



D2.1 Public Space for Political Deliberation

LEAD AUTHORS:

Lucas Anastasiou, Enrico Daga
The Open University



Funded by
the European Union

DELIVERABLE INFORMATION	
Deliverable leader	The Open University
Document type	R - Report
Document name	D2.1 Public Space for Political Deliberation
Work Package / Task	WP2 / T2.1 Requirements Analysis for Political Deliberation, T2.2 Participatory Design and Refinement of Public Deliberation Use Cases
Delivery Date (DoA)	30 September 2025 (M10)
Actual Delivery Date	30 September 2025
Authors	The Open University (OU)
Reviewers	Open Source Politics (OSP), Universidade Nova de Lisboa (NOVA)

DELIVERABLE HISTORY			
Date	Version	Author	Summary of main changes
17/08/2025	0.1	Enrico Daga	Set up the document structure and draft content.
01/09/2025	0.2	Enrico Daga	Added section 1
14/09/2025	0.3	Lucas Anastasiou	Added section 2 and section 1.2
15/09/2025	0.4	Lucas Anastasiou	Added summaries, connection parts
29/09/2025	0.5	Lucas Anastasiou, Enrico Daga	Integration of reviewers' comments and suggestions
30/09/2025	1.0	Lucas Anastasiou	Submission version

DISSEMINATION LEVEL		
PU	Public	X
SEN	Sensitive, limited under the conditions of the Grant Agreement	

Public executive summary

This Deliverable, **D2.1 "Public Space for Political Deliberation"**, establishes the foundational framework for the MultiPoD project by defining the core user and system requirements for creating an inclusive, multilingual environment for citizen deliberation. It addresses the work outlined in Tasks 2.1 (Literature review and requirements analysis) and 2.2 (Co-Design of Use Cases).

The document is presented in two parts. The first part provides a systematic literature review on multiculturalism in deliberation technologies, mapping academic insights to the current landscape of digital tools. This review identifies significant challenges, such as the failure of existing platforms to move beyond literal translation to achieve true cultural adaptation, and the lack of transparency in AI-driven features like content summarization or moderation. The analysis reveals a critical "Cultural Adaptation Gap" that MultiPoD aims to address.

The second part details the project's co-creation methodology, which engaged pilot partners through focused interviews and a collaborative workshop to ground the technical development in real-world needs. This participatory process identified several key "pain points" experienced by practitioners, including the difficulty of engaging vulnerable groups, overcoming language barriers in real-time, and sustaining long-term participation. These findings were synthesized into a prioritized set of high-level system requirements. Finally, this deliverable presents MultiPoD use case definitions and details sample user scenarios (from a Human Computer Interaction - HCI perspective).

Table of Contents

Public executive summary	2
Introduction	6
I - Literature review and mapping to the landscape of deliberation tools	6
1.1 Objective and scope	6
1.2 Methodology	7
1.3 Findings and analysis	9
1.3.1 Research areas in relation to multicultural ICT systems.....	9
1.3.2 How do we characterise multiculturalism in the context of deliberation technologies? (RQ1).....	12
1.3.3 What are the challenges and opportunities of multicultural- aware deliberation technologies? (RQ2)	14
1.3.4 What design methodology can lead to successful multicultural-aware deliberation technologies? (RQ3)	17
1.4 Requirements for deliberation tools.....	20
1.5 Mapping to deliberation tools	22
1.5.1 Approach.....	22
1.5.2 Selected deliberation platforms	23
1.5.3 Analysis.....	25
1.5.4 Gap analysis.....	30
1.6 Summary	31
II - Co-creation of the MultiPoD solution for public deliberation use-cases	31
2.1 Methodology	31
2.2 Workshops (data collection).....	32
2.2.1 Internal pilot survey	32
2.2.2 Focused workshop with pilots	33
2.2.3 Co-Design workshop (plenary meeting in Barcelona)	33
2.3 Comprehensive pain point analysis	34
Pain point 1: Engaging vulnerable and marginalized groups	34
Pain point 2: Language and accessibility barriers	35
Pain point 3: Digital literacy and technology access	35
Pain point 4: Sustaining long-term engagement.....	35

Pain point 5: Platform fragmentation and tool integration	36
Pain point 6: Trust and political disengagement	37
2.4 High-level system requirements	37
2.5 Use case scenarios	38
2.5.1 Use cases definitions	39
<i>Use Case 1: Large-scale virtual citizens' assembly</i>	39
<i>Use case 2: In-person deliberative focus groups</i>	40
<i>Use case 3: Hybrid citizen & policymaker assembly</i>	40
2.5.2 UX scenarios	41
<i>Scenario A: Virtual citizen assembly (KMOP)</i>	41
<i>Scenario B: Deliberative focus groups (NOVA)</i>	42
2.6 Conclusion	44
References	45

List of Figures

Figure 1 MoSCoW analysis prioritizing the requirements	33
--	----

List of Tables

Table 1 Literature review sources, search criteria, and number of publications.....	8
Table 2 Requirements from literature, mapped to key design principles.	22
Table 3 Capability matrix of the selected platforms to the Design Principles	26

Abbreviations

ADDIE	Analyze, Design, Development, Implementation, Evaluation
AI	Artificial Intelligence
API	Application Programming Interface
AR	Augmented Reality
ASR	Automatic Speech Recognition
CC	Creative Commons
COFE	Conference on the Future of Europe
COR	Community Operational Research
CSLM	Culture-Specific Language Model
DEF	Diversity-Enhanced Framework
DFG	Deliberative Focus Group

DP	Design Principle
DPIA	Data Protection Impact Assessment
DR	Democratic Reflection
EU	European Union
FOSS	Free and Open-Source Software
GDPR	General Data Protection Regulation
HCI	Human Computer Interaction
ICT	Information and Communication Technologies
IEEE	Institute of Electrical and Electronics Engineers
KG	Knowledge Graph
LLM	Large Language Model
ML	Machine Learning
MIT	Massachusetts Institute of Technology
MoSCoW	Must-have, Should-have, Could-have, Won't-have
NMT	Neural Machine Translation
NLP	Natural Language Processing
OSS	Open-Source Software
RIE	Re-Imagine Europa
RLHF	Reinforcement Learning from Human Feedback
SECI	Socialization, Externalization, Combination, Internalization
SLR	Systematic Literature Review
SRL	Self-Regulated Learning
SSO	Single Sign-On
UI	User Interface
UX	User Experience
VSM	Viable System Model
WLT	webLyzard technology
WP	Work Package
XAI	Explainable AI

Introduction

Work Package 2 (WP2) of the MultiPoD project, titled "Public Space for Citizen Deliberation," aims to acquire a deep understanding of user requirements for citizen deliberation in multilingual spaces and define problem statements using a participatory approach.

This document is structured in two main parts:

Part I presents a systematic literature review on multiculturalism in deliberation technologies, mapping these academic insights to the current landscape of existing tools. This process identifies the state-of-the-art and crucial gaps that MultiPoD aims to address.

Part II describes the co-creation methodology used to engage with project partners and end-users. It outlines the data gathered from interviews and workshops, synthesizing this information into a set of high-level system requirements and detailed use-case scenarios that will directly inform the technical development in subsequent tasks (T2.2, T2.3, T2.4) and work packages (WP3).

I - Literature review and mapping to the landscape of deliberation tools

To build a novel **Public Space for Citizen Deliberation**, it is first essential to establish a comprehensive understanding of the existing socio-technical landscape. This initial part of the deliverable executes the foundational work of **Task 2.1** by systematically investigating the theoretical principles and practical realities of multicultural deliberation. Following the "Discover" and "Define" phases of the project's double-diamond design methodology, we first conduct a wide-ranging literature review to uncover the core challenges and opportunities. We then apply these insights to an in-depth analysis of current deliberation tools, allowing us to define the specific gaps that the MultiPoD solution is designed to address.

1.1 Objective and scope

Overall, WP2 is designed to establish the foundational methodological framework, enabling early dialogue among user communities, policymakers, stakeholders, and developers, thereby guiding the project's technological development and community engagement.

Specifically, Task 2.1: Requirements Analysis for Political Deliberation aims to:

- Explore how deliberations in multilingual settings can be best mediated either by design or through technological assistance.



- Conduct a detailed analysis of the current landscape of tools, methodologies, and innovations in this thematic context.
- Include a state-of-the-art review that maps political deliberation theory to the technological features of modern deliberation platforms.
- Examine the multilingual and multicultural particularities of established approaches within highly diverse environments.

1.2 Methodology

Our methodology combines principles of systematic literature review (SLR) with recent advances on the application of generative AI to scientific literature production, following recent trends [Chen01, Kala01]. Our approach can be presented in four steps: (a) Research Questions; (b) Data Collection; (c) Data Analysis; and (d) Reporting.

Research Questions

The literature review was conducted to explore how deliberations in multilingual and multicultural settings can be best mediated by design or through technological assistance. The review was guided by the following formally defined research questions:

RQ1: How do we characterise multiculturalism in the context of deliberation technologies? What is our definition of multiculturalism?

RQ2: What are the challenges and opportunities of multicultural-aware deliberation technologies?

RQ3: What design methodology can lead to successful multicultural-aware deliberation technologies?

Data collection

The search criteria were defined to capture the most relevant and recent academic work in the field of computer science. Venues include key academic databases published by major computer science editors/publishers, including ACM, IEEE, ScienceDirect, and ACL. In addition, we used Google Scholar. We limited our survey to a 10-year timeframe: 2015 to the present.

A focused search on “multilingual and multicultural deliberation technologies” on the sources mentioned above yielded a short list of highly relevant publications (17), which are marked in the citations list with the prefix ‘HP’. To further extend our corpus, we widened the search by searching scientific publications relevant to multicultural technologies, and then we filtered them according to a set of keywords that link that research to aspects of deliberation technologies. These are marked with the prefix ‘S’.

This was performed in two steps: (i) data gathering, and (ii) filtering. First, we searched for all publications relevant to multicultural technologies and AI. Next, we filtered results using a limited set of keywords relevant to MultiPod research. Data gathering was conducted by searching with the criteria shown in Table 1.

Table 1 Literature review sources, search criteria, and number of publications.

Source	Selection method	Publications
ACM	[All: multicultural] AND [E-Publication Date: (01/01/2015 TO *)]	1024
ScienceDirect	Keyword: multicultural subjectAreas=1700 (Computer Science)	407
ACL Anthology	keyword "multicultural" in either title or abstract	
IEEE	keyword "multicultural" in either title or abstract	
Google Scholar	allintitle: Multicultural Technology	93
	allintitle: Multicultural Artificial Intelligence	7

We collected all results and filtered them on MultiPoD topics. Specifically, filtering publications with title or abstract including any of the following keywords: "democracy", "deliberation", "deliberative", "argumentation", "argumentative", "collective".

