Supplementary file

Citizens meet Climate: A Digital Participation Framework and Prototype for Citizen Climate Action

This supplementary file provides additional information concerning methodology (Parts A and B), the platform analysis (Part C), the resulting expanded design framework (Part D), and prototyping and testing results (Part E).

Part A: Methodology – Platforms analysed in the paper

Table A. List of the platforms analysed in the paper.

Platforms	Description
Dipas; Chilecracia; Maptionnaire; CrowdGauge; Consul Democracy	Citizens are asked to vote and give their opinion about different topics and projects proposed by policymakers. They can be structured as questionnaires or with a free format based on comments and votes.
I Change my City; FixMyStreet; SeeClickFix	Citizens can inform municipalities of issues in the city. Citizens can also communicate with each other by commenting on each other's posts.
Decidim; Reykjavík City; Consultation	Citizens can propose new projects and initiatives. This can be completely open or within a subject defined by the initiators of the participatory process.
Citizenos	Forum to connect people from different parts of the world, the conversation and topics are self-managed.
Rotterdams Weerwoord	The platform showcases a variety of information regarding climate impacts and action in the city of Rotterdam. Concerning climate impacts, explanatory texts and neighbourhood maps follow six themes: heat, flooding, subsidence, groundwater, rain, and drought. Other information includes a toolkit following these themes, information on subsidies, as well as ongoing initiatives and plans of the municipality.
Ambrogio and Gaia	The platform shares information about heatwaves and climate change impacts in the city of Milan. By following two personas, the platform presents information through a personal narrative and various visuals such as maps, pictures of existing environments, sketches, news articles, and heat diagrams to emphasise the issue.
Klimaateffectatlas	Platform by the Dutch Meteorological Institute (*Koninklijk Nederlands Meteorologisch Instituut*) to inform on impacts of climate in the Netherlands. It presents historical climate data and two future scenarios 2050 and 2085 through maps and narratives.

Part B: Methodology – Questionnaire used in the participatory testing

Table B1. Overview of the three testing rounds (N = number of participants).

Round	Setting	N	Type of audience	Description
1	Workshop	7	Students, Researchers	Paper prototype evaluation using a paper questionnaire, with an open discussion at the end of the workshop.
2	Workshop	22	Mixed (researchers from different fields, students, civic society)	Digital prototype (version 1) evaluation using an online questionnaire, with an open discussion at the end.
3	Workshop	4	Mixed (researchers from different fields, students, civic society)	Digital prototype (version 2) evaluation using an online questionnaire, with an open discussion at the end.
	Online survey	12	Unknown (no personal data was collected)	Digital prototype (version 2) evaluation using an online questionnaire.
	Community festival	13	Community festival	Digital prototype (version 2) evaluation using an online questionnaire.

Table B2. Details about each testing round: Questionnaire scale and personal data.

Category	Items	Testing round		
		R1	R2	R3
Scale	-	1-8	1-7	1-7
Personal data	Age	No	Yes	No
	Education background	No	Yes	No
	House ownership	No	Yes	Yes
	Climate position	No	Yes	Yes

Table B3. Overview of statements used in the questionnaires. The phrasing of some statements changes slightly across testing rounds in response to misunderstandings raised by participants (see results in Part E).

Theme from the literature review	Design Principle	Empowerment component	Statement	R1	R2	R2
Citizen engagement	1	Behavioural	I feel empowered in taking climate action	Yes	Yes	Yes
	2	Intrapersonal	I feel that my input and opinions are heard/important	Yes	Yes	Yes
Platform governance	2	Intrapersonal	I feel that my input and opinions will be taken into account	Yes	Yes	Yes
	7	Interactional	I feel my data and privacy are protected	Yes	Yes	Yes
		Interactional	Rank who would you trust the most as the manager of this platform: municipality, neighbourhood initiative, private company, individual citizen	No	No	Yes
Climate change framing	1	Intrapersonal	I feel motivated in taking climate action	Yes	Yes	No
	4	Interactional	I feel connected to other users and part of a community	Yes	Yes	Yes
	4	Interactional	I feel I know more about climate action opportunities around me	Yes	Yes	Yes

Promotion of climate action	3	Behavioural	The prototype gives me the necessary tools to engage in climate action	Yes	Yes	Yes
Presentation of climate information	5	Interactional	I feel I know more about climate risks and impacts	Yes	Yes	Yes
		Intrapersonal	I understand the presented data	Yes	Yes	No
		Behavioural	The climate information/data presented is relevant/useful	Yes	Yes	Yes
Platform navigation & Interface appeal	6	NA	The platform is intuitive to navigate	Yes	Yes	Yes
		NA	The platform looks attractive	Yes	Yes	Yes
		NA	The platform is engaging and fun	Yes	Yes	Yes

Table B4. How the three empowerment components were evaluated through the questionnaire.

Empowerment component	**Statements**
Intrapersonal	I feel that my input and opinions are heard/important
	I feel that my input and opinions will be considered
Interactional	I feel I know more about climate action opportunities around me
	I feel connected to other users and part of a community
	I feel I know more about climate risks and impacts
	I feel my data and privacy are protected
Behavioural	I feel I have the necessary tools to engage in climate action
	The climate information/data presented is relevant/useful

Part C: Platform analysis

First, a scoping literature review was conducted at the intersection of participatory planning, digital engagement and human-computer interaction, and climate action and science communication. The review was not intended to be systematic or exhaustive, as it aimed to identify key themes and existing concepts at the intersection of these fields. These themes were operationalised in a set of guiding questions (Table C1), which served as a consistent framework against which every selected platform was evaluated in an inductive process. To ensure consistency and minimise individual bias, two co-authors independently evaluated the platforms, subsequently resolving any discrepancies through structured discussions with a third author. The section below "Critical summary of platform analysis" summarises the structured discussion, and Table 2C presents the systematic comparison of platforms.

Table C1: Themes and guiding questions used for the platform analysis

Theme	**Guiding question(s)**
Citizen engagement	How are citizen engaged (e.g., information sharing, voting, mapping, commenting)?
Platform governance	How is citizen data handled and used?
Climate change framing	How is climate change framed (e.g., positive, negative, local, global)?
Promotion of climate action	How is climate action promoted (individual, collective, online, offline, behaviour, infrastructural)?
Presentation of climate information	How is climate data/information presented?
Platform navigation & Interface appeal	How is the navigation through the platform? How appealing is the interface?

Critical summary of platform analysis

First, we found that none of the analysed platform is strong in both participation/empowerment and climate action. The platforms that focus on climate action are largely awareness-oriented and do not provide opportunities for digital interaction. The platforms for citizen engagement are 'generic' platforms and, therefore, do not provide information about climate change. Furthermore, most platforms do not try to move participation to a real-life context and are not appealing, not intuitive, and very overwhelming. Details about the platform analysis are provided next. The structured discussion of the platform analysis highlighted four issues: disconnection between climate data and personal experience, complex navigation, information overload, and limited opportunities for action.

