# ThinkWrite: Design Interventions for Empowering User Deliberation in Online Petition

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## ABSTRACT

Online petitions have served as an innovative means of citizen participation over the past decade. However, their original purpose has been waning due to inappropriate language, fabricated information, and the lack of evidence that supports petitions. The lack of deliberation in online petitions has influenced other users, deteriorating the platform to a degree that good petitions are seldom generated. Therefore, this study designs interventions that empower users to create deliberative petitions. We conducted user research to observe users' writing behavior in online petitions and identified causes of non-deliberative petitions. Based on our findings, we propose ThinkWrite, a new interactive app promoting user deliberation. The app includes six main features: a gamified learning process, a writing recommendation system, a guiding interface for self-construction, tailored AI for self-revision, short-cuts for easy archiving of evidence, and a citizen-collaborative page. Finally, the efficacy of the app is demonstrated through user surveys and in-depth interviews.

## CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in HCI**; **Interactive systems and tools**; **User centered design**.

## KEYWORDS

Online Petition, e-Petition, Deliberation, Design intervention, Citizen Participation, Public policy

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## 1 INTRODUCTION

The value of online petitions as a civic participation platform has been recognized in the digital domain [1, 3, 44]. Online petitions have gained significant traction and become the most popular form of online political activity in several countries [11, 20]. During the COVID-19 pandemic, their popularity appears to have become even more prominent [36, 39, 47]. At the same time, however, the original purpose of online petitions has been waning due to the lack of deliberation; which includes a collaborative mindset for respecting others and the ability to propose a petition with relevant background, occasion and reasonable solutions. The absence of deliberation is reported in the current use of online petition platforms, with problems including (1) emotional and irrational petitions [26, 43], (2) disregard for the petition rules, (3) inappropriate topics of petitions [23], and (4) conflicts due to little mutual respect [43, 46].

While such platforms should be designed to facilitate effective and appropriate petitions from their users, consideration of users struggling with writing deliberative petitions is still absent in existing studies. The aim of the research is thus to gain empirical findings regarding users' difficulties in creating deliberative petitions and develop and evaluate a new online petition app for empowering users' deliberation. To this end, we conducted a remote field study and semi-structured interviews with 17 participants and then utilized these findings to develop the petition platform. The main research outcomes include: (1) the user research findings on specific needs and challenges in writing online petitions, (2) a new online petition platform concept with six key design features, and (3) its effects on civic engagement for deliberative petitioning.

## 2 RELATED WORKS

The existing studies in citizen participation in online policy-making platforms have largely dealt with amassing citizen opinions for the policy development process. Such studies involved citizen participation and provided an in-depth understanding of citizens' needs, which eventually led to valuable insights for more citizen-centered policy development [22, 32, 40]. According to this trend, the current HCI studies have adopted technologies and developed systems to promote citizen participation [8, 24, 27] and successfully instilled interest for policy-making among citizens. However, the greatest limitation of the existing platforms is that they fail to engage users in ways that help the users to acquire the capability for generating deliberative policy proposals (i.e., petitions). Public policy researchers have argued that the deliberative capabilities of citizens are essential. They emphasized that meaningful civic participation in public policy-making demands a higher level of engagement [18], rational argument [45], and practical concerns of feasibility [4], rather than simply focusing on the increase in user participation [13]. Citizens should display a sense of equality, mutual respect, and rationality [31] while considering the expected consequences


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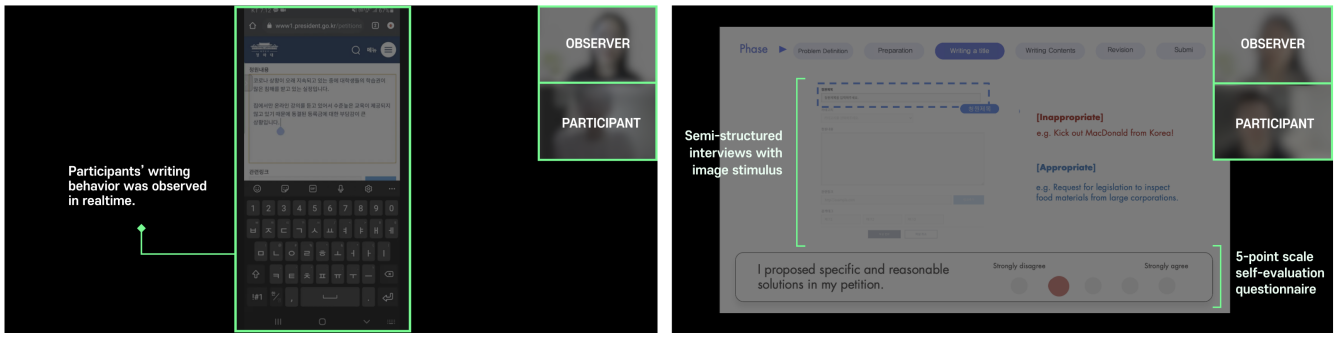


