

Exploring Open Parliament Initiatives in Ecuador Through Technology

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ABSTRACT

A healthy dialogue between civil society and governments stems from meaningful communication and understanding of political data. Visualization tools have the potential to support this. To contribute to a growing Digital Civics agenda in the Global South, we built an interactive visualization prototype that enables open-ended analysis of legislative roll-call vote data from the Ecuadorian parliament; political actors were interviewed and shown this tool to explore future opportunities for open parliament technologies. This work serves as motivation for the design of open parliament technologies which ought to (i) provide stories and narratives about the parliament's and legislators' political history, (ii) support the understanding of how parliamentary bills and resolutions become law, and (iii) grapple with the socio-technical considerations that platforms must undergo in order to make citizen participation an incremental journey rather than a fixed destination.

CCS CONCEPTS

• Human-centered computing → Empirical studies in HCI.

KEYWORDS

Open parliament, open government, political data visualization

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1 INTRODUCTION

From its beginning over 10 years ago, Open Government (OG) and Open Parliament (OP) initiatives held the promise of strengthening democracy by increasing citizens' opportunities to participate in their countries' political lives and demand accountability of their institutions and representatives [6, 22, 23]. Opening parliament data was expected to bring parliaments closer to the people they represent; it entailed the possibility of enabling citizens to understand the legislative process and eventually intervene in it, ensuring it responds to their needs [4, 17, 22]. The pressure to deliver such a transformative impact is especially high for Global South countries, where corruption across political structures disempowers citizens and hampers institutions' capacity to alleviate poverty [5, 10]. As a result, non-profit organizations, academia, and governments around the globe have motivated the creation of diverse parliamentary Information and Communication Technologies (ICTs) for citizens to acquire, interpret, challenge, and use legislative information [22, 38, 40]. Despite the initial optimism, these innovations still struggle to produce evidence that confirms they can change traditional political practices promoting stark inequalities [6, 38].

As part of their Digital Civics agenda, the fields of HCI and CSCW—and related areas such as Information Systems—have shown a growing interest in illuminating the use of technology for supporting individuals, communities, and institutions—including parliaments [15, 21, 26]—in working together towards policy changes [8, 12, 13, 41] and transformational pathways [14, 24, 32]. Despite the research, most of the technologies made publicly available have provided limited possibilities for citizens to analyze and use data in collaboration with governmental bodies [30]. As several authors highlight (e.g., [3, 30, 34]), if the goal is to transform governmental practices, it becomes critical to engage in more explorations with both governmental and civic stakeholders on the crafting of two-way, trustworthy, and mutually-committed citizen-institution

interactions. The current predominance of Global North-based inquiries also indicates a pressing need for work on democracy, data, and technology to grapple with a richer spectrum of parliament practices, legislative processes, partisan relationships and politics as a whole.

In this study, we engage with those pressing questions by exploring the possibilities of designing Open Parliament Technologies (OPTs) in Ecuador—a country in the Global South starting to explore the effects of OP policies in its highly fragmented, multi-party electoral system [35]. In particular, we investigate how diverse parliamentary data experts operating in-between average citizens and the government (e.g., legislators, journalists, activists, and political analysts) perceive the role of ICTs in the citizen-parliament relationship. To elicit participants' reflections, we presented them with a prototype enabling the interactive visualization of Ecuador's roll-call legislative data and discussed their impressions on how this type of tools could enrich citizen's political participation.

In working with a wide range of government and citizen actors, in a context where OPT opportunities are still scarce, this exploratory study offers two contributions to HCI's growing Digital Civics agenda. First, it sheds light on how historical analysis, process visibility, and citizen participation can foster two-way citizen-parliament collaborative spaces in contexts where the quality of democracy is under permanent questioning [4]. Second, it proposes three directions for the future of OPTs: (i) designing OPT with intermediaries, (ii) crowdsourcing the data gaps, and (iii) using geographical and political context for eliciting meaning. Our findings suggest that, exploring these possibilities can help diverse stakeholders in coming together to define common matters of concern and reach important agreements for moving towards sustainable and meaningful OPT innovations.