1. Disconnection Between Climate Data and Personal Experience

The analysis shows a clear divide between climate communication platforms and participation platforms. Climate platforms such as Klimaateffectatlas are strong in providing scientific and data-driven insights but often fail to connect this information to citizens' everyday experiences. Highly technical platforms present large amounts of data that are difficult for non-experts to interpret, creating a barrier to understanding and engagement.

Platforms like Ambrogio and Gaia and Rotterdams Weerwoord are successful in 'translating' climate change into tangible information for citizens but are largely passive. In particular, the narrative, locally contextualised approach used in Ambrogio and Gaia, combining storytelling, visualisations, and relatable scenarios, help translate abstract climate data into meaningful personal experiences. However, these platforms provide one-way information to citizens, with

no possibility for citizens to interact with the information provided, thus limiting the integration of climate data and lived experience.

In contrast, participation platforms, including spatial survey tools (e.g., Dipas, Maptionnaire, Consul Democracy), civic issue-reporting platforms (e.g., FixMyStreet, SeeClickFix), and proposal-based systems (e.g., Decidim, Reykjavík City), focus on collecting citizens' input but rarely provide climate-related information or context. As a result, citizens can participate in urban planning projects and decision-making in general, but without a systematic understanding of how their input relates to climate challenges.

2. Complex Navigation and Lack of Intuitive Design

Across both participation and climate platforms, navigation is often complex and unintuitive. Many of them require users to navigate through multiple layers of information, making it difficult to understand where to start or how to contribute. This is particularly evident in platforms that combine maps, datasets, and participation tools without a clear structure. Participation platforms, especially spatial survey tools and civic engagement systems, can be functionally rich but visually and structurally overwhelming. Similarly, climate platforms often present layered maps and technical interfaces that are not user-friendly for a general audience. Only a few platforms demonstrate effective design practices, such as clear layouts and self-guiding interfaces (Maptionnaire being a good example). In general, however, the lack of strong visual identity, engaging graphics, and interactive elements results in a passive user experience and reduces motivation to explore the platform further.

3. Information Overload

Information overload is a recurring issue, particularly in climate communication platforms. Platforms like Klimaateffectatlas provide extensive datasets, future scenarios, and detailed maps, which are valuable for transparency and accuracy but can overwhelm citizens who lack technical expertise. At the same time, participation platforms generate a different type of overload. Open text contributions, such as comments, proposals, and discussions, produce large volumes of qualitative data that are difficult both for citizens to navigate and for institutions to process. While simpler interaction tools like voting systems (used in many spatial survey platforms) reduce complexity, they also limit the depth of participation by restricting users to predefined options. Although most platforms aim to inform citizens and build trust through transparency and data sharing, the balance between clarity and completeness is often not achieved. As a result, citizens may feel either overwhelmed by too much information or constrained by overly simplified interaction tools.

4. Limited Opportunities for Climate Action

A key finding is that most platforms, regardless of type, offer limited pathways for translating digital engagement into real-world action. Participation platforms enable users to share opinions, report issues, or propose initiatives, but they often lack transparency about how this input is used. This can lead to frustration and reduced motivation, as citizens do not see tangible outcomes from their contributions. Climate platforms, on the other hand, focus primarily on informing and raising awareness, with little emphasis on enabling participation or collective action. While some platforms showcase ongoing initiatives or provide toolkits, they rarely facilitate community-building or support users in organising their own actions. Across all platform types, features that could encourage real-life engagement, such as clear calls to action, do-it-yourself activities, or mechanisms to develop and implement initiatives, are underdeveloped. Even when such features exist, they require significant guidance and raise concerns about privacy and data use.

Table C2. Systematic analysis of selected platforms.

Platform	Themes identify in the literature review					
	Citizen engagement	**Climate change framing**	**Promotion of climate action**	**Presentation of climate information**	**Navigation**	**Interface appeal**
Generic planning or consultation platforms that could be adapted for climate action						
DIPAS	Interactive mapping; idea collection; invited comments; ratings; spatial feedback	Depends on issue addressed	Depends on issue addressed	Depends on issue addressed	Map-based; layered information	Interactive; map-based
Chilecracia	Consultations; voting; citizen proposals; invited comments	Depends on issue addressed	Depends on issue addressed	Depends on issue addressed	Consultation-based; thematic sections	Simple; functional
Maptionnaire	Participatory mapping; location-based surveys; invited comments; place-based feedback	Depends on issue addressed	Depends on issue addressed	Depends on issue addressed	Map navigation; location-based interaction	Interactive; map-based
CrowdGauge	Voting; prioritisation exercises; interactive; educational; gamified	Depends on issue addressed	Depends on issue addressed	Depends on issue addressed	Step-by-step; interactive tasks; game flows	Engaging; playful; gamified
Consul Democracy	Citizen proposals; debates; invited comments; voting; participatory budgeting	Depends on issue addressed	Depends on issue addressed	Depends on issue addressed	Process-based; thematic; participation stages	Functional; modular
Decidim	Proposals; debates; comments; voting; assemblies; participatory processes	Depends on issue addressed	Depends on issue addressed	Depends on issue addressed	Process-based; thematic navigation	Functional; modular
Reykjavík City Consultation	Ideas; proposals; comments; voting; discussions	Depends on issue addressed	Depends on issue addressed	Depends on issue addressed	Topic-based; structured consultation flows	Functional; modular
CitizenOS	Forums; discussions; proposals; comments; voting; collaborative decision-making	Depends on issue addressed	Depends on issue addressed	Depends on issue addressed	Workspace-based; topic navigation	Functional; modular

Issue reporting platforms that cannot be adapted for climate action						
I Change My City	Issue reporting; photos; comments; community interaction; issue tracking	Not possible; the platform does not control what issues are addressed	Not possible; the platform does not control what issues are addressed	Not possible; the platform does not control what issues are addressed	Map-based; issue tracking	Simple; functional
FixMyStreet	Issue reporting; comments; updates; citizen–municipality communication	Not possible; the platform does not control what issues are addressed	Not possible; the platform does not control what issues are addressed	Not possible; the platform does not control what issues are addressed	Simple; map-based	Simple; functional
SeeClickFix	Issue reporting; photos; comments; notifications; municipal responses	Not possible; the platform does not control what issues are addressed	Not possible; the platform does not control what issues are addressed	Not possible; the platform does not control what issues are addressed	Dashboard; map-based	Simple; functional
Climate-focused platforms						
Rotterdams Weerwoord	Information access; neighbourhood exploration; local initiatives; adaptation resources	Local climate impacts, risks, and adaptation in Rotterdam	Promotes individual, community, and municipal climate actions	Climate maps; neighbourhood information; themes (heat, flooding, drought, etc.); toolkits; subsidies; local initiatives	Theme-based; interactive maps; resource navigation	Visual; informative; locally focused
Ambrogio and Gaia	Narrative exploration; learning through personas; visual engagement	Climate change framed through local heat impacts and personal experiences	Promotes awareness, preparedness, and behavioural change	Narratives; maps; photographs; sketches; heat diagrams	Story-driven; sequential exploration	Narrative; immersive; visually engaging
Klimaateffectatlas	Information access; map exploration; climate data interaction	Climate impacts, historical trends, and future scenarios	Supports climate adaptation planning and evidence-based decision-making	Interactive maps; datasets; historical data; future scenarios	Map layers; thematic browsing; data exploration	Data-driven; interactive; expert-based

Part D: Expanded Design Framework

Table D1. Expanded Design Framework, describing each design principle, how each principle relates to design elements and strategies identified in the platform analysis as well as to key references identified in the literature review.