(a) CONTEXTUAL INQUIRY FOR OBSERVING USER BEHAVIOR

(b) SEMI-STRUCTURED INTERVIEWS WITH SELF-EVALUATION QUIESTIONNAIRE

**Figure 1: (a) In the remote field study, we asked the participants to share their screens to observe their petition writing process. (b) Semi-structured interviews with image stimulus and a 5-point scale self-evaluation questionnaire to check how much they had satisfied requirements for deliberative online petition**

of policies, not only for oneself but also for all other people who are under the influence of the prospective policies [15]. Despite the recent emphasis on a deliberative mindset for writing petitions, little research has been dedicated to directly developing a system aimed at improving users' deliberation in online petitions. Existing online petition platforms (e.g., [9, 19, 21, 33, 34, 37, 38, 48]) have problems such as irrelevance to policy proposals, inappropriate language, fabricated information, and a lack of tangible evidence for the petition [23, 26, 43, 43, 46]. Other online platforms for aggregating citizen opinions [18, 28–30, 41] mainly support the deliberative exchange of information and personal views on policies with others. However, these platforms are not based upon users' needs and challenges expressly identified for writing deliberative online petitions and they lack the capability to lead the petitions toward better policy proposals. Upon this background, we attempt to explore ways of designing more deliberative online petition platforms by identifying the problems and challenges that users face in online petitions.

## 3 USER RESEARCH

The primary objective of user research was to identify the underlying causes of users not being able to write petitions in a deliberative manner. By using a remote field study and semi-structured interviews, we obtained an in-depth understanding of current user experiences on the online petition platforms. From the causes identified during our user research, we established the main objectives the proposed new platform design should satisfy, in order to promote deliberation among users during petition and resolve the detrimental lack of deliberation in the current online platform.

### 3.1 Participants and Recruitment

We recruited 17 participants (7 male, 10 female). We judiciously considered the participants' past experiences with online petition platforms as well as their demographic backgrounds to guarantee diversity among our participants. The criteria established to select the interviewees of our research were as follows: (1) petition platform experience (2) age, and (3) gender. We first recruited the participants who had the experience of using the existing petition platform so that they could share the difficulties they encountered during the petition writing. Additionally, we recruited participants with no experience of using a petition platform as well since the experienced users' familiarity with the system may cause them to overlook the obstacles to learning the petition rules. Our expectations of the inexperienced users were that their interaction with the existing system would allow us to discover new insights into the constraints and problems that inhibited the development of a deliberative mindset in an online petition. In total, 17 participants were recruited, with eight having previous experience and nine new to the platform. With respect to gender distribution, there were seven males and ten females, with the average age of 38.4 years (SD = 12.41, median: 34, range: 20-57), which closely resembled the online petition user distribution in South Korea [35].

### 3.2 Interview Procedure

Our user research method consisted of a mixed-method approach focusing on the following techniques: (1) a remote field study and (2) semi-structured interviews. Due to the COVID-19 pandemic, we conducted a remote field study on Zoom to observe users' writing behavior in-real time. We asked the participants to write a petition using the national online petition platform in South Korea (Figure 1 (a)). The participants were not provided any prior topic for the petition, so as to avoid bias and allow them the freedom to write petitions by relating to their own experience or current interests. Following the remote field study, we conducted semi-structured interviews to assess the participants' deliberative writing capabilities. We asked the participants if they could write necessary elements for deliberative petitions such as background, evidence, reasonable solutions, and expected effects of their petitions. In order to provide the interview data with a quantifiable analytical framework, we formulated a 5-point Likert-scale self-evaluation questionnaire for their satisfaction with the requirements of deliberative online petitions (Figure 1 (b)). The requirements were adopted from the criteria established by the existing petition platforms and deliberative writing theories [5, 6, 10, 13, 16, 45]. The online petition criteria these theories commonly require of the users are divided into the following six stages: (1) acquiring a deliberative mindset,