2 RELATED WORK

Since the emergence of open government initiatives worldwide (e.g., the Open Government Partnership¹, the Declaration of Parliament Openness², and the Open Government Standards³), there has been a growth of open data policies as well as digital products, platforms, and integrated IT services for supporting more openness, accountability, and transparency [14, 19, 21, 22]. Today, over 95 countries have a form of *Right to Information Requests* law implemented, and 33 have at least one form of technology providing access to that information [38]. One of the governmental bodies that these policies and initiatives have especially targeted is the parliament: to foster political participation it is essential that citizens can hold legislators' decisions and the legislative process accountable to evaluation [22, 34, 40].

Parliaments, civic organizations, and universities across the globe have proposed diverse ICTs to fully harness and support existing initiatives. OPTs so far have addressed two different purposes. First, to enable citizens' monitoring of legislative information: civic organizations around the world have created websites with reports and metrics about law projects (e.g., GovTrack⁴ in the US), legislative commissions within the parliament (e.g., TheyWorkForYou.com

in the UK), legislators' political history (e.g., Project Vote Smart⁵ in the US) and their votes (e.g., CongresoVisible⁶ in Colombia). Researchers have also harnessed visualization techniques to provide more analytical power to users, offering interactive models of legislative voting behavior (e.g., Connect 2 congress [21]), enabling comparisons between visualizations along time, parties, and coalitions (e.g., CivicAnalysis [15, 31]), and identifying voting patterns (e.g., Social Action [36]). Other uses of visualization of political data include explaining the concept of voting power [27] and enabling comparative analysis of election results [28].

A second purpose for OPTs has been to support citizens in shaping parliamentary activities. This has entailed allowing citizens to propose new law and policy projects (e.g., VotaInteligente⁷ in Chile [40]), share their opinion about existing law projects (e.g., Senador Virtual⁸ also in Chile [4]), and issue concerns and complaints directly to legislators [4, 40] (e.g., CRM systems [26]). It has also included enabling indirect citizen participation by collecting discussions on social media and interpreting them to inform legislators' political agendas [2, 19] (e.g., the NOMAD project).

Despite the large number of initiatives and their varied purposes, reports worldwide suggest most OPTs struggle to deliver the increase in political participation that was originally envisioned [6, 22, 38]. Even if parliaments release the needed data, the feasibility for the average citizen to engage with tools that monitor legislators' actions such as voting, is rather low: conveying the complexity of government data and processes to the general public is a pending challenge for OPTs [43]. OPTs that collect citizen's opinions also face challenges on their own to be considered participatory; in all cases, legislators still have the power to decide how much of citizens' input to consider [2, 7, 26, 29].

The critical debates that diverse HCI researchers have advanced on the relationship between design, technology, and politics (e.g., [12, 14, 16, 25]) can suggest important pathways for the future of OPTs. In their exploration on the role of trust in the citizen-institution-technology relationship, for example, Corbett and Le Dantec make a call to go beyond a sole focus on offering user-friendly, fast, and smart interfaces that, in the end, only seek to help institutions to better manage and deliver services but do little to motivate citizen participation [12]. In addition, the work of Nelimarkka, reviewing efforts to enhance participation in democratic decision-making [30], and of Hamm et al., exploring the sustainability of civic tech initiatives [20], recommend to more deeply engage with the complex and sophisticated multi-stakeholder social structure that often interacts with democratic innovations. In stemming from a rich understanding of the wide range of actors between governments and average citizens, OPTs could be better prepared to support more resilient, trustworthy, and collaborative citizen-institution relations that can disrupt existing power relations.

This paper reports an initial exploration that answers these calls by using a parliament roll-call visualization prototype to prompt multiple stakeholders' reflections on how OPTs can be game-changers. By focusing on a Global South context with emerging OP initiatives, this paper also expands the understanding of

¹<https://www.opengovpartnership.org>

²<https://www.openingparliament.org>

³<https://www.access-info.org/2015-01-22/open-government-standards>

⁴<https://www.govtrack.us>

⁵<https://www.votesmart.org>

⁶<https://congresovisible.uniandes.edu.co>

⁷<https://www.votainteligente.cl>

⁸<https://www.senadorvirtual.cl>

OPTs in contexts where institutionalized behaviors tend to hamper genuine citizen-government interaction and positive social transformation.