The list of articles is included in the references section, prefixed as follows:

- 'HP': first results obtained when searching for multicultural or multilingual deliberation technologies (17 publications);
- 'BG': selected articles cited by one of the 'HP' articles that we consider important background literature (6 publications);
- 'S': articles found when searching for multicultural AI or multicultural technologies (expanded search, 24 publications).

Data analysis

We conducted our qualitative data analysis using Notebook LM. First, we uploaded the PDF files of the collected articles to Notebook LM. The system generates individual summaries for each article, as well as an overall summary of all the documents, accompanied by relevant question prompts. The answers provided include references that quote the sources, allowing users to verify the claims made. The process was as follows:

1. Load the collected data (see previous steps).
2. Ask to summarise the research areas covered by the sources.
3. Ask each one of the research questions (see previous steps).
4. Ask about listing requirements derivable from the sources.
5. Verify the claims and related references.

Data reporting

In the final step, we focused on presenting the content in a unified narrative by rearranging and editing the text to avoid content duplication, improve terminology accuracy and improve readability.

1.3 Findings and analysis

In this Section, we first summarise the literature by providing a summary of the research areas involving multiculturalism and ICT in general. Next, we organise the findings of the literature review by answering the research questions outlined in Section 1.2. Next, we elaborate on a definition of multiculturalism in the context of deliberation technologies and discuss the implications of our definition. Finally, we elicit requirements for the design of innovative, multicultural deliberation technologies.

1.3.1 Research areas in relation to multicultural ICT systems

Research into multicultural-aware Information and Communication Technologies (ICT) systems spans several key areas, focusing on how technology interacts with diverse cultural contexts, values, and social dynamics. These areas often involve understanding, mitigating, and leveraging cultural differences for more inclusive and effective technological solutions. Here are the eight main research areas in relation to multicultural ICT systems:

1. Diversity and Bias in AI and Large Language Models (LLMs)

A primary aspect of this thematic area is bias detection and mitigation, including political, gender, and stereotype biases, and ensuring transparency regarding underlying assumptions and values in system designs. The goal is to contribute to the development of culturally inclusive and trustworthy AI technologies, especially as information access shifts towards AI-driven integration systems. [S1] In addition, this area critically examines whether LLMs genuinely reflect the value preferences of different cultures and aims to identify optimal models and methods for aligning AI systems with diverse values. [S1] Research involves developing innovative methodologies like the Diversity-Enhanced Framework (DEF) to capture the complexity and variability of model responses across cultural contexts. This framework incorporates prompt, configuration, and memory modifications to generate surveys tailored to diverse participants and preference distributions. They also investigate the impact of multilingual data and human-annotated data on such alignment.

Digital technologies (e.g., Augmented Reality, automated narratives) may help mitigate prejudice and foster cross-cultural understanding. Research includes experimental studies using Augmented Reality (AR) to recreate historical experiences, aiming to modify emotional attitudes towards places, enhance understanding of multicultural place meaning, and reduce memory-related ethnic bias. [S40] It also investigates the effect of narrative formats (e.g., short fiction) on reducing negative prejudices and worldviews towards socially stigmatised groups, analysing the mediating roles of empathy and identification with characters. [S39] The objective is to contribute to positive behavioural changes and increased understanding of multicultural contexts. [S39, S40]

2. Promoting multiculturalism through ICT in Education

This area focuses on designing learning models that integrate and promote multicultural aspects, aiming to instil an understanding of diversity from an early age. [S10] Research involves developing multicultural problem-based learning models that incorporate values such as human rights, justice, unity, democracy, and social justice into the curriculum. Methodologies include development research, often using the ADDIE method (Analyze, Design, Development, Implementation, Evaluation), to determine the validity and feasibility of these learning models. The emphasis is on fostering an understanding of diversity through problem-solving in real situations, promoting ethical and dignified students with a sense of justice and openness to other cultures and religions. [S10]

3. ICT for Argumentation, Critical Thinking, and Self-Regulated Learning in Diverse Contexts

This research explores how information and communication technologies (ICTs) can stimulate argumentation skills, critical thinking, and self-regulated learning (SRL) in educational settings, recognising the potential for richer discussions in multicultural environments. [S11, S12, S23, S29] Studies involve implementing pedagogical activities using collaborative software for critical debate and argumentative mapping. Mixed-methods approaches are used to evaluate the development of these skills, combining quantitative assessments (e.g., questionnaires like Halpern's Critical Thinking Assessment and MSLQ) with qualitative analyses of student interactions and self-reports. A key objective is to empower citizens to make reflective and informed decisions on socially significant issues, and to promote higher-order thinking skills essential for future educators. [S11, S23, S29]

4. Collective Intelligence and Knowledge Management with Web Tools

This domain investigates how web tools can support and promote collective intelligence and knowledge management by enabling the sharing, understanding, and collaborative construction of knowledge among diverse participants. Research involves implementing models like the SECI (Socialization, Externalization, Combination, Internalization) model to foster collective intelligence. [S16, S17] It also explores the use of platforms that allow students to design their own knowledge classification and organisation through tags and folksonomy. [S14] The emphasis is on leveraging group heterogeneity (e.g., by varying prior knowledge levels) to create positive synergies and improve learning outcomes, also in large groups. Surveys are used to diagnose the use of ICTs and collective intelligence within educational communities. [S16, S30] The ultimate aim is to enhance collaborative and cooperative learning, strengthen communication skills, and support decision-making processes. [S16, S17]

5. Intervention and Governance in Multicultural Contexts with ICT

This area explores methodologies and tools within Community Operational Research (COR) to support community development and self-governance in multicultural settings. It addresses the complexities of multiculturalism through a creative choice of methods, including elements of boundary critique, the Viable System Model (VSM), rich pictures, and social cartography. Research aims to clarify self-governance dilemmas and paradoxes for sustainability and to support democratic and participative decision-making. It specifically adapts methodologies like the Self-Transformation methodology to account for cultural diversity, language barriers, and sociological traditions, often employing ethnographic and critical approaches. The studies also consider the impact of digital tools, such as digital kiosks and mobile phones, as "variety amplifiers" within communities, acknowledging both their positive and negative effects on local contexts. A key aspect is identifying and addressing power imbalances and conflicts inherent in multicultural environments. [S32]

6. Ethical and Legal Implications of ICT Systems on Vulnerable Groups

This research area critically analyses the interplay between the vulnerability of groups in algorithmic systems and the protection of collective interests within data protection law. It addresses concerns about algorithmic systems unfairly affecting claimants (e.g., in social benefit applications) and the potential for "emergent discrimination" from algorithmic profiling. Studies combine group rights theory, vulnerability studies, and law and technology perspectives to develop theoretical frameworks for understanding collective data protection and group vulnerability. A key aspect is identifying positional group vulnerability, where algorithmic profiling systems create risks and impair a group's ability to protect itself. This includes ensuring the applicability of data protection regulations to algorithmic groups and integrating group vulnerability into legal frameworks. The research highlights the importance of Data Protection Impact Assessments (DPIAs) to identify vulnerable groups and implement safeguards such as the right to contest automated decisions and human intervention. [S6]

7. Diversity and Inclusion in Software Development

This area investigates the relationship between developers' perceptible race and ethnicity and the evaluation of their contributions in Open Source Software (OSS) projects. Research aims to raise awareness of racial and ethnic diversity distribution in OSS and understand differences in pull request acceptance rates among various groups. Studies use large-scale quantitative analysis of OSS platforms (like GitHub) to identify demographics and assess potential unconscious or unintentional racial and ethnic bias. It examines concepts like "affinity bias," where integrators might favour contributions from those of the same race/ethnicity. Findings often indicate a low representation of Non-White developers, particularly in positions of power, highlighting a significant diversity

issue. The goal is to foster more diverse and inclusive OSS communities by identifying barriers to participation and proposing tools (e.g., single-blind code review) to ensure that contributions are evaluated purely on quality. [S9]

8. Urban Planning and Design for Culturally Pluralized Cities with ICT

This research area focuses on rethinking urban planning and design principles to effectively accommodate cultural diversity and manage social interactions in cities with culturally plural populations. It addresses challenges such as social stiffness among different cultural groups (aboriginals, co-migrants, immigrants) and aims to bridge divides. Research proposes an "organic analogy and holistic methodology" for designing cities that reflect the diverse cultural values and preferences of their communities. A key aspect is making the planning process inclusive by actively seeking input from constituent ethnic communities through methods like local area planning, public consultation, and social surveys. The area also considers the role of economic drivers in cultural migration and urban transformation, seeking to integrate these dynamics into design and policy. [S41]

1.3.2 How do we characterise multiculturalism in the context of deliberation technologies? (RQ1)

We consider multiculturalism in the context of deliberation technologies, as being characterised by the degree of diversity of the backgrounds of the audience involved in the deliberation process. Indeed, the presence of multiple cultures among the audience produces a complex interplay of diverse linguistic backgrounds, communication styles, values, and societal norms that participants bring to digital democratic spaces. It challenges the traditional assumptions of homogeneous public spheres and highlights the need for technologies and processes that actively accommodate this diversity [HP14, HP4, HP17]. Here's a detailed characterisation of multiculturalism in this context:

1. Deep Interconnection with Language and Communication

Multiculturalism is deeply intertwined with multilinguality, as language is the primary medium through which ideas, values, and perspectives are expressed, negotiated, and understood in deliberative settings. [HP4] It is not just about words, but also about "speech culture", which encompasses language choice, discourse style, norms of politeness, and argumentation patterns characteristic of a community. [HP17] Diverse speech cultures can manifest in different communication styles, such as direct versus indirect communication, preferences for implicit versus explicit messaging, varying tolerances for interruption or silence, and different conventions for showing respect or disagreement. [HP17]

2. Acknowledged Societal Reality and Inherent Plurality

Multiculturalism reflects the "fundamental reality that virtually all contemporary nation-states have multiple language groups among their citizens" [HP2]. It is a pervasive social and global phenomenon driven by factors such as migration, globalisation, and increased mobility. [HP4]

A multicultural perspective forces us to move beyond "monolingual ideologies" or "monolingual mindsets" that traditionally assumed a single common language as a prerequisite for democratic processes. Instead, multiculturalism in deliberation views linguistic diversity as the reference starting condition. [HP2, HP4]

3. Principles and Outcomes: Inclusivity, Authenticity, and Consequentiality

Multiculturalism significantly impacts the core principles of deliberative democracy: inclusivity, authenticity, and consequentiality [HP2], which we illustrate:

Inclusivity determines who can participate and how effectively their voices are heard. Multiculturalism highlights that linguistic barriers can exclude minority-language speakers, including refugees and older immigrants, from political discourse. Deliberation technologies are characterised by their potential to overcome geographical and linguistic barriers to maximise participation. [HP2, HP11, HP13]