(2) learning the petition rules, (3) collecting petition-related evidence to support one's claims, (4) checking for redundant petitions, categories and addressee of the petition, (5) writing and revising the petitions, and (6) submission. In our interview, we asked how deliberative they thought they were in each phase and thoroughly analyzed the difficulties they commonly confronted while writing those petitions.

## 3.3 Analysis

The interviews were recorded and transcribed into text files with the consent of participants. The interview data were thematically analyzed through textual coding, in order to discover the causes of non-deliberative petitions. We first coded the interview data for causes of non-deliberation according to the petition writing sequence. Subsequently, the coded data were categorized into groups of similar causes, from which we identified the specific causes triggering non-deliberative petitions. In the following section, we summarize the results.

## 3.4 Findings

From the user research, we identified the six key causes that gave rise to non-deliberative petitions, the details of which are as follows:

*3.4.1* ***Misconceptions about online petitions.*** We found that most of the users did not comprehend the fundamental purpose of the online petition as a channel for generating policy proposals. They merely regarded the platform as a place for pouring out complaints and venting emotions at the government. Such an attitude caused the users to write unreasonable petitions, resulting in a large number of petitions being discarded. In fact, 25% of all petitions written are eventually discarded by the platform managers [35].

*3.4.2* ***Low willingness to learn and comply with petition rules.*** Another contributing factor to non-deliberation is the low level of willingness to learn and abide by the petition rules. This problem is exacerbated by the challenges in learning the petition rules. The existing platforms tend to present petition rules in a sequence of long, enumerated texts without any form of support or interaction to motivate users to learn the rules. Most users were not even aware of the existence of such rules prior to writing their petitions. In short, the users lacked a deliberative mindset mainly due to platforms' lack of effective medium through which the prerequisite rules could be conveyed to their users. Moreover, users felt overwhelmed by the process so they skipped necessary steps such as checking for redundant petitions, specifying categories and recipients. Users wanted to be given interfaces that could help them quickly search and find similar petitions. Those who lacked knowledge of policy required information to help them determine appropriate choices for their petition categories and recipient bodies.

*3.4.3* ***Lack of petition-writing knowledge.*** Most users were not familiar with writing online petitions. This is easily shown from the statistic: 89% of the users are first-time users of the online petition platform [35]. The users were incapable of deciding the appropriateness of their writing nor were they aware of what should be included in the petition. Despite such circumstances, the current online petition platforms provide neither user guidance nor support in writing deliberative online petitions.

*3.4.4* ***Too much effort to use evidence.*** Users barely knew how to find and use petition-related data as evidence for writing a deliberative petition. As such, most of the participants simply complained about the social injustice in their petitions without rational evidence. The difficulty of collecting and utilizing petition-related data such as legal, industrial, political and policy information to be used as evidence for petition also hindered the writing of deliberative petitions.

*3.4.5* ***Lack of self-reflection.*** One of the problems that prevented deliberative thoughts from being manifested in petition writing was the use of inappropriate languages. Obscenities, discriminating words and inappropriate expressions were not sufficiently restrained during the process of writing, leading to the lack of self-reflection among users with respect to their own petitions. However, in the current online petition platforms, such measures to enable self-reflection on the user's own writings were absent.

*3.4.6* ***Lack of cooperative culture.*** From our user research, users expressed intentions to share their knowledge and opinions regarding petition topics with other citizens in order to generate better, more deliberative petitions. Nevertheless, the current platform does not have the features to enable a cooperative deliberation among users, which limit voluntary sharing of opinions and thus the proliferation of deliberative writing culture.