3 RESEARCH CONTEXT: ECUADOR'S POLITICAL LANDSCAPE

As many parliaments in Global South countries, where the average voter experiences important levels of poverty [33, 39], the Ecuadorian parliament or “Asamblea Nacional” operates under a candidate-centric electoral system [37]. In this system, the existence of multiple political parties prevents one single party from commanding a majority in the parliament for extended periods. This system also weakens opportunities for party cohesion: although legislators are expected to vote following their party's directions, they switch parties or become independent quite frequently, giving in to different power groups' political or monetary bribery [39]. This gives rise to so called “mobile majorities”, where different groups of legislators support different bills—depending on what is at stake [37]. Further, it heightens possibilities for legislators to fall into corrupted behaviors, often agreeing on voting decisions based on bribery [1]. As a result, the average Ecuadorian citizen are highly distrustful of political actors and prefer to disengage from learning or participating on the country's political life [11].

In this scenario, it becomes hard to provide OPTs that are perceived as reliable in many fronts. For example, the parliament's political landscape is under constant change and official data cannot keep up with political shifts. Despite the hardships, the Ecuadorian parliament does ascribe to OP principles: it periodically releases legislative voting data on its official website⁹—albeit via a format that makes automatic data analysis impractical. It is also a member of OP networks in the region and globally (e.g., [OpenParliamentENetwork.org](https://openparliamentnetwork.org)) and has recently started a plan for strengthening the tools and policies that can ensure OP standards [35]. To close the gap between citizens and parliament, civic organizations have created portals such as the Legislative Observer¹⁰ that parses and publishes the official data. However, similarly to other civic efforts, this tool's analytical power is limited: it does not provide tools for custom, open-ended analysis of the Ecuadorian legislators' voting behavior, and it does not offer alternatives for citizens to reach deeper levels of participation in parliament activities.

This context, where OPTs are emerging and the parliament is open to exploring them, offers important opportunities for learning more about how to design OPTs that fosters connections among the diverse members of a countries' political ecology.

4 METHODOLOGY

Our goal was to gather the perception of a wide range of actors in the Ecuadorian political landscape on opportunities for OPTs to enable citizen-parliament two-way communications. Our initial explorations with participants that had experience with—or affinity to—political data suggested that including average citizens in this initial study could be counterproductive. Average citizens' high level of distrust towards Ecuador's political actors could prevent them from learning more about the country's political life and

envision changes in that regard. While engaging these actors is critical for the design of OPTs, we concluded that doing so needed to happen once we had a rich understanding of how the political ecology operated. For this study, we decided, thus, to focus only on legislators and citizens with an already existent experience with—or affinity to—political data such as political analysts, journalists, and open data managers. We engaged with each participant in an interview to elicit their reflections and ideas for future OPTs. To stimulate participants' reactions, we presented them with a visualization prototype and engaged with them in a conversation about the positive and challenging aspects of having such a tool as another actor in Ecuador's political ecology.

Next, we describe our prototype, the procedure we followed, and our data analysis process.

4.1 A Roll-Call Voting Visualization Tool

We created a web tool to visualize Ecuador's roll-call legislative data. Using information publicly available, we assembled a dataset of Ecuador's three latest legislative periods. The dataset includes 2,062 votes distributed across 500 legislative sessions¹¹, corresponding to 799 unique legislators—including 352 deputies—associated to 28 different political parties and coalitions.

There is only one tool—CivisAnalysis [15]—that we are aware of that supports exploration of roll-call parliamentary data and representatives' voting behavior for multi-partisan electoral systems. However, we chose to create our own option so as to have control over the data consumption process and data analysis options. Furthermore, we needed an OPT in Spanish, depicting the configuration of the Ecuadorian parliament through representations that were familiar to Ecuadorian stakeholders. In particular, our goal was to provide data analysis options that prompt participants' interest (e.g., contrasting the voting behavior of two opposing parties around controversial topics) without overwhelming them.

Amongst the functionalities that our tool includes are allowing access to the records of the dataset through a search bar (Figure 1.A) and enabling users to drag and drop the results onto visualization elements: Legislators are dropped onto the tool's canvas (Figure 1.B), while votes are dropped onto its timeline (Figure 1.C). Upon adding legislators and votes, the tool generates circular marks, each representing a legislator. By default, marks are arranged into a horseshoe-shaped parliament plot which colors them according to the legislators' vote (e.g., green for yes, red for no). The tool also allows users to transform this default view into two alternative visual representations. A cluster-based diagram groups legislators around the outcomes of a vote. That is, those legislators who voted the same appear together, under the corresponding election outcome (Figure 1.D). This layout colors marks according to the legislators' party (unless otherwise specified). An additional view shows the votes through a covoting network (Figure 1.E) whose edges get thicker and more opaque as co-votes get more common.