Authenticity shapes the quality and fairness of deliberative interactions (as defined by [HP4]). Different cultural communication styles need to be accommodated to ensure genuine and high-quality discussions. [HP2, HP17]

Consequentiality influences the transformative potential of deliberation and its public endorsement. Crucially, it highlights the tension between the aspiration for linguistic diversity and the practical challenges of enabling meaningful participation from all groups. The perceived legitimacy of deliberative processes is closely linked to how well they reflect societal diversity and include multiple cultures. [HP4]

In essence, characterising multiculturalism in deliberation technologies means acknowledging it as an inherent feature of contemporary societies, moving beyond simply seeing it as a problem, and actively designing and implementing technologies and processes that value and integrate diverse languages and communication styles to foster more inclusive, authentic, and legitimate democratic engagement. [HP2]

1.3.3 What are the challenges and opportunities of multicultural-aware deliberation technologies? (RQ2)

Multicultural-aware deliberation technologies present both significant challenges and promising opportunities in fostering collective intelligence and democratic participation. We identify 5 of them below:

1. Challenges of Multiculturality in Deliberation Technologies

Communication Barriers: Multilingualism is often perceived as an obstacle to mutual understanding and effective communication, potentially hindering deliberation and consensus building. [HP2, HP4] Misunderstandings and communication difficulties can arise from different speech cultures and linguistic nuances. [HP4, HP17]

Language differences can make communication strenuous, increase the risk of misunderstandings, and lead to "enclave deliberation," where groups remain isolated. [HP2] While machine translation exists, it can be error-prone and cumbersome, particularly for real-time speech-to-speech interaction, potentially leading to "ludicrous rigidity" or "hopeless misunderstandings". [HP13] Furthermore, the technological focus often prioritises widely spoken languages, potentially excluding smaller linguistic communities. [HP13] Illiteracy and unfamiliarity with technology also pose significant barriers to participation. Language can limit participants' ability to fully engage with information, potentially skewing the deliberation process. [BG3]

Cultural Differences and Embedded Biases: Deliberation is profoundly shaped by local communication norms, including direct versus indirect styles, high-context versus low-context communication, and varying tolerances for interruption or silence. [HP17] The values and biases of technology creators and the data used can leak into AI systems, leading to discriminatory outcomes, as seen in examples like Amazon's recruitment AI discriminating against women. [BG5, S4] AI developers may lack sufficient critical self-reflection on their own biases, often representing a narrow societal niche, resulting in non-inclusive technologies. [BG5] Cultural value differences can cause "contribution, vision, and system conflicts" in technologically supported interactions, impeding collaboration. [BG3] Implicit cultural values embedded in technology can lead to unexpected consequences, potentially privileging dominant cultural norms over inclusivity. Deeper challenges include implicit or unexpressed premises in arguments, which are rooted in cultural and political background beliefs and can hinder mutual understanding. [BG3]

Technological and Implementation Hurdles: There is a notable lack of large language resources (such as trained models or benchmarks) for argument mining models, and the complexity and unpredictability of AI make it difficult to provide concrete ethical design guidance. [HP16, BG5] Many existing digital

deliberation projects are disconnected, operating as "walled gardens" that hinder the cross-pollination of ideas and fail to integrate insights from social sciences. [BG2] Ensuring AI trustworthiness is a "Grand Challenge" for the public sector. Legal and ethical considerations, such as GDPR compliance and avoiding algorithmic bias, are critical and complex, particularly regarding data collection, analysis, and confidentiality across countries. [BG6] The "many hands" problem (attributing responsibility in complex systems) and epistemic opacity in big data algorithms also challenge democratic accountability. Unequal access to ICTs exacerbates existing social and cultural inequalities. [BG3]

Power Imbalances and Exclusion: The use of a single or dominant language can reflect and reinforce existing power imbalances, potentially marginalising less privileged groups or those with specific accents or styles of speech. [HP2, HP4, HP7]

Resource Constraints: Providing high-quality multilingual facilitation and translation services (human or technological) can be costly and logistically demanding, posing challenges for widespread implementation. [HP2, HP4]

Public Perception and Skepticism: In societies where linguistic diversity is politically sensitive, the public (especially nationals) may view multilingual initiatives with skepticism, perceiving them as catering disproportionately to minority groups or undermining national identity, leading to discrimination against linguistic minorities. [HP2, HP4]

2. Opportunities and Solutions through Technology

Enhanced Participation and Inclusivity: Deliberation technologies can remove cultural and geographical barriers, significantly increasing engagement by ordinary citizens in diverse polities. Multilingualism, when supported by technology, is viewed as an integral feature rather than a barrier to democratic deliberation. These technologies can provide linguistic inclusivity, potentially reducing the need for strict language selection criteria in deliberative processes. They enable equitable participation from all language groups, ensuring voices are heard and influence outcomes. Multilingual deliberative technologies can offer a rare platform for non-nationals and non-native speakers to engage, challenging traditional models of political inclusion that demand cultural homogenization. [HP4]

Improved Communication and Shared Understanding: Multilingualism can encourage active listening and more thoughtful communication. Technologies supporting cultural openness can foster intercultural interaction and mutual understanding. [BG3] Multimodal, culturally sensitive translation allows full participant engagement by adapting to cultural nuances and implicit biases. [HP1] Argument mapping technologies improve online deliberation practices by

fostering shared understanding and promoting constructive dialogue, integrating diverse opinions without leading to polarisation [BG4]. Explicit norm-setting and culturally adaptive facilitation styles, guided by meta-communication, can bridge differences and integrate local speech practices into deliberative dialogue. [HP17] ICTs can enhance transparency, allowing participants to better understand collective actions and processes. [BG3]

Other Opportunities: Advances in Natural Language Processing (NLP) and Generative Artificial Intelligence (AI) enable "democratic innovations" that bridge disciplinary barriers and facilitate more inclusive political dialogue. [HP1] AI can summarise and analyse citizen contributions to identify trends and support moderation, agenda setting, and translation. [HP11] Fine-tuned Large Language Models (LLMs) and Culture-Specific Language Models (CSLMs), combined with Knowledge Graphs (KGs), are crucial for cultural transformation, content summarisation, and adapting to cultural nuances. [HP4] Visualisations can shift focus from linguistic form to content, adapt to cultural contexts, and support diverse communication, including sign languages. Argumentation-level analysis tools can identify pro/con arguments, premises, evidence, and fallacies, highlighting linguistic misunderstandings. An open architecture can interconnect existing communities and deliberation platforms across languages and cultures, fostering cross-fertilisation of ideas and avoiding isolated "walled gardens". Investment in multilingual AI tools can systematically facilitate more inclusive and qualitative deliberative processes. [HP4]

3. Potential solutions offered by AI

Multiculturalism, when embraced, can be a "source of strength and opportunity for humanity", enriching discussions and fostering social inclusion. [HP2]

- **Technological Tools:** AI-driven translation tools (e.g., NMT models like Meta's NLLB), natural language processing (NLP), and machine learning (ML) are increasingly proposed to mediate multilingual and multicultural political deliberations. [HP2, HP8, HP10, HP14] These tools can facilitate automated moderation, translation, sentiment analysis, and the structuring of content. [HP1, HP8]
- **AI-Enhanced Communication:** Generative AI models and Large Language Models (LLMs) can be leveraged to provide interpreter-like condensation, dynamically adapted translation, real-time speech translation, and culturally aware translation to bridge linguistic, social, and cultural divides. [HP1]
- **Accessibility Features:** Beyond translation, AI can help in text simplification, content moderation, argument clustering, and fact-checking, making deliberative platforms more accessible and fostering more robust and democratic exchanges of ideas. [HP1, HP5]

- **Hybrid Approaches:** The most promising solutions often involve hybrid configurations combining technology with human oversight (e.g., human translation/interpretation with AI support). [HP13]

1.3.4 What design methodology can lead to successful multicultural-aware deliberation technologies? (RQ3)

To design successful multicultural-aware deliberation technologies, a mixed-method and adaptive methodology is essential, drawing on various research paradigms and incorporating specific principles and practices.

1. Methodologies and Perspectives

Social Informatics: This perspective is fundamental, asserting that culture and information and communication technologies (ICTs) mutually and iteratively affect each other (bidirectional impact), rather than one linearly determining the other. Change is seen as context-dependent, emphasizing that design and use of ICTs are shaped by socio-cultural and organizational contexts. [BG3]

Sociotechnical Approach: Given that social and cultural inequalities often overlap with technological access issues, inequalities cannot be resolved through purely social or technical solutions. Instead, a sociotechnical approach is required, integrating both social and technical considerations in design. [BG3]

"Design for Value": Technology design should not be a value-neutral task but must incorporate moral and societal values to align with users and society at large. This includes reflecting the diverse values of global heterogeneous contexts. [BG5]

Relational Perspective: Design should consider how systems contextually impact people's capabilities, recognising the types of behaviours the socio-technical infrastructure affords or precludes to individuals and groups. [S6]

2. Specific Design Frameworks and Approaches

Design Science and Action Research: These complementary paradigms are suitable for developing such technologies. Design science involves problem identification, conceptualization, defining solution objectives, designing and developing the solution, demonstration, evaluation, and communication. Action research emphasizes collaboration and ethical considerations in addressing real-world problems, often integrated with design science for iterative refinement based on usability, functionality, and scalability. [HP1, HP4]

Mixed-Methods Research: Given the nuanced and context-dependent nature of communication norms, a mixed qualitative and quantitative research design is appropriate. This allows for capturing measurable patterns alongside nuanced meanings and subjective experiences. [HP17, HP4]

User-Centred Approach: Designing for maximum impact involves actively engaging users throughout the development lifecycle, including linguistic and cultural minorities and people with communication impairments in focus groups and assemblies. With this approach, requirements are directly collected from participants and mediators (as we do in Section 2). [HP5]

Systemic Perspective: Research should examine how multilingualism shapes deliberative practices within institutions, communities, and transnational organizations, considering systemic factors like legal frameworks, technological infrastructure, and educational policies that influence accessibility and inclusivity. [HP4]

3. Key Design Principles and Practices

We can elicit the following design principles (DP) from the analysis done so far.