Design Principle (DP)	Description	Design elements/strategies identified in the platform analysis	Key references identified in the literature review
1. Balanced use of negative and positive framings	Participation in climate action should combine realistic depictions of impacts with hopeful narratives, best practices, and success stories. This balanced framing encourages action and sustained involvement and avoids climate anxiety.	Storytelling, Scenarios, Realistic representations of the local environment, Best practices, Success stories	O'Neill & Nicholson-Cole, 2009; Nabi et al., 2018; Hegger et al., 2017; Luxon, 2019; Clayton, 2020
2. Valorisation of citizen knowledge and lived experiences	Participation in climate action should build on citizens' lived experiences and contextual knowledge. Platforms should provide diverse ways for people to contribute insights.	Different ways for citizens to provide input, Open comments, Pictures, Citizen science	Scannell & Gifford, 2013; Prost et al., 2023; Brown & Kyttä, 2014; Adelle et al., 2022; Champlin et al., 2022; Gonçalves et al., 2024
3. Promotion of awareness and sense of efficacy both individually and collectively	Participation in climate action should strengthen citizens' belief that their actions matter, which motivates both individual and collective engagement. Community-building features and recognition of positive behaviour further reinforce a shared sense of impact and responsibility.	Educational and awareness materials, Mechanisms for community building, Do-it-Yourself, Tutorials, Awarding positive behaviour, Success stories	Zimmerman, 1995; O'Neill & Nicholson-Cole, 2009; Nabi et al., 2018; Goncalves et al., 2026
4. Grounding in local and personal perspectives	Participation in climate action should be grounded in local contexts to increase relevance, linking global phenomena to daily life. Personal and place-based perspectives enhance emotional resonance and perceived relevance.	Storytelling, Landmarks, Realistic representations of the local environment	Prost et al., 2023; Scannell & Gifford, 2013; O'Neill & Nicholson-Cole, 2009; Veland et al., 2018
5. Clear, credible and reliable information	Participation in climate action should be accessible, transparent, and based on credible scientific information, which builds trust and supports informed decision-making.	Educational material, Scientific data, Realistic representations of the local environment, Guided debate, Open data	O'Neill & Nicholson-Cole, 2009; Nabi et al., 2018; Prost et al., 2023; Slingerland & Overdiek, 2023; Hanzl, 2007; Sheppard, 2015

6. Appealing and engaging interfaces and communication	Participation in climate action should be visually consistent, interactive, and emotionally engaging to spark curiosity and keep citizens engaged.	Consistent (visual) language, Gamified elements, Social media features, Storytelling, Rewards	Atreja et al., 2018; Hügel & Davies, 2020; Nicholson-Cole, 2005; Slingerland & Overdiek, 2023; Gonçalves et al., 2024; Franken-Champlin, 2019
7. Transparent and clear participatory processes	Participation in climate action should provide clear communication about roles, responsibilities, and decision-making processes, which helps citizens understand how their contributions are used and what outcomes they can expect. Transparency and clarity also foster long-term engagement and confidence.	"About us" information, including clear information about roles and expectations, Privacy mechanisms, Informed consent page, Data and GDPR compliance statement	Gonçalves et al., 2024; Gonçalves et al., 2025; Monno & Khakee, 2012; Yazar et al., 2025

Part E: Results – Prototyping and Testing Results

E1: First Round - Paper Prototype

The open feedback was extensive and can be found verbatim in Table E1. Table E2 shows how each questionnaire item was rated by participants on a scale between 1-8. The table also quantifies the percentage of participants (N1=7) that rated the prototype lower than 4,5, equal to 4,5, or higher than 4,5. This is a small sample, so statistics are less relevant. However, these results show specific aspects that were rated low by participants, including perceptions that their input and opinions are heard and will be taken into account (items 3 and 4) and that the platform connects them to other users or a brodaer community (item 7). Feeling motivated, perceptions of empowerment and having acquired the tools necessary to take climate action (items 1, 2 and 9) were also rated relatively low. Together, the open feedback and participant ratings confirm the importance of the core elements in the concept, such as storytelling or the promotion of concrete climate action. Suggested improvements were clustered clustering around five key design strategies, summarised as follows:

(1) Leveraging storytelling and contextualised personal narratives

Participants perceived the platform narrative as overly linear, which limited their sense of engagement. They expressed a preference for a more interactive and personalised experience, with greater variation in user journeys. In addition, some participants found it difficult to position themselves within the predefined climate positions. While the storytelling approach was appreciated, it was considered insufficiently dynamic. Participants emphasised the need for stronger visual identity and more diverse pathways through the platform.

(2) Integrating scientific evidence with lived experience

The use of heat maps and diagrams was regarded as clear and informative. However, participants noted that these representations did not foster an emotional connection. The implications of climate data, particularly in relation to personal experiences of heatwaves, were not sufficiently articulated. As a result, although the data were understandable, they were perceived as detached and lacking in experiential relevance.

(3) Enabling meaningful opportunities for action and efficacy

Participants responded positively to the inclusion of climate action options. Nevertheless, they indicated a need for clearer information regarding the expected impact and required level of effort associated with each action. Suggestions included categorising actions according to their nature, for example distinguishing between individual initiatives and those requiring institutional support such as government subsidies. Participants also expressed interest in a broader and more diverse range of actions, alongside clearer indications of their potential outcomes.

(4) Fostering connections between communities and place

Participants reported a limited sense of connection both to the selected persona and to other users. They noted the absence of opportunities to express their own opinions directly, as well as a lack of visibility of others' perspectives. Consequently, the platform was perceived as insufficiently participatory and not adequately personal. Participants suggested enhancing the sense of empathy towards personas and strengthening social interaction, including greater emphasis on the collective value of shared data, experiences and actions.

(5) Ensuring transparency and clarity about platform governance

Participants highlighted the need for a clearer and more consistent visual identity. This was seen as important not only for usability and engagement but also for communicating the platform's purpose and governance more effectively.

Table E1. Rating given by the participant followed by the justification (verbatim). Not all participant provided justifications in all questions, which is why the number of comments varies per item.