⁹www.asambleanacional.gob.ec

¹⁰<https://observatoriolegislativo.ec>

¹¹The Ecuadorian legislature organizes votes in sessions. Several topics are often discussed in a single session. A session can span several days.

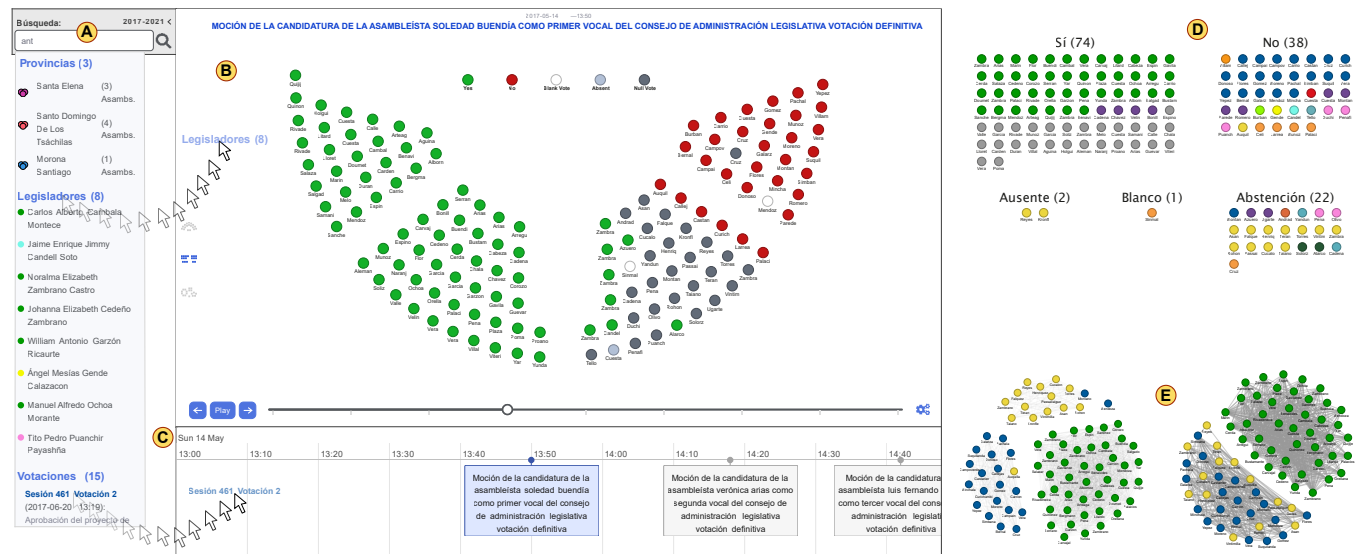


Figure 1: Interface of the prototype tool we use as a probe to elicit stakeholders' impressions. See Section 4.1 for a detailed description.

4.2 Participant Recruitment, Data Collection, and Analysis

We followed a snowball sampling methodology, reaching out to close contacts of the research team who were political advisers to then get access to a variety of political stakeholders. We recruited 13 participants in total: 2 journalists, 2 open data NGO coordinators, 2 activists, 2 current and 1 former legislator, and 4 political advisers.

Prior to the tool demonstration, participants engaged in a one-hour interview with two members of the research team. The interview's goal was to allow participants to first reflect on their practices on accessing, understanding, investigating, and communicating information on the proceedings of the Ecuadorian legislature. For the prototype demonstration, one of the researchers explained the prototype's use of parliamentary data and its functionality and guided participants through several analytical scenarios. Participants were able to ask questions at any point during the live demonstration of the prototype. Afterwards, we discussed their take on possible uses for such a tool and other OPTs, suggestions for changes, and barriers for their adoption.

Interviews took place via video conferencing. Collected data consisted of video and audio recordings and interviewers' notes.