DP1 Inclusivity and Equitable Participation

- **Accommodate Linguistic Diversity:** Technologies must facilitate communication in multiple languages, allowing participants to engage in their preferred language without barriers. [HP1, HP4]
- **Bridge Divides:** Enhance existing systems to bridge linguistic, social, and cultural divides across text, speech, and video modalities in online and face-to-face settings. [HP1]
- **Address Underrepresented Groups:** Design for equitable participation from all language groups, ensuring voices are heard and influence outcomes. Special attention should be given to linguistic and cultural minorities and those with communication impairments. [HP5]
- **Transparent Communication:** Information about the process and its multilingual design should be shared clearly and openly with the broader public to enhance legitimacy and public support. [HP4]
- **Reflect Societal Diversity:** Design should prioritize accessibility, inclusion, and equity over mere efficiency, aiming to mirror the diversity of society. [HP4]

DP2 Cultural Sensitivity and Bias Mitigation

- **Culturally Sensitive Translation:** Go beyond mere translation by post-processing translated text to adapt it to specific cultural contexts and account for latent biases and local expressions. Multimodal, culturally sensitive translation allows for full participant engagement. [HP1]
- **Culture-Specific Models:** Develop and fine-tune Culture-Specific IT artifacts – such as Language Models (CSLMs) and Knowledge Graphs (KGs) – to understand and reflect cultural nuances, values, and implicit premises in arguments. [HP1]

- **Bias Detection and Mitigation:** Implement tools to detect and flag linguistic and cultural biases (e.g., political, gender, stereotypes). Apply techniques like Reinforcement Learning from Human Feedback (RLHF) or Red Teaming to mitigate biases during training [Chau01].
- **Explicit Norms and Meta-communication:** Facilitators should guide meta-communication (“talk about talk”) to help groups reflect on and adjust their interaction norms. This involves explicitly setting norms and acknowledging diverse communication styles at the outset. [HP17]

DP3 Enhanced Deliberation Quality and Understanding

- **Argumentation Analysis:** Tools should perform argumentation-level analysis, identifying pro/con arguments, premises, evidence, and fallacies. This includes making implicit or unexpressed premises explicit. [HP1]
- **Content Moderation and Quality Control:** Implement advanced AI algorithms to scrutinize content, filter irrelevant material, and group similar arguments for structured presentation (argument clustering). Crucially, AI-driven fact-checking tools should verify claims. [HP1]
- **Summarization and Visualization:** Provide automatic summarisation of discussions and generate visualisations and reports to translate complex discussions into easily understandable formats. [HP1]
- **Interactive Visualizations:** Develop interactive visualizations that emphasize content over linguistic form, adapt to cultural contexts, and support diverse communication, including sign languages. These should allow seamless transitions between different levels of granularity. [HP1]

DP4 Transparency, Trustworthiness, and Ethical AI

- **Explainability:** Design for explainability of LLMs, providing insights into translation and summarization choices, ensuring accurate conveyance of social and cultural aspects. Human-in-the-loop systems can enhance this. [HP1]
- **Accountability and Bias Testing:** Identify and address underlying assumptions and values built into system designs. Monitor AI systems to reduce risks and ensure accountability for discriminatory outcomes, even if unintended. [BG4]
- **Data Privacy and Security:** Ensure strict compliance with data protection regulations (e.g., GDPR) and implement safeguards against security threats like adversarial attacks and model poisoning.

DP5 Open and Flexible Architecture

- **Interconnect Communities:** Design an open architecture to interconnect existing communities and platforms across languages and cultures, avoiding “walled gardens” and fostering cross-fertilization of ideas.

- **Context-Sensitive Solutions:** Recognize that there is no one-size-fits-all solution; designs must be flexible/adaptable to varying contexts, including different types of multilingual settings and societal compositions. [HP4]

DP6 Developer Role and Cultural Competency

- **Diverse Teams:** Foster diverse development teams in terms of race, gender, personality, and age, as diversity helps address problems from different perspectives and leads to more robust software solutions for multicultural deliberation. [S9]
- **Cultural Competency Training:** Equip computing professionals with cultural competencies to connect local design practices to the public impacts of those designs. This includes learning about systemic biases, theories of race, intersectionality, and ethical human data collection. Developers should engage in critical self-reflection on their own biases. [BG4, BG5]

By integrating these methodological approaches, principles, and practices, deliberation technologies can be developed to genuinely address and overcome the complexities of multiculturalism in collective intelligence settings, fostering more inclusive, authentic, and consequential deliberative democratic processes.

1.4 Requirements for deliberation tools

Deliberation technologies should be designed with several key requirements in mind, focusing on enhancing inclusivity, improving communication, and ensuring trustworthiness. In this Section, we elicit a list of requirements relevant to multicultural deliberation technologies that emerged from the literature survey. Such requirements make ways to overcome the challenges that multiculturalism brings in collective intelligence settings.

1. **Comprehensive Multilingual Support** [HP1, HP2, HP4, HP13]: Technologies must accommodate linguistic diversity by enabling communication in multiple languages. This includes machine translation and interpretation for citizen deliberation, enhancing existing systems to bridge linguistic, social, and cultural divides across text, speech, and video modalities in both online and face-to-face settings. Efforts should specifically address minority languages or dialects where textual resources are limited to ensure equal representation.
2. **Culturally Sensitive Communication and Transformation** [HP1, HP17]: The systems need to manage cultural differences in meaning and interpretation, going beyond mere translation. This involves post-processing translated text to adapt it to specific cultural contexts and account for latent biases and local expressions. Technologies should support multimodal, culturally sensitive translation for full participant engagement. Understanding "speech

culture"—distinctive ways of speaking and argumentation patterns—is crucial to integrate local norms into deliberative dialogue, seeing diversity as an asset rather than a barrier.

3. **Enhanced Inclusivity and Representation** [S1, BG1, HP4, HP5]: Deliberation technologies should maximise participation by overcoming geographical and linguistic barriers, reflecting the full diversity of views and positions in society. This means designing for equitable participation from all language groups, ensuring voices are heard and influencing outcomes. Special attention should be given to underrepresented groups, including linguistic and cultural minorities and those with communication impairments, ensuring their access and engagement.
4. **Improved Deliberation Quality and Understanding:**
 - a. **Facilitate Shared Understanding:** Technologies should support the development of shared understanding of complex problems and promote constructive rather than dichotomizing discourse. [BG2, HP17]
 - b. **Argumentation Analysis:** Tools should provide argumentation-level analysis, identifying pro/con arguments, premises, evidence, and fallacies, and highlighting linguistic misunderstandings or implicit premises.
5. **Advanced Content Moderation and Quality Control:** Implement advanced AI algorithms to scrutinise deliberative content, filter irrelevant material, and group similar arguments for structured presentation. AI-driven fact-checking tools should verify statements and claims. [HP1]
6. **Transparency, Trustworthiness, and Bias Mitigation:** Technologies must be designed with trustworthiness as a core principle, including transparency, accountability, and explainability. This involves identifying and addressing cultural and political biases inherent in algorithms and data, and anchoring statements, claims, entities, and concepts to reference knowledge graphs.
7. **Leveraging Advanced AI and Semantic Technologies** [HP1]:
 - a. GenAI, Large Language Models (LLMs): Fine-tuned LLMs and Culture-Specific Language Models (CSLMs) support cultural transformation, content summarization, and adapting to cultural nuances.
 - b. Knowledge Graphs: Used to structure factual knowledge and cultural values, enabling culturally aware content annotation and transformation.
 - c. Visualisations: Interactive visualisations should emphasize content over linguistic form, adapt to cultural contexts, and support diverse communication, including sign languages. Tools for automatic summarisation and mind map creation are also key.
8. **Open and Flexible Architecture** [HP2, HP4]: Deliberation technologies should feature an open architecture to interconnect existing communities and platforms across languages and cultures, rather than building isolated

"walled gardens". The design should be flexible and context-sensitive, acknowledging that there is no one-size-fits-all solution but rather a need for tailored approaches to linguistic diversity, even if solutions must aim at replicability in order to optimise interoperability.

Table 2 summarises the requirements elicited from the literature review and maps them to the key design principles outlined before. These requirements aim to harness technology's potential to unite people, overcome societal ills, and foster a more democratic and resilient global society. [BG4]

Table 2 Requirements from literature, mapped to key design principles.

ID	Requirement Description	DP1	DP2	DP3	DP4	DP5	References
REQ-1	Comprehensive Multilingual Support	x	x				[HP1, HP2, HP4, HP13]
REQ-2	Culturally Sensitive Transformation	x	x	x			[HP1, HP17]
REQ-3	Enhanced Inclusivity & Representation	x					[S1, BG1, HP4, HP5]
REQ-4	Argumentation Analysis & Support			x			[HP1]
REQ-5	Advanced Content Moderation			x	x		[HP1]
REQ-6	Transparency, Trustworthiness & Bias Mitigation		x		x		[HP1]
REQ-7	Advanced AI & Semantic Technologies		x	x	x		[HP1]
REQ-8	Open and Flexible Architecture	x				x	[HP2, HP4]

DP1: Inclusivity & Participation; DP2: Cultural Sensitivity & Bias Mitigation; DP3: Deliberation Quality & Understanding; DP4: Transparency & Trustworthiness; and DP5: Open & Flexible Architecture.

1.5 Mapping to deliberation tools

The literature review provides a robust theoretical framework and a clear set of design principles for creating successful multicultural-aware deliberation technologies. However, to bridge the gap between theory and practice, the next crucial step is to assess how these principles are—or are not—implemented in the tools currently available to citizens, policymakers, and communities. The following section grounds our analysis in this real-world context by systematically mapping the capabilities of 17 key deliberation platforms against the core design principles identified, thereby revealing the state-of-the-art and its limitations.

1.5.1 Approach

The methodology for mapping the landscape involved a multi-stage process. First, an initial list of argument-centric technologies was compiled from established academic and community repositories¹. This broad list was then curated to a selection of 17 key platforms for detailed analysis. The selection process prioritized platforms that are currently active, have significant popularity

¹ This has been sourced from a community maintained spreadsheet of argument and deliberation relevant platforms <https://shorturl.at/0OZ7n>

(in user numbers or academic citations), are directly relevant to deliberation, and collectively represent the diverse archetypes in the field—from academic argument-mappers to large-scale civic suites.

Each of these platforms was then systematically analyzed against a rigorous framework of six key Design Principles (DPs) derived from democratic theory (see Section 1.1):

- Inclusivity and Equitable Participation (DP1)
- Cultural Sensitivity and Bias Mitigation (DP2)
- Enhanced Deliberation Quality and Understanding (DP3)
- Transparency, Trustworthiness, and Ethical AI (DP4)
- Open and Flexible Architecture (DP5)
- Developer Role and Cultural Competency (DP6)

This approach allows for a nuanced assessment that moves beyond a simple feature checklist to evaluate how deeply a platform's design aligns with the core requirements of multicultural democratic innovation.

1.5.2 Selected deliberation platforms

In what follows, we report an overview of the selected deliberation platforms.

Kialo: An online structured debate platform with tree-like argument maps. Users post thesis questions and collaboratively add supporting (pro) and opposing (con) arguments. Kialo's visual interface encourages clear, balanced reasoning in debates.

Pol.is: An open-source large-group survey and consensus tool. Participants submit short comments on a question and vote (agree/disagree/pass) on others' comments. An embedded algorithm clusters viewpoints to highlight consensus statements and reveal divisions.