# 4 DESIGN INTERVENTIONS

Our user research findings vividly illustrated how great is the necessity for designing an online petition platform capable of supporting the user to create deliberative petitions through purpose-designed user interaction at a system level. Therefore, we propose a design concept for "ThinkWrite". It is designed to awaken the users to the significance of deliberation in petition, help them overcome the challenges and create more deliberative policy proposals on their own. ThinkWrite (Figure 2-4) provides the user with interactive guiding interfaces through which the user can learn petition rules and apply them to writing rational, logical and sound petitions in appropriate and democratic ways. Further, the platform promotes a voluntary exchange of knowledge and information among its users. The six key features of the app are as follows:

***Gamified learning process:*** This intervention enhances user's willingness to learn petition rules. It employs gamified learning techniques by using various quizzes and 3D emojis to replace the long and complex texts (Figure 2 (c)). We applied gamified learning techniques to our design interventions, since gamified learning improves the quality of learning and enhances learning effectiveness by better engaging people with learning activities [2, 12, 17, 50]. The new features are intended to spark users' interest and a sense of accomplishment for learning petition rules. This intervention is designed to transform the dry and laborious learning process for petition rules into enjoyable and entertaining interactions. This in turn prepares the user for applying the rules to writing deliberative petitions. Not only do the interactive quizzes act as learning tools but also as a "checklist" to see if the user has indeed understood the rules of deliberative petition. This intervention also provides

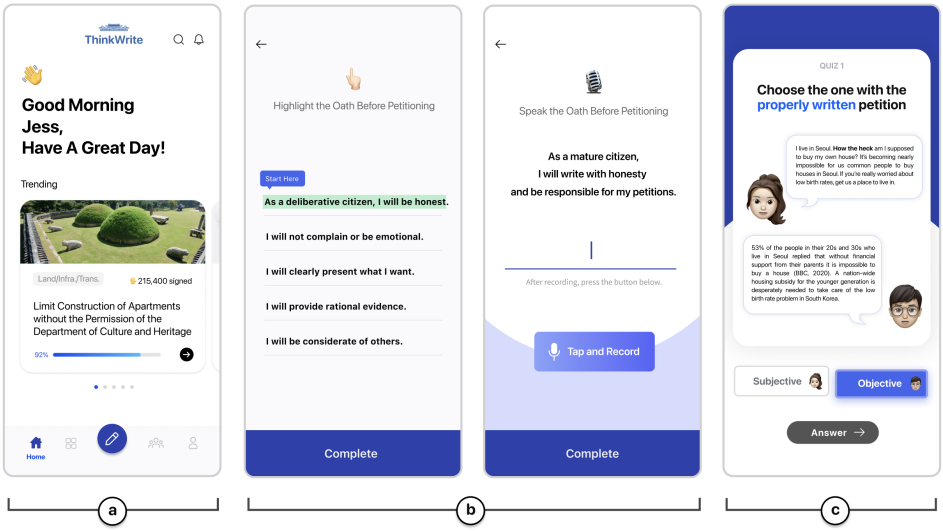


**Figure 2: (a) App Home Page (b) Interactive Oath - to start writing petitions, users must complete an interactive oath which reminds them to be deliberative in their writing. The app provides various options for the oath so users can choose according to personal preference. (c) Gamified Petition Rules - following the oath, the app provides interactive quizzes as learning tools to see if the user has understood the petition rules.**

the user with an interactive function for logging citizen's oaths for deliberative petitions before actually writing one, as mature and responsible citizens (Figure 2 (b)).

***Intelligent recommendation for necessary steps:*** This intervention provides AI (Artificial Intelligence) recommendations for checking duplicate petitions, categories, and recipients (Figure 3 (c)). It provides a guide interface with good and bad title examples to the users. At this time, if the title is well written according to the guide, AI searches for similar petitions. In the existing platform, many users skipped the process of searching for similar petitions, but now AI automatically ascertains and finds them, and thus the users cannot skip this process. The following is a function that resolves the problem of users encountering difficulty specifying categories and recipients of petitions. When a user enters data such as keywords or titles of a petition, the data are analyzed based on databases created by other users, and then the recipients and category of the petition suitable for the petition are recommended.

***Guided self-construction:*** The guiding interfaces are open and present the necessary elements in templates, thereby resolving the difficulties that users face in constructing petitions (Figure 4 (a)). A guide is presented in the form of a question or button so that users can write items one by one without omitting the background of the petition, the basis of the petition, the public interest and effect, or the desired solution.

