idea was going to be used and how such an evaluation would impact the law reform.

When the crowdsourcing stages were over, however, there were instances of vertical transparency. The participants received email updates about progress made and who the responsible authorities were in the ongoing process. The analysis methods and results of the crowd input were also communicated to the participants during the process. Several summaries, reports, and blog posts were published during and after the process to inform the participants and the wider public about the outcomes of the researchers' analysis, the next steps in the process and the timeline. The information was also posted on the website blog (maastoliikennelaki.fi), which provided more information about the law.

However, the analysis in itself was not transparent, as the researchers conducted the analysis without the crowd's participation or observation. Having the crowd participate in the analysis process by categorizing, evaluating, and merging the ideas with the researchers would have contributed to transparency and would have increased the legitimacy of the analysis outcomes. An interactive and deliberative idea map could have been used for the crowd and organizers to work simultaneously, commenting on the choices and proposing solutions to ambiguous data. Furthermore, the crowd could have participated in the synthesizing process at the end by helping to summarize the crowd input and plan for the next phases.

- *Platform*: The crowdsourcing platform enabled horizontal transparency as the participants could see each other's comments and ideas. Horizontal transparency enabled democratic deliberation—the visibility of the content enabled equal access and the ability to react to it. Horizontal transparency, however, existed in layers. The crowd who preferred not to officially sign up could only see part of the content on the crowdsourcing platform. The participants who did sign up on the site (and met the conditions for signing up, i.e., a verifiable email address), had access to all the content on the website. The platform allowed vertical transparency in that the moderators could post to the same comment threads as the crowd and could send private messages to the participants. However, the technology lacked transparency insofar as participants could choose to use their real name, a nickname, or a default choice, which would label them as "community members" on the platform. Their name would be displayed adjacent to their comments and profile. The choice of community member as a name on the platform created deficiencies in transparency because the ones who chose "community member" as their name could not be differentiated. There were dozens of users labeled as community members, and in comment threads it was impossible to distinguish one from another and determine who had said something earlier in the conversation or in another thread. The crowd-evaluation stage also lacked horizontal transparency in that the participants did not see all the ideas on the crowd-evaluation platform. They could not see each other's evaluations and they could not choose the categories from which the ideas were randomly sampled. This lack of horizontal transparency led to a situation in which a pro-environmental participant might have evaluated ideas based on anti-environmental values. The resulting opacity often created a critical environment amongst the participants; however, the participants liked the exposure to different viewpoints.

Modularity

- *Process*: The process was modularized into several sequences. Initially, only one crowdsourcing sequence was planned, but due to the crowd's input and the differences in the government's and crowd's agenda in the first phase, a second phase structured on the crowd's extended topical agenda was needed. Having two idea crowdsourcing phases allowed a constant flow of new participants into process. However, since the second crowdsourcing sequence was introduced only after the process had launched, it was not clear in the early stages that a subsequent stage would be offered. Idea crowdsourcing was followed by crowd evaluation, which was another stage in the process. Crowd evaluation was introduced only at the end of the second idea crowdsourcing stage, so again participants were not aware from the beginning that there would be a crowd-evaluation stage. This lack of clarity in the planning of the sequences caused some confusion among and criticism by the participants.

Within both idea-crowdsourcing stages, the tasks for the crowd were modularized so that each topic was divided into questions for participants to answer. For instance, the category about improving safety in off-road traffic was

divided into several different questions. Nevertheless, the process could have benefitted from better modularization, including task subcategories.

- **_Platform_**: A graphic on the home page on the crowdsourcing platform indicated which part of the process was currently ongoing. When there was a break in crowdsourcing, the graphic showed that the input was being analyzed, and the site provided information about when the process would resume and what the next steps would be. This visual representation of modularity supported the accessibility of the process in that participants were aware of which stage they were participating in. The crowdsourcing platform also enabled each topic category to appear as a separate thread. When a participant shared an idea related to a particular category, the idea appeared under the category and other participants' comments were threaded under the initial idea in chronological order. However, the platform did not allow viewers to switch from the current stage to the previous stage by following topics; this would have been helpful in seeing a topic discussion in the previous stage. Merging topics from previous crowdsourcing stages was also not possible in the sense that a user could have followed the evolution of a topic from the first crowdsourcing phase to the second one.

Synthesis

- **_Process_**: After each stage finished, the researchers analyzed and synthesized the crowd input and publicized the synthesis both for the participants and the wider public. The synthesis included analysis of the arguments presented in the process, qualitative analysis of the viewpoints presented, and quantitative analysis of the amount of participation. Problematically though, the synthesis lacked a holistic analysis of the differences between the crowd input and the expired bill and discussion of the impact that those differences would have on the reform process.