Parlia: An “encyclopedia of opinion” that collects diverse public views on social and political issues. It utilizes short polls and articles to present all sides of an issue, aiming to present every argument or opinion on a topic in a calm and balanced manner.

Loomio: A free, open-source decision-making platform designed for collaborative, consensus-oriented groups. Members create discussion threads and proposals; voting (agree/disagree/abstain) on proposals is visualized with charts. This supports transparent group discussions and collective decisions.

Adhocracy: An open-source e-participation platform inspired by liquid democracy. It enables communities to brainstorm ideas, debate them, and make collective decisions through deliberation and delegated voting. Its modular design offers tools for idea collection, surveys, mapping and participatory budgeting.

Debategraph: A web-based collaborative idea-mapping tool for policy deliberation. Debategraph lets users build visual argument networks around complex public issues, linking arguments and evidence. It has been used by governments and media (e.g., White House, UK Foreign Office) to visualize pro/con arguments on policy topics.

DebateWise: An online debate community where users on both sides of an issue collaboratively assemble the best pro and con arguments. Participants can compare ranked arguments and vote on debate positions. This structured pro/con layout helps readers make informed decisions by showing opposing viewpoints side by side.

Deliberatorium: A web-based system (from MIT) for large-scale collaborative deliberation on complex problems. It combines formal argumentation frameworks with social-computing interfaces, so users can post ideas, evidence and critiques. The system organizes and summarizes crowd contributions, helping organizations structure and harvest collective wisdom.

DemocracyOS: An open-source civic participation platform (originating in Argentina) for proposing, debating and voting on policies. Citizens create proposals, engage in threaded debates, and then vote by a set deadline. The platform rewards strong arguments and filters irrelevant content to focus the discussion and reach decisions online.

Democracy Earth: A blockchain-based governance platform applying liquid democracy. It provides a secure, decentralized voting system where participants can create bills, debate them, and then vote or delegate their votes on each proposal. The blockchain backbone ensures transparency and incorruptibility in voting and delegation.

LiquidFeedback: An online decision-making tool built around the “liquid democracy” principle. Users propose topics, discuss and amend proposals, and can either vote directly or delegate their vote to others. The system transparently aggregates votes (including delegations) to find community decisions. It emphasizes open proposal development and collective voting.

DebateHub: A large-scale deliberation tool (by Open Univ. KMI). Communities use it to raise issues, share ideas and debate pros/cons in a linear thread. DebateHub is distinctive for its advanced analytics and visual dashboard: it dynamically highlights the most robust arguments (not just popular ones) and gives moderators summary visualizations to track debate progress.

Consul: An open-source civic engagement platform used by many cities and governments worldwide (originally from Madrid). It bundles tools for citizen participation: idea crowdsourcing, participatory budgeting, public petitions, legislative proposals, debates and polling. Through Consul, citizens

collaboratively propose initiatives and vote on them, aiming for transparent, inclusive governance.

Decidim: A free/libre participatory democracy framework (originating in Barcelona). It provides modular components for participatory processes: e.g. public consultations, citizens' assemblies, participatory budgeting, proposals, debates and voting. Decidim is multi-lingual and open-source and lets municipalities and communities co-create policies with citizens via organized online and in-person engagements. Further, it allows for community organising, participation and self-governance at any scale (local, national, international).

Debate.org: A free online debate forum/community. Members start debates on current issues and take turns posting arguments on each side. Each debate shows threads of "pro" and "con" posts, and community members can vote on which side won. Debate.org's structured pro/con format and polling features facilitate open public discussion and collective polling.

ProCon.org: A non-profit public-interest website presenting professionally researched pros and cons on hundreds of controversial issues. Each issue page lists succinct, balanced arguments for and against, with citations. Millions of people (especially students and educators) use ProCon.org each year to learn impartial viewpoints on key social and political debates.

Crowd Deliberation (Crowdpolicy): A civic-tech platform for municipal/regional engagement. It enables governments to run multiple online deliberations simultaneously, combining idea generation with structured feedback. Citizens and officials can post proposals, comment and vote/rate ideas in each debate topic. The system is designed for user-friendly citizen input and for looping feedback between the crowd and decision-makers.

1.5.3 Analysis

We present the capability mapping of the above-selected platforms to the Design Principles (DP1-DP6) in Table 3.

Table 3 Capability matrix of the selected platforms to the Design Principles

Platform / Feature	DP1: Inclusivity (multilingual, broad access)	DP2: Cultural Sensitivity / Bias (mitigation)	DP3: Deliberation Quality (argument analysis, summary, viz)	DP4: Transparency/Trust (explainability, privacy)	DP5: Open/Flexible Architecture (interoperability, open standards)	DP6: Dev Roles & Competency (diverse teams, ethics training)
Kialo	Partial – Structured UI encourages clarity; mostly English interface, limited localization.	Low – No built-in bias checking or cultural adaptation.	Medium – Clear pro/con trees aid understanding; no automated argument analysis or summaries.	Medium – Proprietary service with clear terms; public argument maps but not open-source.	Closed – Proprietary backend, but integrates easily via web; not open API.	Low – Commercial product; developer diversity not documented.
Pol.is	Medium – Interface supports discussions (translatable interface available); designed for large crowds.	Low – Focused on statistical consensus; no explicit cultural bias tools.	High – Uses ML clustering to reveal consensus and minority views; interactive visual reports.	Medium – Open-source code (AGPL), transparent algorithms; privacy disclaimers available.	High – Open-source with API; part of Computational Democracy Project (modular).	Medium – Open community of contributors, with some emphasis on ethical use in civic projects.
Parlia	Partial – Content covers diverse opinions; site in English.	Low – Presents all opinions neutrally, but no special bias filters.	Low – Organizes opinions encyclopedically, not analytic tools.	Medium – Site content moderated; lacks deep AI components, so bias risk is low.	Medium – Web-based wiki-like tool; not open-source but has a community input model.	Low – Small startup; team diversity is not emphasized in the documentation.
Loomio	High – UI translated into 35+ languages; used globally (100+ countries)	Medium – Open design encourages transparency; no automatic bias correction.	Medium – Structured discussions and proposal votes; no automated summarization.	High – Free/libre software; data hosted by group (privacy-focused); voting is transparent.	High – Fully open-source (Ruby on Rails); supports plugins (e.g., SSO, integrations).	High – Cooperative project with global contributors; diverse governance (co-op model).
Adhocracy	Medium – Available in multiple languages (German, English, etc.); web-based.	Low – Implements delegated voting but no cultural/bias detection.	Low – Basic forums/modules; no advanced analytics or AI summarization.	Medium – Open source (GPL); participatory process transparent;	High – Modular open-source framework; extensible modules	Medium – Developed by civic tech NGOs; diverse values but small core team.

Platform / Feature	DP1: Inclusivity (multilingual, broad access)	DP2: Cultural Sensitivity / Bias (mitigation)	DP3: Deliberation Quality (argument analysis, summary, viz)	DP4: Transparency/Trust (explainability, privacy)	DP5: Open/Flexible Architecture (interoperability, open standards)	DP6: Dev Roles & Competency (diverse teams, ethics training)
				data protection requires care.	(liquid voting, budgeting, etc.).	
Debategraph	Partial – Web maps are visual; few languages (English-centric).	Low – No bias mitigation features reported.	Medium – Visual argument mapping aids understanding; no automated analysis beyond mapping.	Medium – Public graphs under CC license; moderate transparency (but not open code).	Medium – Social-enterprise; content open (CC-BY-SA) but software not public.	Low – Small team; not enough info on diversity.
DebateWise	Low – Primarily English content.	Low – Allows balanced debate view but lacks tech bias controls.	Low – Humans curate the best arguments; no summarization or AI features.	Medium – Arguments visible to all; site founded on neutral debate principles.	Low – Closed platform (owned by Debatewise Ltd).	Low – Likely small for-profit team; no published diversity policies.
Deliberatorium	Medium – Web-based, used internationally; interface technical.	Medium – Applies formal argument structure; no explicit bias-checking.	High – Structures arguments and evidence; supports moderated aggregation of input.	Medium – Research platform (not open to public); source code available upon request.	Medium – Originating in academia (some open-source elements); may integrate ext. data.	Medium – Academic project with interdisciplinary team (CS, social science).
DemocracyOS	High – UI in multiple languages (15+); designed for broad public use	Medium – Emphasizes open debate; no special cultural filters mentioned.	Medium – Ranked argument threads, voting; no automated fact-check or summary.	High – Open-source; used by governments (e.g., Mexico), which increases trust.	High – FOSS platform; APIs exist for integration with other civic tools.	Medium – Founded by activists/teachers; team encourages democratic values.
Democracy Earth	Medium – Global (blockchain) focus; bilingual interface (English, Spanish).	Low – Blockchain voting; no language adaptation beyond the interface.	Low – Primarily vote/delegate functions; minimal debate tools.	High – Uses blockchain for transparency and auditability; code is open-source.	High – Open-source (multiple repos on GitHub); designed to interoperate via protocols.	Medium – Non-profit organization with tech and civic experts; emphasis on inclusivity.

Platform / Feature	DP1: Inclusivity (multilingual, broad access)	DP2: Cultural Sensitivity / Bias (mitigation)	DP3: Deliberation Quality (argument analysis, summary, viz)	DP4: Transparency/Trust (explainability, privacy)	DP5: Open/Flexible Architecture (interoperability, open standards)	DP6: Dev Roles & Competency (diverse teams, ethics training)
LiquidFeedback	○ Low – Used in some German/Swiss contexts; interface not multi-lingual.	○ Low – No bias tools beyond open voting.	● Medium – Transparent delegation tracking; no NLP or summarization.	● Medium – Data visible by community; open-source, centralized moderation.	● High – Open-source; has APIs; was basis for Democracy projects.	● Medium – Founded by nonprofit (NGO Poplus); open dev community.
DebateHub	● Medium – Designed for citizen forums; English UI (other languages possible).	● Medium – Promotes “best-argument wins principle; no automated cultural adaptation.	● High – Strong support: advanced analytics and visualization highlight robust arguments	● Medium – Research tool; code availability	● Medium – Built within an EU project (Catalyst FP7); not public domain but can integrate with other DebateKit tools.	● Medium – Academic developers with user testing; ethics considered in design
Consul	● High – Multi-language interface (deployed across Spain, Latin America Europe).	○ Medium – Flexible modules allow local customization; no built-in bias scanning.	● Medium – Offers mapping of proposals, voting results; lacks AI summarization.	● High – Open-source (GPL); governments often publish deliberation results for transparency.	● High – FOSS platform (used in 35+ countries)	● Medium – Maintained by NGO (Consul Foundation) with a broad contributor base.
Decidim	● High – Multi-language (Catalan, Spanish, English, etc.); designed for global use.	● Medium – Emphasizes inclusion (right to city); no auto bias tools.	● Medium - Rich features (comments, amendments, voting); no automatic argument analysis.	● High – Open-source (AGPL), strong focus on data ownership and transparency	● High – Modular FOSS (Ruby on Rails); integrates with other systems (OAuth, APIs).	● High – Large int’l developer community; core team diverse (public institutions and citizens).
Debate.org	● Medium – Any user can participate (English UI); open to a global audience.	○ Low – Community-driven; no cultural sensitivity features.	○ Low – Simple threaded debate; no summarization or advanced analysis.	● Medium – Community-owned site; users vote on winners, adding accountability.	○ Low – Proprietary platform; no published API (user-export only).	○ Low – Commercial site; unknown dev practices.