***Easy to collect/archive petition evidence:*** This intervention recommends petition-related evidence and sources based on the user's petition (Figure 4 (b)). The intervention includes a function that helps users conveniently collect and manage various evidence to support petitions. Users can easily find (1) Higher laws/reasons related to petitions, (2) Current laws/policy, and (3) Professional information that is difficult to find and utilize on other platforms, such as related expertise and industry knowledge, in the petition intervention. In addition, materials that can help readers' understanding, such as news and images,can be found and used within the petition platform.

***Support self-reflection and personalized revision:*** The intervention provides an intelligent assistant function that promptly reacts to the user input by suggesting reactions and revisions, if necessary. This function immediately analyzes text written by users to check whether they have used inappropriate expressions in the petition (Figure 4 (c)). If AI detects inappropriate expressions, it proposes corrections to help users use appropriate expressions.

***Share, support, and collaborate with others:*** This intervention allows users to work together to construct deliberative petitions (Figure 4 (d-g)). According to the existing studies, people may share knowledge, engage in discussions, provide constructive feedback on ideas and perspectives and help foster a sense of civic identity through idea generation and collective action [7, 14, 25, 41, 42, 49]. Thus, we implemented a function that allows other users to propose evidence, suggest solution ideas and modify petition contents for those who wanted help from others. We designed interactions for functions such as "asking for help" (Figure 4 (e)), "making comments" (Figure 4 (f)) and "suggesting revision" (Figure 4 (g)). The process of sharing knowledge with others can awaken a sense of responsibility for deliberation as more mature citizens.

## 5 EVALUATION

We evaluated the effects of our prototype on users' deliberation. We recruited 16 evaluators from the user's perspective. The evaluation participants consisted of 11 men and 5 women, and the average age was 30.88 years old (SD = 10.97). The evaluation was conducted by the following criteria : (1) Comparisons of pre-and post-mindset ratings and (2) Comparison of deliberative features

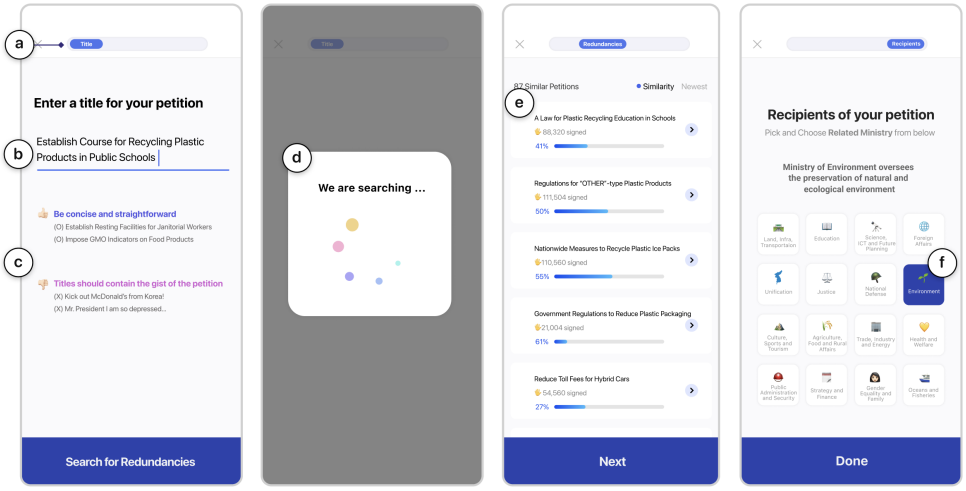


**Figure 3: Intelligent guidance for title appropriateness, redundancy elimination and recipient recommendation - (a) The app displays a top-bar navigation to guide the title input process, (b) the user enters a petition title, (c) the app displays examples for good and bad petition titles to produce appropriate titles, (d) AI system searches for similar petitions, categories and recipients of the petition based on the title, (e) redundant petitions are presented based on similarity, (f) the list of recommended recipients are shown so users can choose pertinent departments to handle the proposed petition.**