When I use the prototype I feel motivated in taking climate action
1: A lot of thought has been put in the informing side of climate change, but not on the problem solving side. Also I feel that the slides of the rise in temperature and urban heat should be the ones that give me motivation, but they don't grab my attention
4,5: Not super excited
3,5: It feels a bit corporate which makes me a bit cynical
6,5: It's nice to see the initiatives that are in my city, I feel that if I join them I would make some noticeable change in my surroundings
5: I think you can add more details of residents' impact on climate changing. Because now I see nothing, only the statistics of temperature. So I was not motivated
6: As a young person, I feel that the prototype is a quick way to understand what I can do to take climate action
When I use the prototype I feel empowered in taking climate action
1: Maybe if the platform would also show what local climate action can mean for the reduce in temperature. The platform does not inspire me on the problem solution side. Maybe if you would have reference projects of local citizen climate action and the result of that, I would feel more empowered.
6: It could be personalised regarding my preferences
5,5: I think I feel slightly more motivated than empowered after seeing the alternatives. But after taking action I would feel more empowered I believe
4: I think you can give multiple choice of how people can take part in taking climate action. Now there's only 3 solutions
When I use the prototype I feel that my input and opinions are heard
3: I think citizens can also share problems they experience in the event of urban heat or solutions they are thinking of. This platform can also be this community forming place instead of just a click and go website
4,5: It's dynamic but not personal
2: It didn't really ask for my opinion
4,5: I felt heard by my character, but not heard in a bigger sense like by my community for example
When I use the prototype I feel that my input and opinions will be taken into account
3: It is not clear as user how my input/opinions will be used
1,5: It's dynamic but not personal
2: I didn't give much of any input
4,5: I think that when I join one of the initiatives I will feel that my opinion are more taken into account
2: I didn't find other's opinions/comments about how to choose the place in the prototype
The prototype increases my awareness of climate risks
6: I would suggest emphasising the risks a little bit more. With narratives or graphs
6,5: Being already active it was not new
7,5: Yes! Now I know more about how climate threats will affect my city
7: The urban heat island map is a really good way to suggest a cooler space. But why not give it in advance but give me after I make the choice
6: It is simple and easy to understand
The prototype increases my awareness of climate action opportunities around me
8: A good overview of platforms. Maybe this platform could also suggest other platforms that are working on other climate problems (water, energy)
6,5: Diverse opportunities are given
8: I didn't know these specific websites in Delft
7,5: I really liked to see the initiatives, because when I finished I was like: what can I do?
3: There could be more options for climate action opportunities
7: Yes! I am becoming aware of the organisations & policies around me better & how I can access them
When I use the prototype I feel connected to other users and part of a community

3: It is nice how this platform is a place for connecting people with initiatives, but I think it could be enhanced by creating the opportunity for visitors to leave an idea or something. Making it a bit less generic and lively
2,5: I have no idea what others do or think or feel
3: I felt mostly that I talked to a chat bot
5,5: Not really during the use, but when I saw the last screen yes
2: I didn't see any comments on the spot I chose. It's more like a website for appealing people to take actions not like a community
3: I do not see how the fellow citizens feel about climate change

When I use the prototype I understand the presented data.

8: the storytelling is very clear as well as the presented data
6,5: but I kinda study maps all day every day
7,5: I study urbanism and have seen such maps many times
6,5: the graphs were clear to me and the explanation

The given data are useful

5: I think it is useful for informing citizens but I'm not sure if it excites people to actually engage in climate action
1,5: Right now I cannot imagine 1°C difference
6: The only thing is missing is attaching feelings to it
6,5: I think it is useful to understand the risk that we're facing and the consequences
7: If I have no idea which place that I could take my parents to, I may take it into my consideration

The prototype gives me the necessary tool to engage in climate action

3: Currently I feel like the target group of this platform is more focused on children. I think they would have fun scrolling through this platform but do not think anybody else will do this out of curiosity
6,5: It could be more engaging to actually use the tools. How to translate to practice?
6: could be more radical, connect you to other people, social media but for climate, a tool to play with
6,5: It provided me the knowledge and showed me how I can take action. I like that! I think some initiatives would be fun if I join with some friends
4: I think the most useful tools are the heath map and the temperature graph. For the second part, the solution, I feel it is not connected into the first part

The prototype is intuitive to use

8: the steps are clear, as well as the graphs
7,5: really clear steps and guidance
8: I like the interaction with the prototype

The prototype looks attractive

5: It is cute but not exciting. I feel like the whole marketing on climate change can be more out there.
6,5: Nice language
6,5: it looks clear and not overwhelming
5: maybe more colourful!

The prototype is engaging and fun.

5: again, informing yes, if you want to motivate people to actually do action, maybe not. The actions now are not presented in a fun way
4,5: why would I start to use this though?
5,5: yes, I always want to see what is next. But maybe because there's a predetermined flow it is not that fun
7: I think you can add more details of residents' impact on climate change. Because now I see nothing. So I was not motivated
4: It could be more interactive! Like you could get points when you use it and in the end get some incentive?
When I use the prototype I feel that my privacy is protected.
8: there are no private information asked
7: it didn't ask me many personal things
4,5: I don't know if I have even considered my privacy while using it...
7,5: Since I didn't enter any private data, I didn't even think about this aspect. So I felt safe during the whole use

Table E2. How each questionnaire item was rated by participants in round 1 (N1=7). The table indicated the number of participants per rate from 1-8.

Rating from 1-8 in 0,5 intervals	**1**	**1,5**	**2**	**2,5**	**3**	**3,5**	**4**	**4,5**	**5**	**5,5**	**6**	**6,5**	**7**	**7,5**	**8**	**% > 4,5**	**% 4,5**	**% < 4,5**
When I use the prototype, I feel motivated in taking climate action	1	0	0	0	0	1	0	1	1	0	1	2	0	0	0	29	14	57
When I use the prototype, I feel empowered in taking climate action	1	0	0	0	0	0	2	1	0	1	1	1	0	0	0	43	14	43
When I use the prototype, I feel that my input and opinions are heard	0	0	1	0	1	0	0	3	1	0	1	0	0	0	0	29	43	29
When I use the prototype, I feel that my input and opinions will be taken into account	0	1	2	0	1	0	1	1	0	0	0	1	0	0	0	71	14	14
The prototype increases my awareness of climate risks	0	1	0	0	0	0	0	0	0	0	2	2	1	1	0	14	0	86
The prototype increases my awareness of climate action opportunities around me	0	0	0	0	1	0	0	0	0	0	0	1	1	2	2	14	0	86
When I use the prototype. I feel connected to other users and part of a community	0	0	1	1	3	0	0	0	0	2	0	0	0	0	0	71	0	29
When I use the prototype. I understand the presented data	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	0	0	100
The given data are useful	0	1	0	0	0	0	0	0	1	0	3	0	1	1	0	14	0	86
The prototype gives me the necessary tools to engage in climate action	0	0	0	0	1	0	1	0	0	0	1	3	0	0	0	29	0	57
The prototype is intuitive to use	0	0	0	0	0	0	0	0	0	0	0	3	1	1	2	0	0	100
The prototype looks attractive	0	0	0	0	0	0	0	0	2	2	0	2	0	0	1	0	0	100
The prototype is engaging and fun	0	0	0	0	0	0	1	1	1	2	0	0	1	1	0	14	14	71
When I use the prototype, I feel that my privacy is protected	0	0	0	0	0	0	0	1	0	0	1	0	1	2	2	0	14	86