Platform / Feature		DP1: Inclusivity (multilingual, broad access)	DP2: Cultural Sensitivity / Bias (mitigation)	DP3: Deliberation Quality (argument analysis, summary, viz)	DP4: Transparency/Trust (explainability, privacy)	DP5: Open/Flexible Architecture (interoperability, open standards)	DP6: Dev Roles & Competency (diverse teams, ethics training)
ProCon.org		● Medium – Focus on US issues but free global access; English only.	● Medium – Editorially neutral stance presents both sides fairly.	○ Low – Static content lists; no interactive tools or summarization.	● High – Non-profit, nonprofit transparency; research-backed, credible sources	○ Low – Closed content site; not open-source.	● Medium – Board of academics and educators ensure ethical content.
Crowd Deliberation		● Medium – Geared to citizens and orgs (municipalities); English/Greek.	● Medium – Citizen-friendly UI; no ML bias checks.	○ Medium – Supports multi-stage idea collection, commenting and voting flow	● Medium – Commercial platform (Crowdapps) with government clients; data policies vary.	● Medium – Offers APIs; integrates with municipal systems (open innovation tools).	● Medium – Professional team; focus on civic engagement best practices.

This analysis of 17 technologies identifies five distinct platform archetypes. These categories include Academic Argument-Mappers (e.g., Kialo) for structuring logical arguments, and Open-Source Community Forums (e.g., Discourse) that offer flexible spaces for general discussion. For democratic participation, there are two types: ethically-guided Open-Source Civic Suites (e.g., Decidim) and feature-rich Proprietary Civic Suites (e.g., CitizenLab) for government clients, which often lead to AI integration. A final, unique archetype is the Consensus-Finder (e.g., Pol.is), which uses AI to visualize collective opinion and identify common ground.

1.5.4 Gap analysis

The mapping of existing platforms against the design principles reveals several systemic gaps between the field's current capabilities and the needs of truly multicultural deliberation.

The Cultural Adaptation Gap: This is the most significant gap. While many platforms offer multilingual user interfaces and integrate machine translation, they fall short of genuine cultural adaptation. The dominant approach focuses on literal translation, which often fails to capture cultural idioms, context-specific expressions, and different communication styles. Most platforms are built on English-centric (and Western-centric more generally) design assumptions from user interface designs to embedded AI logic that reflects West structures.

Explainability: The increasing reliance on AI for moderation, summarization, and analysis creates a fundamental conflict with the principle of transparency (DP4). The "black box" nature of many proprietary AI systems undermines user trust and procedural legitimacy, as users are rarely given clear, human-understandable explanations for why content was flagged or how a summary was generated.

Sustainability and openness: The landscape is divided between proprietary "walled gardens" and open-source initiatives. Commercial platforms often lead in usability and AI features but limit data sovereignty and create vendor lock-in, hindering interoperability. Conversely, while open-source projects like Decidim excel in transparency and flexibility (DP5), they often face significant challenges in securing the long-term funding and maintenance required to compete with proprietary alternatives.

Infrastructure Limitations: Current technical infrastructure constrains the ability to perform real-time, simultaneous, multi-directional translation that also incorporates cultural context interpretation. The high computational requirements for sophisticated AI analysis and culturally-aware language models limit their accessibility, particularly for smaller, open-source projects. A bigger problem for both researchers and practitioners is the lack of standardized benchmarks. Without a common way to measure how effective these platforms are in cross-cultural contexts, it's difficult to improve them and roll them out as truly multilingual and culturally aware tools.



Funded by
the European Union

1.6 Summary

This first part of the deliverable (Section 1.1) establishes the evidence-based rationale for the MultiPoD project. The investigation began with a systematic literature review that defined multiculturalism in the context of deliberation technologies not as a simple problem of translation, but as a complex interplay of diverse communication styles, values, and socio-political norms. The review identified critical challenges facing existing platforms, including the prevalence of embedded cultural biases and unresolved power imbalances.

Subsequently, the analysis of existing deliberation tools (see Section 1.2) revealed gaps in the current deliberation landscape. Most importantly, while platforms offer multilingual interfaces, they largely fail to achieve genuine cultural adaptation, creating a “**Cultural Adaptation Gap**” in this way.

This Section validates the rationale and innovation potential of MultiPoD. It demonstrates the urgency for a new “Public Space for Citizen Deliberation” that bridges the above-mentioned Cultural Adaptation Gap, fostering inclusivity (DP1), transparency/trustworthiness (DP4), and openness (DP5).

II - Co-creation of the MultiPoD solution for public deliberation use-cases

Having established the theoretical foundations and identified the systemic gaps in the current landscape in Part I, this second part of the deliverable transitions from research to practice. It details the work of **Task 2.2**, which focuses on the co-creation of the MultiPoD solution through a deeply participatory process with the project's pilot partners. This section bridges the “Define” and “Develop” phases of our methodology, translating the identified challenges into a concrete, user-centric set of system requirements and detailed use case scenarios that will serve as the blueprint for technical development.

2.1 Methodology

A three-phase participatory design methodology was established to guide the co-creation process:

Phase 1: Focused Interviews: In-depth interviews were conducted during the spring with pilot partner teams (RIE, KMOP, and NOVA) to gather initial requirements and understand their specific contexts and challenges.

Phase 2: Joint Scenario Development: This phase, originally planned for scenario development, was adapted into a joint methodology with WP4. This ensures a cohesive approach to designing both the technology (WP2) and the community engagement pilots (WP4). The methodology focuses on developing detailed user scenarios and data journeys.



Phase 3: Co-Design Workshop: A half-day, in-person workshop was held with all pilot leaders and technology providers during the MultiPoD plenary meeting in Barcelona to validate initial findings and collaboratively refine the use cases and requirements

2.2 Workshops (data collection)

The following activities were conducted to collect data and insights from project partners:

2.2.1 Internal pilot survey

To systematically gather initial data on the specific needs and challenges of each pilot, a detailed questionnaire was circulated to the pilot members. Two representatives from each pilot organization partner were invited to participate, and they were allocated one week to complete and return their responses. The survey was designed to elicit deep insights into their operational contexts, primary challenges ("pain points"), and ideal solutions. The questions posed were as follows:

1. **Your Organisation/Community Context:** Please provide a short description of the social, cultural, political, and/or environmental context in which your Association/Organisation primarily acts.
2. **Identify Your MOST Significant "Pain Point":** Thinking about online participation, deliberation, and community management within your context, what is the single most significant obstacle, frustration, or inefficiency (the biggest "Pain Point") you currently encounter?
3. **Real-Life Example of this Pain Point:** Please provide a concrete, real-life example or a short story that clearly illustrates the Pain Point you described in Question 2. Describe the situation, what happened, and why it was problematic. Include links or any other relevant evidence if relevant and easily available.
4. **The Ideal Fix ("Magic Wand" Scenario):** Imagine you had no constraints (technological, financial, etc.). What would be the ideal solution to the Pain Point described in Question 2? Describe your "magic wand" fix or your fantasy future state where this problem doesn't exist or is handled perfectly.
5. **Measuring Improvement:** How would you know or measure if the Pain Point described in Question 2 has been significantly improved or resolved? What specific changes, whether subjective feelings or objective data points/indicators, would tell you that things are better? (e.g., "Less time spent manually tagging duplicates", "Higher satisfaction reported by minority language speakers", "Faster time to reach a documented decision", "Specific metric X decreases by Y%").

2.2.2 Focused workshop with pilots

Following the analysis of the survey responses, an online workshop was held with participants from each pilot case. The goal of this session was to validate the initial findings and collaboratively prioritise the needs that had emerged. Key points and pain points extracted from the survey responses were presented back to the participants to stimulate discussion.

The central activity of the workshop involved asking the pilot partners to classify the high-level requirements using the **MoSCoW analysis** method. Using a collaborative Miro board, participants worked together to categorise requirements such as **Must-have**, **Should-have**, or **Could-have** ("Would be good to have"). This interactive exercise was crucial for establishing a shared understanding of the most critical functionalities for the MultiPoD solution.

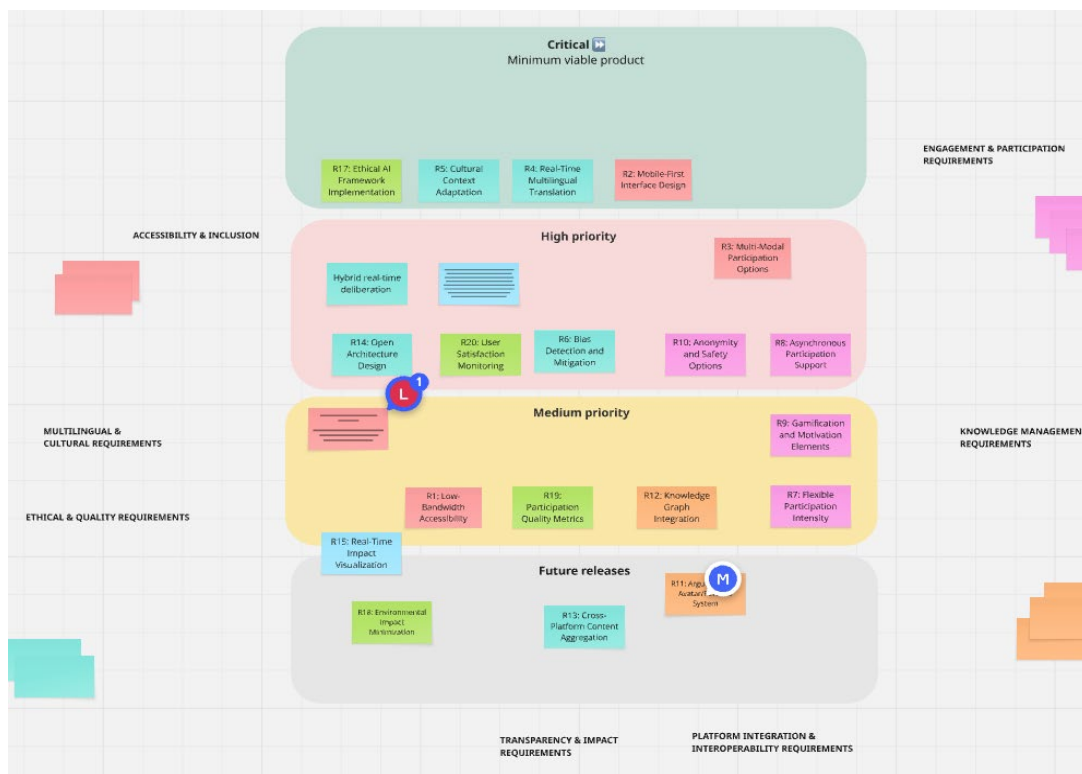


Figure 1 MoSCoW analysis prioritizing the requirements, organized into Critical (Must-have), High priority (Should-have), Medium priority (Could-have), and Future releases.