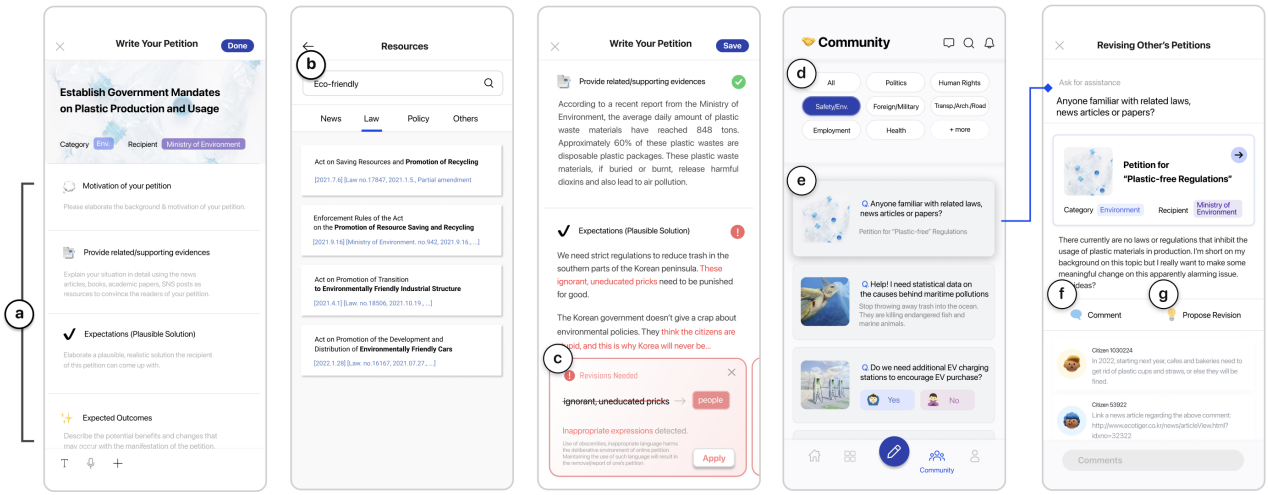


**Figure 4: (a) Guide interface for self-construction, (b) petition-evidence recommendation - if users input petition-related keywords, the system recommends appropriate policies, laws, news articles and documents, (c) AI system to detect and suggest modifications to users' inappropriate language, (d) choosing related categories for the petition, (e) posting request for petition-related knowledge sharing, (f) users sharing their knowledge via comments, (g) and can directly revise and add contents to others' petitions.**

between the existing and new platforms. The evaluation methods included quantitative surveys and in-depth interviews (Figure 5).

## 5.1 User Mindset Evaluation

In order to identify the effects of ThinkWrite on users' attitudes toward deliberative petition writing, we created a survey with a list of deliberative mindset goals highly recommended in online petitions. Participants completed the same survey including the eight items before and after using ThinkWrite (Table 1). All survey data were analyzed using Python and are presented in the text in the form of mean ± standard deviation (SD). Within-subject comparisons were conducted using non-parametric two-sided Wilcoxon signed rank test with a 95% confidence interval for the comparison of pre- and


**Figure 5: Evaluation Process of Design Interventions. The evaluation process is largely twofold: (i) self-evaluation of the participant's deliberative mindset before (pre) and after (post) using the existing petition platform and ThinkWrite (in blue), and (ii) functional evaluation of each platform to identify which feature helped the participant acquire such deliberative capability (in green). The evaluation ends with an in-depth interview of each participant to rationalize their responses.**

post-mindset ratings. We used the test for the quantitative measurement of the significance of ThinkWrite on users' deliberative mindset. We also conducted complementary in-depth interviews to interpret the survey results.

## 5.2 Features Evaluation

A features evaluation was conducted to ascertain whether the new platform's functions helped users to acquire a deliberative mindset and write deliberative petitions in comparison with the existing petition platform (Table 2). The survey consisted of 15 items and responses were measured using a 5-point Likert scale. Non-parametric tests were performed on the paired sample using the Wilcoxon signed rank test with a 95% confidence interval. We also conducted a subsequent in-depth interview to collect extensive feedback on the proposed system. In the following, we summarize the key findings drawn from the evaluation.