E2: Second Round - Digital Prototype (Version 1)

The open feedback in this round was also extensive and can be found verbatim in Table E3. Table E4 shows how each questionnaire item was rated by participants on a 7-point agreement scale from strongly disagree to strongly agree. The table also quantifies the percentage of disagreement by aggregating participants who responded strongly disagree, disagree and somewhat disagree, the percentage of agreement by aggregaging participants who responded strongly agree, agree and somewhat aggree, and a percentage of neutrality calculated based on partipants who were neutral with respect to the item.

This round showed more positive feedback compared to the initial evaluation, though they cannot be directly compared since they tested different versions of the prototype. In this round, about half of the participants (strongly/somewhat) agreed with statements related to their input and opinions being heard and taken into account and that the platform conveys a sense of community. About 80% of participants agreed with statements related to perceptions of empowerment and having acquired the tools necessary to take climate action. In addition, several areas for improvement were identified, which we grouped according to the design strategies:

(1) Leveraging storytelling and contextualised personal narratives

A few participants noted that the platform narrative lacked closure, particularly in its connection to the selected persona at the end of the user journey. There was also some confusion regarding the function and meaning of the final page. Furthermore, participants observed that the range of personas was limited and did not adequately represent more vulnerable groups, such as older adults or children.

(2) Integrating scientific evidence with lived experience

The data and visualisations were generally perceived as valuable and effective in communicating climate risks. However, opinions diverged regarding the visual style. While some participants appreciated the informal, sketch-based approach, others suggested that a more refined and professional visual identity would better convey credibility and purpose. One participant suggested incorporating Physiologically Equivalent Temperature (PET) as a more relatable metric to represent thermal comfort.

(3) Enabling meaningful opportunities for action and efficacy

Participants expressed a strong interest in collective approaches to climate action. At the same time, they highlighted the lack of guidance and support provided by the platform in facilitating these actions. Several participants suggested the inclusion of a clear and immediate call to action, such as an ‘Act Now’ feature, as well as more opportunities related to climate activism. Concerns were also raised regarding the affordability of certain proposed solutions, with some participants noting that these may not be accessible to all users.

(4) Fostering connections between communities and place

Participants reported that the platform did not yet foster a strong sense of community, particularly in relation to collective action beyond the digital environment. There was a clear demand for additional features enabling interaction, such as opportunities to share opinions, ask questions, comment, and exchange information with other users. Some participants characterised the platform as primarily individual rather than collective in its current form.

(5) Ensuring transparency and clarity about platform governance

Participants indicated that the purpose of the platform and the motivations for user engagement were not sufficiently clear. The absence of information regarding the organisations or stakeholders responsible for the platform contributed to uncertainty and reduced trust. Moreover, participants highlighted a lack of transparency concerning how citizen input would be utilised in subsequent processes, leading to challenges in managing expectations.

Table E3. Comments (verbatim) provided by participants per item in round 2 (N2=22). Not all participant provided justifications in all questions, which is why the number of comments varies per item.

When I use the prototype, I feel motivated in taking climate action

- I love the information and the way the website is formed. I think it gives you enough information to het excited about doing something, especially with the examples of what might happen in the future
- It makes climate change insightful and it makes it practical
- The platforms provides concrete and specific resources on actions I can take to address climate change on a local level. This makes it feel more accessible and it gives me the impression that I am not alone in trying to do something about climate change, but I am supported by a larger system
- Heat map is strong to support
- This prototype really helps one become aware of what resources can further educate them about climate action
- I am myself very interested on climate change and I didn't know all the initiatives that there exist so I find it really cool to have an easy platform to be guided on how to contribute to climate action
- It helps picture and see the problem and the solution more vivid
- The different visualizations of the heat problem motivate me to prevent a future that looks like that. The presentation of existing initiatives also feels encouraging because one is not alone, other people are working on the problem aswell. The menu gives the opportunity to choose the place of my involvement, that is quite appealing because it suggests I can do small steps.
- Good suggestions at the end, they show possibilities
- There are nice examples (especially the three categories learn and discover, online and offline communities and building and DIY), but I most tips weren't new to me. Maybe more variety of tips and diy project are nice. I very much like the community part, I would love to download a DIY manual to make my neughborhood greener to do together with neighbours.
- It shows very concrete examples, more than just an idea or activity but also the website where you can find information
- The scenario images make the impacts of climate change very clear in a familiar setting, it feels more relatable than just numbers. Also the scenario of heat / looking for a cool place is very familiar
- I feel like the ending parts could still follow in the story path chosen a bit more, I got emotionally invested and then it kind of dissappeared
- I like the concrete options you get at the end to start with, but the action Alex needs to do (picking a good place for friends) did not activate me towards climate change
- It's a clear guide on how to take collective action or just find a comfortable place during terrible climate situations. Even though I still don't feel like what I'm doing is very useful for climate action other than myself and my immediate surroundings.
- Yes- I feel like there are opportunities offered to act - but they are mainly inspiring and the last step is still missing
- I definitely feel more motivated and inspired to do little things that can help, but I'm still lacking the initial motivation why I would go in the platform to begin with. Yes I can feel the heat around me but the main reason I would go in this platform would be to see things to do on a hot day with my friends. I still think my individual actions will not make as much difference as the actions of big companies because they are the main pollutants.
- The platform provides different practical initiatives in which I can get involved in, depending on my level of awareness of climate actions

When I use the prototype, I feel empowered in taking climate action

- Feeling of appreciation when you see an initiatives you are also active in
- I like the feeling that more people are doing this (community part, and initiatives that already exist)
- It is an encouragement!
- I can imagine other people might have the same challenges and it works as a guide to better-informed choices. I could find others going the same direction, and we could help each other.

- Final pages give a lot of thorough information, its informative and local at the same time
- Possibilities are offered, but the “act now” step is still missing, created awareness that something needs to be done now
- The prototype gives some starting points which is important because there it is hard to filter the relevant information in the whole amount of climate research.
- Not at the moment, because the links don't work yet. "Existing initiatives" could show concrete initiatives, the "building and diy" could redirect to actual guides or reference projects/inspiring stories.
- The platform provides different practical initiatives in which I can get involved in, depending on my level of awareness of climate actions
- I think there could be more approachable diy solutions (eg add plants to your balcony etc). Perhaps asking for woning type before proposing solutions would make the options feel more relevant!
- I feel more empowered but not too much. I feel like it is something I would see and be like “oh cool!” But not go back into it again.
- Too many options can also seem overwhelming so maybe one option at a time could have helped me understand this information more easily
- The suggestions presented in the website are interesting, but they only provide a way to start or get informed about possible actions. I don't feel like I will also be supported throughout the process.