2.2.3 Co-Design workshop (plenary meeting in Barcelona)

During the project's plenary meeting in Barcelona, a hands-on co-design workshop was conducted with the pilot partners. A significant part of this session was dedicated to presenting a technical demonstration of each of the core tools developed by the consortium partners: **Decidim**, **Storypact**, **webLyzard**, and **Democratic Reflection**.

After the demonstrations, a facilitated discussion was held on how these tools with different uses and features could be coherently and strategically integrated into the pilots' deliberation platforms. The conversation was structured around a typical deliberation journey, exploring how the tools could support different stages, such as **Discovery**, **Invitation**, **Onboarding**, **Participation**, **Synthesis**, **Decision**, and **Follow-up**. During this session, initial draft ideas were brainstormed, which acted as essential seed ideas for the detailed use cases and sample user scenarios that are defined in the subsequent sections of this document.

2.3 Comprehensive pain point analysis

This comprehensive analysis synthesizes survey responses from 6 participants across three organizations (KMOP, NOVA University, Re-Imagine Europa) and workshop discussions to identify critical requirements for the MultiPoD multilingual deliberation platform. The analysis reveals six major pain points, seven key desires, and a prioritized requirements framework essential for successful pilot implementation.

Pain point 1: Engaging vulnerable and marginalized groups

Priority Level ● **CRITICAL**

Core Challenge Ensuring meaningful participation from traditionally excluded communities in democratic processes.

Supporting Evidence from Partners

"The most significant 'pain point' we encounter is ensuring meaningful and sustained engagement in online participatory processes, particularly among vulnerable or marginalized groups." — *KMOP Survey Response*

"The biggest one is being able to bring participation to the most vulnerable parts of the population, groups marginalised or disengaged, which are often the ones whose voices are not heard." — *Re-Imagine Europa Survey Response*

"Our most significant pain point is effectively engaging public voices—particularly those of everyday citizens and non-expert stakeholders—in online participation and deliberation processes." — *Re-Imagine Europa Survey Response*

Workshop Context: This was identified as the top challenge across all organizations during requirements prioritization.

Pain point 2: Language and accessibility barriers

Priority Level ● CRITICAL

Core Challenge Overcoming obstacles in multilingual communication to include diverse linguistic communities in real-time deliberation.

Supporting Evidence from Partners

"Lack of interpretation in a variety of languages, including sign language, has hindered the participation of community members in events focusing on information provision and discussion of their rights." – *KMOP Survey Response*

"...language barriers; cultural and political differences that lead to misunderstandings, polarisation, or disengagement; digital inequality difficulting access." – *RIE Survey Response*

Workshop Technical Clarification

💡 Specific scenarios were raised, highlighting the need for multi-step, real-time interpretation (e.g., from French to Arabic, and then from Arabic to Farsi) in community meetings, which current setups do not support effectively.

Pain point 3: Digital literacy and technology access

Priority Level ● HIGH

Core Challenge Addressing the technical barriers that prevent equitable participation due to varying levels of digital competence and resource access.

Supporting Evidence from Partners

"...we often face challenges related to digital literacy, access to technology, and motivational barriers, which hinder equitable participation." – *KMOP Survey Response*

"Many participants struggle with unfamiliar digital tools, unstable internet connections, or a lack of confidence in using online platforms." – *KMOP Survey Response*

"...participants disengage mid-process, or remain passive throughout, due to barriers such as connectivity issues, language limitations, or discomfort with the discussion format." – *KMOP Survey Response*

Pain point 4: Sustaining long-term engagement

Priority Level ● HIGH

Core Challenge Maintaining participant involvement and motivation across extended deliberation processes, especially with transient or specialized communities.

Supporting Evidence from Partners

"Our 'membership' and community base is very specialized and mobile - every person has their own interests, goals, projects... So members have little and intermittent interest in local issues of common concern." – *NOVA Survey Response*

"In my scenario, deliberation takes some time: say 6 months and several meetings. One member of the community is 'there' in the first two months/meetings... but then goes away." – *NOVA Survey Response*

"...citizen engagement in today's fast-paced, attention-scarce environment is extremely challenging. Many individuals... found it difficult to commit to in-depth deliberative formats." – *Re-Imagine Europa Survey Response*

Workshop Insight

The challenge of maintaining engagement over long deliberation cycles (e.g., six months) was highlighted as a critical issue that can jeopardize the integrity and outcome of the entire process.

Pain point 5: Platform fragmentation and tool integration

Priority Level ● HIGH

Core Challenge Overcoming the inefficiencies caused by a lack of coherent, integrated solutions for comprehensive deliberation management.

Supporting Evidence from Partners

"...the fragmentation of online tools and the lack of integrated solutions for deliberation, feedback collection, and community management create inefficiencies and limit our ability to maintain coherent and productive dialogue..." – *KMOP Survey Response*

"In some projects, lack of effective communication and coordination between technical and non-technical partners." – *Re-Imagine Europa Survey Response*

Pain point 6: Trust and political disengagement**Priority Level** ● MEDIUM-HIGH**Core Challenge** Countering widespread mistrust in public dialogue and political processes, while also managing the risks of bias and polarization.**Supporting Evidence from Partners**

"As several groups of citizens do not feel represented by politics, they tend to see active participation as an external responsibility... Due to a lack of trust or the perception that public dialogue is too polarised, these groups often choose not to participate." – *RIE Survey Response*

"...mistrust and misinformation hinder the development of a common ground for evidence-based discussion." – *RIE Survey Response*

Workshop Emphasis on Bias Concerns

💡 A key concern was raised regarding the misuse of deliberation platforms. If a tool is consistently used by a group with a specific bias, the tool itself could become biased through its training, amplifying polarization rather than mitigating it.

2.4 High-level system requirements

The comprehensive analysis of pain points provides a clear, user-validated understanding of the most pressing challenges that hinder effective multicultural deliberation. However, to transform these qualitative insights into an actionable guide for our technical partners, the next essential step is to translate these problems into a structured framework. The following section details the High-Level System Requirements that were derived directly from this analysis, ensuring that the technical architecture of MultiPoD is fundamentally designed to solve the real-world problems faced by its intended users.

The co-creation activities, including the internal survey and the Barcelona co-design workshop, produced a clear set of high-level system requirements. These requirements, prioritized by the consortium partners, form the functional core of the MultiPoD solution. They are grouped into the following key areas:

Sensemaking and Visualization: This area has been identified as a top priority. The system is required to furnish tools that facilitate user and moderator comprehension of intricate deliberations. Key functionalities encompass:

- **Argument Mapping:** The visual structuring of arguments to elucidate relationships among claims, evidence, and counter-arguments.
- **Summarization:** The AI-powered generation of concise summaries for extensive discussions or documents.
- **Topic and Sentiment Analysis:** The automated identification of pivotal topics and the analysis of the discourse's emotional tone.

- **Visual Dashboards:** Interactive visualizations that provide an overview of the deliberation process and its outcomes.

Multilingual Support: This constitutes a fundamental prerequisite for the project. The platform must overcome linguistic barriers to enable inclusive, cross-border deliberation. Essential features include:

- **Translation Services:** High-quality, real-time translation for both textual and spoken content.
- **Cultural Adaptation:** AI-driven suggestions and analyses to assist in navigating potential cross-cultural misunderstandings.

Deliberation Support: The solution is mandated to actively support and enhance the quality of the deliberative process itself through:

- **Moderation Support:** Tools designed to assist human moderators in identifying polarization, hate speech, or off-topic contributions.
- **Fact-Checking:** The integration of features to facilitate claim verification and combat misinformation.
- **Structured Argumentation:** Interfaces that guide users in formulating well-structured arguments based on diverse sources, languages, and cultures.

Accessibility and Inclusion: The platform must be user-friendly and accessible to a broad spectrum of participants, irrespective of their technical proficiency or literacy levels.

Integration and Interoperability: To maximize impact and preclude the creation of isolated systems, the MultiPoD solution must feature an **open architecture** capable of integrating with existing deliberation platforms, with a primary emphasis on **Decidim**.

Trust and Transparency: The system's operations must exhibit transparency to cultivate user trust. This commitment extends to **Explainable AI (XAI)** and robust data privacy and security measures.

We proceed to illustrate a more detailed analysis of the above birds-eye view analysis in the Appendix.

2.5 Use case scenarios

The high-level requirements derived from our co-creation process are grounded in the practical needs of the project's pilots. This section translates those requirements into concrete use cases and user experience (UX) scenarios. These scenarios serve as a blueprint for the development and integration of the MultiPoD solution, illustrating how the technology will support real-world deliberation processes. However, it is worth noting that the following are currently in progress, as T2.2 is scheduled to be completed by M12. We present, however, the preliminary results and design, anticipating finalizing on M11-M12.

2.5.1 Use cases definitions

We have defined three primary use cases that represent the core pilot activities of the project. Each use case targets a different format, scale, and set of stakeholders, which validates MultiPoD across a diverse range of deliberative contexts.

Use Case 1: Large-scale virtual citizens' assembly

Summary: A large, fully online Citizens' Assembly that brings together a diverse group of EU residents to deliberate on a key European issue. The assembly combines asynchronous learning and preparation with a structured, synchronous live event to co-create policy recommendations

Scope: The pilot will involve approximately **100 participants** from various linguistic and cultural backgrounds, with a target of at least 40% identifying as having a multicultural or multilingual background. The event will focus on the topic of **Housing in Europe** and the challenges it poses to multilingual communities, exploring subthemes like affordability and discrimination.

Goal: The primary goals are to leverage collective intelligence to co-design actionable policy recommendations on housing and to test the MultiPoD ecosystem's ability to support large-scale, multilingual deliberation in a real-world setting

Expected MultiPoD Solution Integration:

- **Decidim:** To serve as the central hub for the asynchronous phase, hosting participant questionnaires, expert videos, and background materials, as well as managing the final voting process.
- **webLyzard Visual Analytics Dashboard:** To provide a "lite" dashboard allowing participants to explore public discourse on housing, enriching their understanding during the learning phase.
- **Democratic Reflection:** To be used as a second-screen tool for participants to log real-time reactions and reflections during the learning phase, providing facilitators with aggregated insights.
- **Storypact Editor:** To assist organizers in optimizing recruitment messaging and refining the final policy recommendations for clarity and impact.