The scope of analysis for this initial exploratory study was the participants' reactions and comments made during the tool demonstration. Interview transcripts were anonymized, transcribed, and coded following an inductive, thematic analysis approach [9]. Initially, five authors coded at least two interviews independently. This initial coding sought to identify emerging patterns describing participants' information practices and their perception on OPT's benefits, limitations, and potential usage scenarios. In a second stage, we redistributed coding assignments so that each interview was analyzed by at least two different researchers. Through regular meetings, we identified and refined higher-level themes describing

the data (e.g., participants' visions and identified challenges). These themes included the need of adding context to the roll-call data, understanding the lawmaking process, and revising what citizen participation means and entails. We describe these themes in detail in the Findings section. The entire coding process took place over six weeks.

5 FINDINGS

Three critical aspects for the design of OPTs emerged from our data analysis. New platforms need to consider to: (1) go beyond counting votes to providing narratives, (2) provide context and information necessary to unpack the lawmaking process, and (3) incentivize incremental citizen participation. While previous literature has already identified these aspects as relevant [3, 18, 30], our analysis unearthed nuanced views of how to qualitatively bridge the citizen-parliament gap and enhance collaboration opportunities among different stakeholders.

To preserve participants' anonymity, in what follows we refer to participants using pseudonyms related to their profiles (J for journalists, A for activists, L for legislators, LA for legislator advisers, P for political advisers, and N for NGO coordinators).

5.1 It is the History and the Narratives, Not the Numbers

Representing the history of legislators' votes has been many OPTs' goal [15, 19, 21, 34, 40]; in illuminating their shifts in political decisions, voting histories can confirm legislators' level of commitment towards particular citizens' interests [21]. Our participants also expressed an appreciation towards making legislators' voting history public. However, they emphasized the need for this information to

go beyond vote counting and into shedding light on legislators' relationship with their socio-political structures, including law projects, power groups, and society as a whole.

Our tool's ability to show legislators' past votes motivated many participants—including legislators—to reflect on the complexities of the voting process. N1 explained the possible risks that a vote-based historical analysis might entail: *"In the last legislative period, it was common for a legislator to vote for one view and their deputy to vote for another. Showing only the main legislator's vote makes it look as a single vote, when in reality it's not."*

The discussion on the implications of using data to tell parliament's behavior history drove N1 and N2, J1, and P1 to suggest centering historical narratives on specific political junctures of public interest rather than on votes only. J1 explained this idea further: *"I am rather interested in comparing legislators' voting behaviors across the same topics, like how certain legislators voted in the first and second debate on the new Water law."* As P1, argued, understanding legislators' behavior around junctures such as taxation decisions, gender inequities, and auditing, can be key to rendering visible power structures in the parliament:

"A legislator's voting history might insinuate that they have succumbed to, say, the government's interests. However, it is only when you look more deeply into how their votes have supported the people's interests that you can realize their true commitment".

Telling the parliament's behavior history in terms of junctures, non-legislators such as P2 and P3 argued, could also help citizens contest power relations in context such as the Ecuadorian, where legislators often switch to (and sometimes even create) groups of interest. As they suggested, OPTs could support the public in learning when and how these shifts—also known as *camisetazos* (shirt-swapping)—occurred. Seeing how representatives shift positions and the groups of interest that they form, they explained, can be valuable for predicting future parliament decisions, including when and why the parliament might reach cohesive power. In addition, as J1, P2, and L2 highlighted, representing *camisetazos* can help citizens unpack why these took place in the first place. *Camisetazos* can illuminate the power-related motivations driving legislators' decisions (e.g., re-election or party membership goals) and the power structures enabling shifts, such as a deputy system that main legislators can easily hack to avoid making controversial decisions.

Participants' explorations with the tool's visualizations also motivated conversations on the type of historical information that the participants consider extremely valuable but is often lacking in OPTs. J2 stressed the need for representing legislators' workload (e.g., interventions in discussions of law projects) as a way to measure their productivity. J1 and P1 pushed for adding more background-type information to the legislators' behavior history. This includes legislators' political origins (e.g., national or regional, political affiliations and views on political junctures even before being in the parliament), and family and political ties: *"Many legislators have relatives that are also local public servants. Knowing this, and being able to analyze it, can shed light on their decision-making process."*