When I use the prototype, I feel that my input and opinions are heard

- I liked suggesting a new place to go or to start my initiative.
- I feel I can add value by giving input for this research Project
- It’s amore a informative and story, so you don’t really get to give ur own opinion. However this informative part is really nice
- Not at the moment, I think this would be better with the "start your own initiative" button, or somehow connect users to one another?
- To a certain extent. I feel like the platform recognizes my input and responds with solutions based on my needs. However, I don’t know if my opinions will be considered or will be useful yet.
- The fact that I can participate in adding suggestions or starting my initiative is engaging. I would like to be able to also leave general comments and/or questions
- The last section about own actions felt a bit generic but maybe that is because I am very much into the topic.
- There are not a lot of opinions to be given apart from if I want to contribute to climate action
- Would be nice to have a clearer description of how the input will be used / how other people feel about climate (e.g. what percentage of people fell on different parts of the climate anxiety spectrum
- The possibilities to leave my own opinion help a lot
- I didnt have to give input anywhere.
- I do not know what happens with my answers
- This was not as interactive a workshop for me to feel like it was personally for me, maybe further user analysis or character narrative exploration could have helped. I felt like the main aim of this was to let me know of my options in terms of climate change mitigation than making me feel like I contributed much to this.
- i didnt give a lot of input, I’m also not sure what is done with it
- Not sure, at the beginning yes I could see that my pin pops up as recommendation for others but i am not creating impact nor do I feel heard
- I felt like there was no “input” section that i could actually write about my thoughts and opinions. It was more motivating me to take action then being heard.

When I use the prototype, I feel that my input and opinions will be taken into account

- The map is a cool feature
- Knowing there are more specific policy or design motivations would help me feel like my answers have more impact
- Only the social part and if I create my own initiative

- Based on my choices I'll get options to chose from, however it's not about my opinion
- I don't know that for certain at this point.
- Perhaps I didn't notice but I didn't see a place where this was guaranteed. I also didn't feel like starting this questionnaire to be heard. It felt more as a way of getting informed and starting collective action on a scale that it was possible individually or in a small group.
- Same as previous question, it feels like an educational tool, more than a tool to give input
- I think maybe some questions or parts that would ask me "should more be done by the government?" or something like that would help, i didnt feel questioned about my inputs on changing the city/adapting/mitigating climate change impacts
- I'm not exactly sure how many people look at my comments or suggestions
- Can't see the outcome, or evaluation

The prototype increases my awareness of climate risks

- I really like this part! It's very easy to emphatize with the character and understand the risks of CC
- Liked the pictures and future scenarios
- Showing specific data about my town makes it very memorable because it feels personal
- Seeing the future scenario images really help!
- It is good that the future scenarios are not only descriptive but also visualized
- By looking at places where I live and seeing its possible changes in spaces makes it much more appealing to imagine these climatic futures.
- With the different examples, it's really informative
- The scenarios are really insightful and seeing how they could look in the future did make me reflect on how they would actually look. Don't make them too exaggerated because if not it can be taken as funny rather than scary.
- Cs location is delft, I'm more familiar with surrounding environment
- Not much because I was aware of it before
- The collages show concrete things. Maybe visually show how people and life are impacted?
- Would be nice to have current scenario image, and future scenarios, side by side
- The images with times (2050& 2085) were scary! Also good provocative

The prototype increases my awareness of climate action opportunities around me

- It does and gives a variety of options based on my awareness
- I like how this platforms link all these initiatives together, which would be otherwise hard to find
- The concrete and local options were very nice and concrete
- i like the local part and the start your own initiative
- Because it's also all in Delft and we live and study here. So it's really easy to find thing you're interested in and it's nearby
- Pictures and stories helped to put me in this situation
- It is a good push for people who doesn't know what to do
- Show options, many of which I didn't know about yet
- Examples are familiar to me
- I believe that the mentioning of these opportunities is already curated in some way.
- More clarity and overview

When I use the prototype, I feel connected to other users and part of a community

- Helpful that others have the same experience with the prototype
- Would be interesting if the platform showed who/how many people are involved in the local initiatives, then I would feel like I am apart of a community of people doing great things.
- when the leave your review of places function works it will be great
- I guess the sense of community will increase with the full version but right now I only felt it with the map question where you could suggest cool places.
- Will be improved when the map and own initiative features work.
- I like that you could see the choices of others, but I didn't feel connected with them (Maybe if there was an option to respond to them?)

- At the beginning yes (pins)
- Not that much. However, when giving suggestions of places. And perhaps if I find people in the places where I'd go. But the final link to the ongoing projects could also lead to some sort of network where people are already doing something related to that.
- Not really.. maybe if you had some sort of forum where you can talk to others using this website?
- There are different levels of connection, maybe a more direct connection (like chatting with others or sharing info to my own friend groups/ communities is nice too)
- I am not 100% sure if the comments are left my real people or simulated
- Can't relate
- The use of a specific user profile didn't help me know as much about the community to feel like I was a part of it

When I use the prototype, I understand the presented data

- Simple, clear and understandable
- Captions and images are well explained and easy to read
- Very clear!
- The map with the temperatures is really cool!
- Yes and no to be honest, I wasn't entirely sure about the heat map yet, but it's a great approach
- I liked the slider and clear two-phase future scenarios
- Yes but would be useful to have labels of the different places
- It's all really clear with pictures and texts
- UHI map or PET map? PET shows actual impact on humans, but its numbers are hard to understand for non-experts.

The given data are useful in presenting climate risks

- I like the visualisation types such as maps but also photographs of scenario changes since that helps one understand the scale of the challenge
- Yes. Using heat maps and heat is a good data presentation choice because everyone is affected by it and can easily relate to the change in heat patterns
- I was convinced. Especially with the visualisations of climate scenarios.
- Definitely. Especially with the projections of 2050 and 2085
- maybe some info about secondary impacts would help, like how does data presented change our way of living and society, beyond streets are hot and water dissapeares
- I wonder if the PET would be a better indicator for the heat map because there is also a UHI effect without climate change
- PET? Impact on biodiversity (some people car about this), impact on economy (other people care about that)

The prototype gives me the necessary tools to engage in climate action

- The building and DIY section gives initiatives that are very high effort to do.
- I trust the prototype is giving me enough tools. And the opportunity to know how to start my own initiative.
- It makes me think about it more, but I would need an extra spark to get engaged; something that makes me start doing something actionable
- Activism was not discussed, Putting pressure on governments who also need to take action, is also a cause for climate justice
- Act now is missing
- They give you a start to becoming engaged and informed on the subject, not really to immediately take effective action
- I still have more doubts about best practices regarding climate change which have not been answered
- Same answer, tools should lead somewhere
- Could be more options