- **_Platform_**: The platform enabled synthesis of keywords, which the participants had used to tag ideas. The keyword cloud appeared on the navigation bar of the crowdsourcing platform. However, the crowdsourcing platform did not enable structured synthesis of the crowd-generated information or the expressed opinions. The crowd input appeared as a fragmented set of ideas and comment threads. This made it difficult to follow the arguments, opinion formation and the common information nuggets. Also, the pro and con arguments were not separated visually on the platform, which could have made it harder to follow a conversation. At the same time, it may have exposed the participants to viewpoints that they would not have seen if they merely chose to see supporting or opposing arguments.

The platform allowed measuring the popularity of the proposed ideas by automatically counting the votes an idea received from the participants. The participants' vote (thumbs up or thumbs down modality) count appeared next to each idea and comment. On the platform's home page the participants could also see the most popular ideas based on votes and could choose to view ideas either based on that modality or based on temporal dimension (seeing the most recent ideas or the ideas that had received the most votes in a short period of time but were not necessarily the most popular ideas on the platform). The home screen (the screen the participants saw first when entering the platform) vote counts were based on the number of votes that the ideas had received, not on comments. Such functionality enhanced modularity, as the topics remained separate; yet at the same time, the feature hindered synthesis in the sense that a comment might have been a synthesis of many ideas and could get more support in the form of votes than any idea. Therefore, a comment should have been displayed in the front page among the popular ideas.

The platform did not enable automatic analysis of crowd input, for instance, by using natural language processing software (Convertino, Sandor, & Baez 2013), which would have, to some degree, made automatic analysis possible. Instead, the researchers synthesized the material manually. The platform displayed the synthesis only as analysis text and did not have a seamless medium, which would have synthesized the information in a transparent manner with the participants, thus extending the use of crowdsourcing to the synthesizing process.

CONCLUSIONS AND FUTURE RESEARCH AGENDA

We have argued that crowdsourced policymaking should be guided by five design principles, those being inclusiveness, transparency, and accountability, modularity and synthesis. These principles form a normative framework for designing crowdsourced policymaking, including both the process and the medium facilitating crowdsourcing. The three first principles – inclusiveness, transparency and accountability – are derived from the

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normative literature in deliberative and epistemic democratic theory and they are overarching guidelines for designing crowdsourced policymaking. The principles of modularity and synthesis were derived from experience. Together these ideals offer a framework for democratically legitimate and efficient crowdsourced policy-making.

After assessing the crowdsourced off-road traffic law reform in Finland in light of the five design principles, we conclude that the Finnish Experiment was far from ideal. None of the design principles were fully met. Particularly, transparency was lacking both in process and in the media used (the latter being the idea crowdsourcing and the crowd evaluation platforms). Vertical transparency in the process was lacking because the crowd did not have access to information about the proceedings in the law reform process. Vertical transparency faded towards the end of the process. Horizontal and vertical transparency was lacking in the medium, particularly in the crowd evaluation, because the participants did not get to see the full pool of ideas, and they were evaluating only a part of them. They did not get to see each others' evaluations, either, or the procedure for how the crowd evaluation outcome would be used.

Furthermore, although the process design sufficiently met certain criteria like modularity and synthesis in idea crowdsourcing sequences, the crowdsourcing platform or the crowd evaluation platform did not effectively support their practical actualization. For example, while the process included many moments for synthesis, the media did not support automated synthesis, synthesis by the crowd, or the public dissemination of the researchers' conclusions. In addition, while the process design included modularity, the platform did not support the ability to track ideas from one stage to the next. Other criteria, such as accountability, were hardly met at all. There was a severe lack of answerability, which is the core of accountability. The participants did not have sufficient information to demand actions or changes in the law reform process or the role of crowdsourcing in it, or to hold anybody accountable for the decisions that the authorities had made.

The design principles for crowdsourced policymaking, which we introduced in this paper, should be tested in future research by analyzing other cases taken from a variety of contexts. Ideally, the research should focus on the impact of design principles on the quality and quantity of democratic deliberation and knowledge gathering while also addressing the following questions: Are some design principles more essential than others to the success of the crowdsourcing process? What if, for example, there is maximum transparency but very little modularity and synthesis? Or vice versa? What are the trade-offs involved in privileging one or several principles over others? Future research should also develop a practical framework with instructional guidelines based on the five principles in this article for designing more suitable processes and technologies for crowdsourced policymaking. Finally, future research should examine the impact that the implementation of design principles has on the perceived legitimacy and credibility of the process.

ACKNOWLEDGMENTS

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