As a whole, participants' reflections emphasize a desire for parliament technologies to offer a rather nuanced view of accountability and historical data: they are asking for technology to recognize and highlight the ubiquitous nature of politics and the importance of being able to convey open parliament data in stories that can help citizens make sense of such ubiquitous nature. Their visions for the future, however, also shed light on critical data collection barriers standing in the way. *First*, while often collected, much of the data mentioned as desirable is not officially open to the public nor available in easy-to-process formats. Legislator participants mentioned, though, that some of this information is more feasible to access than others via already-existing institutional pathways. *Second*, high levels of distrust towards open parliament data, both from citizens and legislators, can also hamper the needed historical analysis. They all fear that the parliament could not release data with the level of granularity and precision needed to tell the parliament's history reliably. *A critical question to ask then is whether citizens, representatives, and the current digital infrastructures that they navigate could have a role in filling in the existing data gaps.*

5.2 Unpacking the Lawmaking Process

Discussions on how to present the parliament's historical voting behavior led various participants, especially legislators, to reflect on the need for OPTs to make the lawmaking process not only available like existing OPTs already do [42], but more visible and intelligible for citizens. In Ecuador, law projects have different stages: they are initially assessed and qualified and are then assigned to specialized legislative commissions, where the bills are debated. As L2 explained, commission votes are currently only known to commission members, making it impossible for any other legislator to have a word on the debate. Knowing how a commission voted, thus, can afford greater transparency to the process:

Currently, you have to wait to read the reports [of the legislative commissions] before intervening in the plenary session and presenting observations that can be incorporated for subsequent debates. However, if I could see in this tool what the status of a bill is and see, for example, that last week the commission incorporated specific articles [...] I could be informed on what is happening in real time.

However, L2 also reflected on the lack of policies and mechanisms that can make this information available to the public: *"The information about what happens within the commissions is missing on the Legislature's web page. Not even the Legislature's Twitter account publishes that information."* Their account stresses how, to support a rich analysis and visualization of the lawmaking process that might better engage citizens, we need—again—data beyond the votes that take place at the plenary sessions of the legislature. This includes important information and documents generated by specific parliamentary procedures (e.g., written observations, constitutional assessment reports).

Amongst the strategies that legislators and journalists suggested for collecting the data that offers the needed richness for improving process explanation were: watching videos of commission sessions available on the parliament's website, talking to someone within the commission, and monitoring specialized social media accounts.

Other participants recommended adding the justifications and motivations that legislators express during plenary sessions' debates, even advocating for access to automatically-extracted excerpts of videos and transcripts from the Legislature's YouTube channel.

In general, participants' suggestions signal a need to revise existing OTPs that show lawmaking processes (e.g., [42]): in addition to using formally-released data, they need to also add information from informal channels. These might offer important nuances that might help citizens to better unpack the lawmaking process and engage with it. *It becomes critical, thus, to explore how OTPs could incorporate data coming such channels.*

5.3 Revising Participation: A Journey, not a Destination

Participants' explorations of our tool facilitated conversations on the potential for average citizens to use and harness OTPs. As mentioned before, various efforts have proposed OTPs that enable citizens to shape parliaments' decisions [2, 4, 26, 40]. Our data analysis stresses, however, that building platforms that allow citizens' input is not enough to motivate citizens' active participation. Instead, it suggests that OTPs should facilitate gradients of participation, allowing citizens to decide how and when to increase their level of engagement based on how distant they feel to technology, data, and political institutions.

Indeed, a result of our recruitment process was participants' low-level appreciation towards enabling direct citizen participation. Participants' views, however, did shed light on new forms of participation that are feasible within existing governmental structures and, thus, are important to consider. For example, most participants expressed a concern that OTPs might be too complicated, unappealing, or distrusting for citizens, thereby, further impeding their political participation. As N1 explains, *"Citizens already see politics as something hard to grasp, and tools that do not make it easier for them will only push them further away."*

A first level of participation, then, is that of simple access and use. A2 suggested that providing data on citizens' geographical and political contexts can help enable this level: *"If the tool has the citizen's phone number and province, then it can issue alerts with digests about that province's representatives' work and make it more interesting for citizens."*

Another level of participation for average citizens that emerged from our analysis is an indirect one, mediated by citizens with a higher level of expertise on parliament data (e.g., political analysts, journalists, and researchers). Most participants were skeptical of the success that OTPs for directly engaging average citizens could have in a context such as the Ecuadorian. Low education and technology access levels often prevent many citizens from consuming data such as the one produced by the parliament. Further, a historical institutional corruption has driven many citizens to actively distance themselves from political actions. As such, most participants advocated for harnessing the analytical and communicational power of intermediaries to gradually get to average citizens. As L3 explained: *"These tools can be of use for conveying how legislators are behaving and then share the processed results in the media, where information can be made available to the public in a more didactic form."* P1 and P2 took these ideas further and proposed that, with

the analytical support of such intermediaries, OTPs can serve as lobbying tools for organized citizen collectives, *"to identify which legislator might be more willing to discuss a particular topic."* [P2] and *"to better back up their arguments and pursue their fights."* [P1].