The prototype is intuitive to use

- nice graphics!
- I just loved it haha
- Felt like an educative game, which is good I think
- I miss a menu button to understand where I am in the prototype
- I lacked seeing like a main menu where I get an overview of everything I can do in the platform. Now it is like one storyline and I can't go back to check the other characters.
- Not sure what intuitive to use means
- Towards the end I was a bit confused about how the user profile connects to the resources and information shared at the end
- Well the prototype did not have a clear end or a thanks for contributing page so I was wondering if I chose the wrong option and had to explore more Initiatives

The prototype looks attractive

- Very simple and basic makes it easy to use and thus attractive
- I really like the comic-style drawings.
- It looks nice, but its clearly a prototype. The interactions were nice!
- Yesss. Great user experience.
- Font is nice, the style could maybe a become adapted to its purpose (something that reflects the topic of climate change, citizen engagement, anything like that? Could also be a logo)
- While the look is very clean and simple, sometimes a more professional look might improve the credibility of the given information. Right now it is intuitive and fun but I don't take it as seriously
- The spacing between the texts could be improved.
- The colours used / branding feels a bit childish but I like the sketches
- Yes. The graphics are clear and simple and don't require too much effort to understand it
- Some of the texts need to be shortened, reading them takes too long.

The prototype is engaging and fun

- The drawing style and interactive elements are motivating to interact within
- the ability to choose different things makes it really interactive
- I like the map!
- Too much reading, a bit more interaction would be nice, but otherwise quite good.
- It is engaging
- ending becomes bit more texty and less engaging but i understand the necessity

When I use the prototype, I feel that my privacy is protected

- No asking for personal info, very nice
- Good that you do not feel obliged to fill in your name or background information
- There no private information shared that I don't want anyone else to see. Also, I would feel kind of proud to be working on something about climate change so I would also be more happy to share that info
- No information in asked about my identity, no registration needed, and no cookies
- Didn't feel like much of my own private data was asked.
- Yes because you are not using my personal data, however the comment / illustration about the data at the beginning confused me and I was worried that I missed something

Table E4. How each questionnaire item was rated by participants in round 2 (N2=22). The table indicated the number of participants per scale.

Items	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree	% Disagr.	% Neut.	% Agreem.
When I use the prototype I feel motivated in taking climate action	0	0	3	1	7	9	2	14	5	82
When I use the prototype I feel empowered in taking climate action	0	0	1	2	14	3	2	5	9	86
When I use the prototype I feel that my input and opinions are heard	0	3	3	5	2	6	3	27	23	50
When I use the prototype I feel that my input and opinions will be taken into account	0	3	3	6	5	5	0	27	27	45
The prototype increases my awareness of climate risks	0	0	0	1	4	11	6	0	5	95
The prototype increases my awareness of climate action opportunities around me	0	0	0	1	2	9	10	0	5	95
When I use the prototype I feel connected to other users and part of a community	0	0	5	3	6	6	2	23	14	64
When I use the prototype I understand the presented data	0	0	0	0	5	6	11	0	0	100
The given data are useful in presenting climate risks	0	0	1	0	3	14	4	5	0	95
The prototype gives me the necessary tools to engage in climate action	0	0	0	4	7	8	3	0	18	82
The prototype is intuitive to use	0	0	0	0	8	5	9	0	0	100
The prototype looks attractive	0	0	0	3	4	8	7	0	14	86
The prototype is engaging and fun	0	0	1	1	8	8	4	5	5	91
When I use the prototype I feel that my privacy is protected	0	0	0	2	0	7	13	0	9	91

E3: Third Round - Digital Prototype (Version 2)

The open feedback in this round was less extensive compared to previous rounds and can be found verbatim in Table E5. Table E6 shows how each questionnaire item was rated by participants on a 7-point agreement scale from strongly disagree to strongly agree. The table also quantifies the percentage of disagreement by aggregating participants who responded strongly disagree, disagree and somewhat disagree, the percentage of agreement by aggregating participants who responded strongly agree, agree and somewhat agree, and a percentage of neutrality calculated based on participants who were neutral with respect to the item.

This round showed more mixed results compared to the previous round, though they cannot be directly compared since they tested different versions of the prototype. In this round, about half of the participants (strongly/somewhat) agreed with statements related their input and opinions being heard and taken into account, similar to round 2. About 70% of participants (strongly/somewhat) agreed with statements related to perceptions of empowerment and having acquired the tools necessary to take climate action, against the 80% of the previous round. However, only 28% of the participants in this round agreed with statements related to a sense of community and being connected to other users. This rate is similar to round 1, where agreement was among 29% of the participants, and significantly lower than round 1, where 64% of participants agreed with such statement. A potential reason for this is that the setting in round 3 was less personal compared to round 2, which was conducted in a workshop setting that in itself provides a sense of community and connection. Nevertheless, a few areas for improvement were identified, which we grouped according to the design strategies:

(1) Leveraging storytelling and contextualised personal narratives

Participants responded positively to the platform's usability, attractiveness, and level of engagement. The storylines and locally grounded visualisations of climate impacts were appreciated, although one participant considered the visuals used unrealistic.

(2) Integrating scientific evidence with lived experience

Additionally, one respondent criticised the use of numerical scales to classify action opportunities based on effectiveness, arguing that all actions should be considered valuable regardless of their quantified impact. This highlights the need to carefully frame action in a way that is both informative and inclusive.

(3) Enabling meaningful opportunities for action and efficacy

Responses to the platform's ability to support climate action were mixed. Some participants noted that they were already informed about or engaged in climate initiatives, which may explain a lower perceived gain in knowledge or empowerment.

(4) Fostering connections between communities and place

One participant described the platform as resembling a survey, reinforcing the perception of an individual rather than a collective experience.

(5) Ensuring transparency and clarity about platform governance

Participants noted uncertainty regarding how users would encounter the platform and the context in which it would be used. Some respondents also noted that the platform contains too much text and that the font could be improved for better readability.

Additional suggestions were documented but not implemented:

1. Participants noted that vulnerable groups, such as older adults and children, were not represented by the three personas. While it is indeed important to include diverse population groups, the revised version retained the original personas because the primary objective was

to assess whether the use of personas and storytelling constitutes an effective and engaging approach, rather than to develop an exhaustive set of representative personas. S

2. Participants raised questions regarding the ownership and governance of the platform, the overarching purpose, and how citizen contributions would be used beyond the platform. Although embedding the platform within existing organisational structures is an important consideration, it falls outside the scope of this study. Rather than constructing a fictitious ownership scenario, an additional question was included in the next testing round (described next) to identify which actors citizens perceive as most trustworthy to 'own' the platform. Furthermore, it was clarified that the platform was developed as part of an academic research project and was not sponsored by any governmental or commercial institution.
3. Requests for more guidance and support with climate action extended beyond the scope of the CmC prototype, although such support remains a significant component of citizen empowerment. The platform was designed to enable citizens to initiate and implement actions independent of external support, either individually or collectively. Finally, technical suggestions such as incorporating different heat stress indicators were considered but not adopted, as they were unlikely to yield additional insights into citizen empowerment.