# 6 EFFICACY OF THINKWRITE

In this section, we present how the experience of using ThinkWrite influenced the participants' deliberative mindset and their petition writing behaviors. According to the quantitative results, the participants after using the prototype reported on average a statistically significant improvement for seven individual items in the deliberation mindset survey (Table 1, Wilcoxon sign rank test, $p < 0.05$). We confirm that ThinkWrite helped the participants to acquire a deliberative mindset, learn the petition rules, collect rational evidence to support their petition, write deliberative petitions on their own, and proliferate a deliberative and cooperative culture in the online petition. The response of Q6, on the other hand, did not show significant improvement as much as the other responses since the participants were the type of people who did not use inappropriate language. We also confirm that all the functions designed for the new platform helped the users to be more deliberative in comparison with the existing platform (Table 2, Wilcoxon sign rank test, $p < 0.05$). Furthermore, the in-depth interview results also confirmed an improvement of deliberative mindset. In the following, we summarize key findings regarding which functions influenced the participants' deliberation.

***Generating Users' Interest and Accomplishment for Rule-learning Process:*** The provided prototype was designed so that users would not feel overwhelmed by the process of learning rules. Our participants explained that *"The gamified learning process helped me focus on the long and tedious rule-learning process. It prompted my interest and consequently gave a positive sense of accomplishment."* (P2). *"The interactive oath system awakened me to the awareness of deliberation before writing."* (P1).

***Empowering User's Capability to Construct more Deliberative Petitions:*** The participants commented that our prototype was more beneficial than the existing platform in terms of constructing detailed and deliberative petitions. Other participants noted that the artificial intelligent recommendation system reduces the burden of searching for redundant petitions and choosing appropriate categories and petition recipients. The guiding template interface also induced participants to write better petitions without missing necessary elements for deliberative petitions such as background, evidence, reasonable solutions, and effects of petitions. Furthermore, the participants noted that the petition source archiving system increased accessibility for searching petition-related evidence and stimulated the sense of willingness to write a rational petition with rich evidence.

***Inducing Repeated Self-reflection on Petitions:*** After using the commentary functions of the AI system, users reevaluate and proofread their petition before submission. One of the participants said, *"I could do a self-check about my habits if I use inappropriate expressions since AI filters detect those words. I also think that petitions will be more objective if users can interact with this agent system."* (P1). Another participant also commented, *"Even those who have not written petitions can have a chance to make better petitions."* (P3).

***Encouraging Deliberation with User-to-User Interaction:*** Lastly, the participants appreciated that the knowledge-sharing function provided a meaningful experience of cooperation, beyond practical advice for improving individual petitions, which could contribute to establishing a more communicative and deliberative environment. One of the participants emphasized how these knowledge-sharing functions change the culture in online petitions: *"While exchanging knowledge and comments for deliberative petitions with others, we could create a better online environment."* (P12).

However, we also identified two shortcomings of our current prototype that need to be addressed before the application enters the development phase. One is the users' learning effect in the gamified rule-learning phase. The more users used the gamified feature, the more they memorized the quiz answers; the platform therefore should provide tailored/personalized gamification and content depending on the user's experience and deliberation level. The other is the complexity of the interaction in the writing petition phase. Participants noted that the inclusion of numerous steps

**Table 1: Participants' deliberative mindset and attitude before and after using ThinkWrite. Responses were measured using a 5-point Likert scale which ranged from "Strongly disagree" to "Strongly agree". The table contains mean scores, standard deviations, paired t-test scores (Wilcoxon sign rank test using 95% CI).**

| | *Pre* | | *Post* | | *Sig* |
|---|---|---|---|---|---|
| ***Deliberation Survey Items*** | $\mu$ | $\sigma$ | $\mu$ | $\sigma$ | $p$-value |
| *(1) I am responsible for my petition and its authenticity.* | 4.19 | 0.75 | 4.94 | 0.25 | **.002** |
| *(2) I provided reasonable supporting evidence for my petition.* | 3.81 | 0.91 | 4.5 | 0.73 | **.018** |
| *(3) I am well aware of the necessary elements of a deliberative petition.* | 2.75 | 1.18 | 4.69 | 0.48 | **.001** |
| *(4) I clearly presented the motivation and public effects of my petition.* | 4.00 | 1.03 | 4.69 | 0.60 | **.030** |
| *(5) I proposed specific and reasonable solutions in my petition.* | 3.50 | 1.10 | 4.50 | 0.73 | **.003** |
| *(6) I am self-aware of my use of inappropriate language in the petition.* | 4.12 | 0.89 | 4.62 | 0.62 | **.070** |
| *(7) I am willing to assist other citizens' petition to the best of my knowledge.* | 3.31 | 1.20 | 4.63 | 0.62 | **.003** |
| *(8) I believe cooperation with others allows me to write better petitions.* | 3.37 | 1.31 | 4.81 | 0.40 | **.001** |