Along a similar line of fostering different types of participation—including an indirect one—NGO coordinators and political advisers suggested enabling citizens to shape the data that OTPs showcase and depend on. N2, for example, stressed the importance of making sure that these techs work on themes that are of citizens' concerns. Citizens could participate in suggesting and curating these themes of interest. For A3, citizens could also contribute with information (e.g., infographics, suggested videos, links) that enriches data reports and visualizations.

Participants' accounts suggest that the design of OTPs need to consider an ample range of mid-way forms of participation that can harness existing human infrastructures to, little-by-little, scale up. Although the end goal is to facilitate pathways for the average citizen to work hand-by-hand with institutional decision-makers, our analysis suggests that getting there right away is not always feasible and technologies must provide pathways to get there, gradually.

6 DISCUSSION

Rather than providing generalizable design guidelines for OPT, our data analysis points at three directions that can be explored with future tools for further eliciting reflection on OP possibilities with multiple stakeholders: (a) designing OPT with intermediaries, (b) crowdsourcing the data gaps, and (c) using geographical and political context for eliciting meaning. We expect that the collective observations of this series of studies can define clear steps to integrate participants' visions in a tool design that is practical and can be widely used.

Designing OPT with intermediaries: Our prototype allowed us to elicit the reactions and visions of different experts around OP data and tools. This enabled critical design considerations for OPT to emerge, such as the need to design OPT that can foster citizen participation by harnessing and collaborating with intermediaries. In pursuing that pathway, however, it is critical to acknowledge that the visions of intermediaries do not always align with that of the average citizen. Even among the intermediaries in our study we found diverging visions of what an OP tool should be. Our future explorations will focus on considering the voice of other members of the civic society (e.g., journalism or law students) and add mechanisms to our prototype that allow intermediaries and citizens to see each other and engage in peer-to-peer support for analyzing parliament data.

Crowdsourcing the data gaps: Concerns were also expressed on the data needed to implement OPT. In Ecuador, as in many other Global South countries, this is a major challenge [22, 38]. Our data analysis suggests that, to overcome this barrier, OPT may include crowdsourcing support that allows citizens and intermediaries to collect the missing data. Existing uses of crowdsourcing in civic tech often enable citizens to report on issues or to share their views on a topic [2, 3]. Participants' accounts indicate that for future tools, it is essential to include a different use of crowdsourcing: one

where citizens fill in gaps instead of providing the whole bulk of information.

Using geographical and political context for eliciting meaning: Our observations suggest that, beyond numbers and statistics, to facilitate citizens engagement with parliament processes and data, OPTs need to become more contextual. That is, they need to consider what matters to citizens so as to support them in the construction of meaning on the behavior of legislators. As suggested in our data analysis, this can entail future prototypes that allow citizens to subscribe to alerts about the legislators they voted for. Future explorations can also enable citizens to enrich the OPT reports with data from external sources such as videos, newspapers, and user-generated annotations.

Finally, we recognize that carrying out interviews in which we imposed a particular tool design may have biased participants and steered their attention to specific aspects of the data. This is an inherent limitation of our elicitation methodology that should be considered when interpreting our findings.

7 CONCLUSION

We designed and implemented a visualization tool around the published data of roll-call voting from Ecuador's top legislative body. The visions of multiple expert stakeholders helped in the understanding of what the perceived benefits of open parliament schemes are. The results of this investigation indicate that experts believe tools like ours would serve broader population in understanding: (i) the histories and narratives surrounding their legislators, going more deeply than the bare numbers around each bill, (ii) the law-making process, and (iii) what their possible participation in these processes can be. These findings corroborated those presented in work from different contexts outside of the Global South and motivate further exploration into achieving the goals of OP and active participation by the public.

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