Table E5. Comments (verbatim) provided by participants in round 3 (N2=29). Comments were provided at the end of the survey only.

Interesting that the questions were made about the platform, but we experienced the prototype. It was difficult to evaluate, because that was not the true experience of the platform and the end goal, like questions about the privacy etc might not be as relevant in this "feedback" survey. But overall it has a potential!
as a way for people to discover and link up with initiatives happening around them as well as inspiring that kind of collective action i think there could be a lot of potential but for example the voting i thought was a bit silly since its so abstracted and atomized and for me like i think all three solutions are important in different places/times so having to choose one with no context felt weird and also like ok i voted now who's gonna do it? idk. i would like to see it lean more into the organizing part of it over individual recommendations, showing whats being done, how you can join and why thats important work. but not with a x/5 star impact rating!!!! i think a platform like this can lend a lot of credibility to citizen initiatives that people might otherwise consider like silly or ineffective by just giving it a stamp of approval like "yeah this works the science checks out because a, b, c", i get this is more difficult for initiatives around social or political change because the benefits cant be uncontroversially quantified but thats exactly why you shouldnt be trying to put different kinds of action on a numerical scale of effectiveness!!!
I think there is a grammatical error in one of the last pages; to my knowledge, it should be "data is scary" instead of 'data are'
nice initiative, liked the future predictions to show impact. Didn't realise it was a platform. Thought it was just a survey.
I already know a lot about climate because of my job which is why I didn't learn more.
The story telling takes place nicely through the platform. I would try another body type face cuz it might be difficult to reas it in long texts for older peiple. Maybe a simple sanserif font with better spacing;)
I miss the context of the platform; it feels a little in the void. It says my contribution is „revised", but by whom? What happens to my time investment? I suppose that if I want to get active, I either google, get dragged into an initiative via a friend or I won't get motivated only by a website I stumble upon. Also, who decided that I am limited to one implementation only?

For me, the climate risk aspect did not translate well on the platform. The card layer with the temperature did not read as risk, more as heat effect/reality. The 'worst' pictures of the 3 locations in Amsterdam felt too unrealistic to feel like actual climate risk. For example, I would expect that the city of Amsterdam will always take care of proper pavement. People with caps, umbrellas, looking unhappy would maybe tell the story better.

I think because I am already aware of a lot of things spoken about in the platform I also based my answers on in the survey, however, for people who know very little about climate change and impact, I think this platform could be very valuable !!

Maybe smaller scale of the map // ability to zoom-in and zoom-out. A bit less language, a lot of text/to read. Add an overview of where I am in the process. easier to go back to the 1st page for example.

Table E5. How each questionnaire item was rated by participants in round 3 (N3=29). The table indicated the number of participants per scale.

Items	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree	% Disagreement	% Neutral	% Agreement
When using the platform, I feel empowered to take action and make my city more sustainable and healthier	0	1	1	7	9	8	3	7	24	69
The platform gives me the necessary information to take action individually or collectively	0	1	2	5	9	11	1	10	17	72
When using the platform, I feel that my input and opinions will be taken into account by the platform manager	1	4	1	7	8	7	1	21	24	55
When using the platform, I feel that my opinion is important and useful to make my city more sustainable and healthier	1	2	4	4	9	6	3	24	14	62
When using the platform, I feel I know more about climate risks and impacts	0	4	0	9	9	6	1	14	31	55
When using the platform, I feel I know more about climate action opportunities around me	0	2	1	6	6	10	4	10	21	69
When using the platform, I feel connected to other platform users	1	6	7	7	5	2	1	48	24	28
When using the platform, I feel part of a community	2	4	9	6	5	3	0	52	21	28
The platform presents relevant information to illustrate climate risks and impacts	0	0	2	3	8	9	7	7	10	83
The platform gives me the necessary information to take action individually or collectively	0	1	2	5	9	11	1	10	17	72
The platform is intuitive to navigate	0	0	2	3	6	8	10	7	10	83
The platform looks attractive	0	0	0	2	4	9	14	0	7	93
The platform is engaging and fun	0	0	0	1	10	8	10	0	3	97
When using the platform, I feel my data and privacy are protected	1	2	2	4	4	10	6	17	14	69

Table E6. Summary of the design process and participatory testing results, with emphasis on improvement suggestions.

Step →	Round 1	Redesign	Round 2	Redesign	Round 3
Design Principle ↓	**Feedback to improve**	**Changes**	**Feedback to improve**	**Changes**	**Feedback to improve**
Leveraging storytelling and contextualised personal narratives	Storytelling too linear; difficult to define their climate position; unclear link between persona and climate position	More complex stories with real-life examples; use of a slider to allow for nuances in citizens' climate position; explicit description of personalisation	Somewhat loose end of the story; Lack of representation in the personas available (elderly, children, etc.)	End of the story is strengthened; The role of the persona in the story is strengthened	-
Integrating scientific evidence with lived experience	Data does not engage with personal emotions and feelings; Consequences of heat on everyday life are not clear; Numeric elements are not engaging	More emphasis on feelings; Clarifying how heat impacts people; Use of visual scenarios instead of numeric indicators	Questioning the suitability of the metrics used	The role of the persona in future scenarios is further developed	Unrealistic representations of climate impacts; Overload of textual information; Font choice not accessible
Enabling meaningful opportunities for action and efficacy	Impact and effort required for climate action are not clear; Few opportunities to provide input; Few climate action options	More options and variety; Classification of options according to price, effort level, climate impact, and social value; Explicit invitations to contribute input	Some options are too expensive and not accessible; Lack of support throughout climate action; Lack of immediate climate action (e.g., petition)	Question about homeownership to further tailor climate action actions	Quantitative indicators to describe climate actions are not appropriate
Fostering connections between communities and place	Low sense of community; Few opportunities to see the opinion of other citizens	Use of personal markers to identify other citizens (nicknames, comments, etc.); Explicit invitations to engage with others	Insufficient opportunities to share opinions, ask questions, leave comments, and share information with other users	More opportunities for input and personalisation were added throughout the journey; Individual input is compared to collective results	Low sense of community
Ensuring transparency and clarity about platform governance	Unclear platform identity	Opening page with information and consent form is included;	Mixed preferences concerning the platform identity; Purpose and	Stronger and more consistent graphical identity; Improved	Higher trust in municipalities and neighbourhood initiatives

		Strengths of identity through hand-drawn visual elements and colour scheme	ownership of the platform unclear; Expectations about data use not clear	opening page with more details about the research; Question about trust and ownership preferences	as platform managers (lower trust in private companies and individual citizens)