**Table 2: Feature evaluation to ascertain whether the new platform's functions helped users to acquire a deliberative mindset and write deliberative petitions compared to the existing petition platform. Responses were measured using a 5-point Likert scale which ranged from "Strongly disagree" to "Strongly agree". The table contains mean scores, standard deviations, paired t-test scores (Wilcoxon sign rank test using 95% CI).**

| | *Existing* | | *ThinkWrite* | | *Sig* |
|---|---|---|---|---|---|
| ***Evaluation of Platform Functions for Deliberation*** | $\mu$ | $\sigma$ | $\mu$ | $\sigma$ | $p$-value |
| *(1) A deliberative mindset was consolidated through the platform.* | 2.56 | 0.96 | 4.81 | 0.40 | **.0000** |
| *(2) The terms and conditions of writing a petition were easily understood.* | 2.63 | 1.20 | 4.81 | 0.40 | **.0008** |
| *(3) The process of learning the terms and conditions of petitions was interesting.* | 1.94 | 0.93 | 4.63 | 0.62 | **.0000** |
| *(4) Contents that should be included in a petition were easily perceivable.* | 2.38 | 1.09 | 4.81 | 0.40 | **.0005** |
| *(5) Similar petitions to my own were easily identified.* | 2.56 | 1.21 | 4.75 | 0.58 | **.0009** |
| *(6) Choosing the adequate recipient of my petition could be easily done.* | 1.81 | 0.91 | 4.81 | 0.40 | **.0000** |
| *(7) Determining the appropriateness of my title was easily done.* | 2.00 | 0.82 | 4.69 | 0.60 | **.0005** |
| *(8) Related categories to my petition were easily identifiable.* | 2.81 | 1.10 | 4.88 | 0.34 | **.0008** |
| *(9) Writing the background and public effects of my petition were easily done.* | 2.86 | 0.96 | 4.75 | 0.45 | **.0005** |
| *(10) Writing a clearly identifiable solution within my petition was easily done.* | 2.38 | 0.86 | 4.75 | 0.58 | **.0005** |
| *(11) Providing relevant evidence for a rationally-sound petition.* | 2.63 | 1.08 | 4.81 | 0.54 | **.0009** |
| *(12) A self-reflection process to revise my own words to reconsider other citizens.* | 2.12 | 1.36 | 4.81 | 0.54 | **.0008** |
| *(13) Contents necessary to formulate a petition were easily identifiable.* | 2.00 | 0.82 | 4.69 | 0.48 | **.0000** |
| *(14) Convenient to utilize a variety of petition materials (e.g., current laws, policies).* | 1.75 | 0.68 | 4.63 | 0.50 | **.0000** |
| *(15) Easy to archive and use memos, photos, videos and hyperlinks.* | 1.63 | 0.62 | 4.69 | 0.48 | **.0000** |

might cause inconveniences since this requires a lot of interaction to write deliberative petitions. By the end of the evaluation, most of our participants were satisfied with ThinkWrite's features. However, future studies to determine the efficacy and success of the new platform by considering shortcomings are still required.

## 7 CONCLUSION

In this research, we first identified six underlying causes of non-deliberative petitions through extensive, phase-by-phase user research. Based on the findings, we developed a set of design interventions that promoted deliberative mindset and behavior in online petition users, embedded in an online petition platform, "ThinkWrite". The app is designed to overcome the critical shortcomings of the existing platforms with regard to deliberative petition writing and, ultimately, to proliferate deliberative culture in the area of civic engagement in policy development. The platform has design interventions embedded in it with six main features: a gamified learning process, a recommendation system for necessary steps, short-cuts for easy collection/archiving of evidence, a guiding interface for self-construction, tailored AI for self-reflection/personalized revision, and collaboration between citizens. We found through extensive usability testing and in-depth interviews that our solution was effective for increasing the awareness and ability of the users for deliberative petition writing. We also discovered a few minor shortcomings in the application design. As the next step, we first plan to make several improvements on the rule-learning methods according to different levels of user deliberation. We will also conduct further research on the knowledge-sharing functions to enable each user to effectively express their own individual capabilities, civic expertise and potential.

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