Use case 2: In-person deliberative focus groups

Summary: A series of small, in-person Deliberative Focus Groups (DFGs) in Lisbon designed to gather deep qualitative insights into the specific challenges of multicultural communication. These sessions will analyze how participants navigate disagreement and build consensus on contested local topics.

Scope: The pilot will consist of **4-5 face-to-face focus groups**, each with 8-12 participants from Lisbon's culturally diverse communities. The sessions will be voice-recorded and conducted in multiple languages, including Portuguese, English, French, Creole, and Ukrainian, to capture authentic interactions.

Goal: To identify the practical hurdles (e.g., linguistic bias, differing communication styles) to effective multicultural deliberation and to test the **Democratic Reflection** tool within a research methodology to measure its impact on participant reflection. The findings will directly inform the refinement of MultiPoD's AI-powered tools.

Expected MultiPoD Solution Integration:

- **Democratic Reflection:** To be used as the primary data collection tool. Participants will use it to log reflections before and after the deliberation, allowing researchers to measure reflections, perception, sensemaking and shifts in perspective.
- **AI-Powered Audio Analysis:** To be applied to the voice recordings of the sessions to identify key moments of tension, misunderstanding, or consensus, providing rich data for analysis in WP1.

Use case 3: Hybrid citizen & policymaker assembly

Summary: A hybrid assembly that brings citizens, civil society representatives, and policymakers together to bridge the gap between public concerns and policy action. The format is designed to translate the outputs of citizen deliberations into concrete, realistic policy proposals.

Scope: The pilot will be a hybrid event (in-person in Athens/Brussels and online) with over **60 participants**, including policymakers from various levels of administration. The assembly will follow a "Listen - Reframe/Bridge - Act" structure, using insights from previous Citizen Assemblies as a starting point.

Goal: To facilitate a direct, high-quality dialogue between citizens and policymakers, co-create practical policy proposals, and gather critical feedback from policymakers on the usability and effectiveness of the MultiPoD technical solutions.

Expected MultiPoD Solution Integration:

- **Decidim:** To be used for asynchronous preparation, allowing all participants to review materials and start discussions from a shared knowledge base.
- **webLyizard Visual Analytics Dashboard:** To be used by policymakers and facilitators to gain a comprehensive understanding of the public discourse surrounding the selected topics, providing crucial context for the "Listen" phase.
- **MultiPoD Co-Creation Tools:** To support the "Act" phase, where small, mixed groups will use the tools to collaboratively draft, refine, and present their policy proposals.

2.5.2 UX scenarios

The above-created use case definitions led to the formulation of the following UX scenarios:

Scenario A: Virtual citizen assembly (KMOP)

Persona Definition: P1

- **Context:** The participant (P1) is a 32-year-old female professional of Greek nationality residing in Germany, representing the assembly's target demographic of multilingual/multicultural EU residents directly impacted by housing market pressures.
- **Key Pains:** P1 experiences socio-political pain points, including a sense of political alienation and frustration with perceived market failures in the urban housing sector.
- **Goals:** Primary goals include: (1) enhancing policy literacy; (2) contributing lived experience to a collective intelligence process; and (3) achieving a sense of political efficacy.
- **Needs:** P1 requires: (1) a user interface with a low barrier to entry; (2) clear procedural instructions; and (3) a securely moderated, inclusive environment.

Interaction Stages with the MultiPod Deliberative Ecosystem

- **[Antecedent Phase: Pre-Interaction & Asynchronous Learning]** P1 is recruited via a targeted outreach campaign, whose messaging has been optimized using **Storypact Editor** to maximize resonance and clarity. She registers through a screener questionnaire hosted on the **Decidim** platform. In the subsequent asynchronous learning phase, **Decidim** serves as the central hub for accessing preparatory materials. This includes curated expert videos and a pre-configured **webLyizard Lite dashboard**, which allows her to explore the contemporary public discourse on housing

across various media sources. While viewing the expert videos, she uses the **Democratic Reflection** tool on a second screen to log her real-time cognitive and emotional responses (e.g., agreement, confusion, relevance), which are aggregated to inform the facilitators.

- **[Interaction Phase: Synchronous Deliberation]** On the event date, P1 joins the synchronous session. The agenda and participant list are managed within **Decidim**. She participates in the opening plenary, followed by facilitator-led, small-group deliberation in a breakout room. The facilitators use the aggregated data from the **Democratic Reflection** tool to guide discussions toward points of common interest or confusion identified during the learning phase.
- **[Parallel Activity: Viewpoint Formulation & Refinement]** P1's engagement with the multi-tool ecosystem—from exploring public sentiment on **webLyzard Dashboard** to critically logging her reactions with the **Democratic Reflection** tool and dialoguing with peers—facilitates a sophisticated process of viewpoint refinement, transforming her individual perspective into a more systemic and collectively informed one.
- **[Post-Interaction Phase: Synthesis and Decision]** The deliberation culminates in a prioritization workshop and a final vote on policy recommendations, both conducted using the secure and transparent voting components of **Decidim**. The collaborative drafting of recommendations occurs in a shared digital workspace, with the final text potentially being analyzed through **Storypact Editor** by organizers to refine its framing for policy audiences.
- **[Post-Event Tracking: Impact Assessment]** Post-assembly, P1 receives a summary report and a feedback survey via **Decidim**'s communication and survey features. This ensures a transparent and traceable conclusion to the participatory process, reinforcing its legitimacy.

Scenario B: Deliberative focus groups (NOVA)

Persona Definition: P2

- **Context:** The participant (P2) is a 45-year-old male educator of Brazilian nationality, with a high level of civic interest but significant skepticism towards the efficacy of conventional public consultation methods.
- **Key Pains:** P2's primary frustration stems from the prevalence of polarized, unproductive public discourse and a perceived lack of genuine impact from citizen feedback.
- **Goals:** Primary goals are: (1) to critically evaluate an alternative deliberative methodology; (2) to engage in a constructive dialogue; and (3) to achieve a more complex understanding of a contested local issue.

- **Needs:** P2 requires: (1) clear articulation of the research protocol; (2) structured and impartial facilitation; and (3) a confidential environment for open expression.

Interaction Stages within the Research Protocol

- **[Antecedent Phase: Recruitment and Onboarding]** P2 is recruited via an email invitation, the content of which is optimized using **Storypact Editor** to clearly communicate the research objectives and encourage participation. He registers for the focus group slot using a simple scheduling component managed through **Decidim**. The audio-visual stimulus material for the session is prepared by researchers who use the **webLyizard Dashboard** to analyze local media and social media discourse, ensuring the video accurately reflects the contested nature of the topic.
- **[Interaction Phase: The Deliberative Intervention]** The face-to-face session is a direct test of the **Democratic Reflection (DR)** tool within a "sandwich" methodology.
 1. **Initial DR Evaluation:** P2 watches the video stimulus and uses the **DR tool's** interface (e.g., on a provided tablet) to log his initial set of reflective responses. This serves as his pre-test baseline.
 2. **Deliberation:** P2 engages in a 60-minute, facilitator-led discussion aimed at exploring the nuances of the topic.
 3. **Final DR Evaluation:** P2 is re-exposed to the stimulus and again uses the **DR tool** to log his reflections. The variance between his pre- and post-deliberation responses constitutes the primary data for evaluating the deliberative process's impact on participant reflection.
- **[Parallel Activity: Perspective Transformation]** The explicit use of the **Democratic Reflection** tool as the primary interaction mechanism makes the process of perspective transformation the central object of study. The tool nudges P2 to deconstruct its own cognitive and emotional responses, while the deliberation provides the social context for potential shifts.
- **[Post-Interaction Phase: Debriefing]** The session concludes with a researcher-led debriefing, explaining how the data from the **DR tool** will be analyzed to improve democratic technologies.
- **[Post-Event Tracking: Contribution to Research]** The participant's interaction with the **DR tool**, framed by a process informed by **webLyizard** and managed by **Decidim** and **Storypact**, constitutes a crucial data point. The "impact" is his contribution to the co-design and validation of the MultiPod technical solutions.

2.6 Conclusion

This second part of the deliverable details the project's user-centered design process, translating the theoretical findings from **Part I** into a practical and actionable blueprint for the MultiPoD solution. Through a participatory methodology involving focused interviews, surveys, and a co-design workshop with pilot partners, we gathered rich, qualitative data on the primary obstacles to effective multicultural deliberation

The synthesis of this data resulted in a **Comprehensive Pain Point Analysis** (see Section 2.3), which identified critical challenges such as the difficulty of engaging vulnerable groups, overcoming real-time language barriers, and sustaining long-term user engagement. These pain points were then systematically translated into a prioritized set of **High-Level System Requirements** (see Section 2.4), establishing Sensemaking and Visualization, Multilingual Support, and Trust and Transparency as the core functional pillars of the MultiPoD platform.

Finally, these requirements were brought to life through the definition of three primary **Use Cases definitions** and **UX Scenarios**. These scenarios illustrate how citizens and policymakers will interact with the MultiPoD ecosystem to achieve their goals, providing a clear and validated roadmap for the technical development tasks in WP2 and WP3. This co-creation process ensures that the resulting technology will be directly responsive to the needs of the communities it is designed to serve.

References

- BG1 Suran, Shweta, Vishwajeet Pattanaik, Ralf Kurvers, Carina Antonia Hallin, Anna De Liddo, Robert Krimmer, and Dirk Draheim. "Building global societies on collective intelligence: Challenges and opportunities." *Digital Government: Research and Practice* 3, no. 4 (2022): 1-6.
- BG2 De Liddo, Anna, and Rosa Strube. "Understanding failures and potentials of argumentation tools for public deliberation." In *Proceedings of the 10th International Conference on Communities & Technologies-Wicked Problems in the Age of Tech*, pp. 75-88. 2021.
- BG3 Fichman, Pnina, and Madelyn Sanfilippo. *Multiculturalism and information and communication technology*. Springer Nature, 2022.
- BG4 De Liddo, Anna "Using Technology to Unite Us: Can Disagreement be." *Whistleblowers in an Academic Gift Culture: A Commentary on the Scandal in Academia*-Michael James Heron and Pauline Helen Belford (2022): 12.
- BG5 Christodoulou, Eleni, and Kalypso Iordanou. "Democracy under attack: challenges of addressing ethical issues of AI and big data for more democratic digital media and societies." *Frontiers in Political Science* 3 (2021): 682945.
- BG6 Macnish, Kevin, ed. *Big data and democracy*. Edinburgh University Press, 2020.
- Chau01 Chaudhari, Shreyas, Pranjal Aggarwal, Vishvak Murahari, Tanmay Rajpurohit, Ashwin Kalyan, Karthik Narasimhan, Ameet Deshpande, and Bruno Castro da Silva. "RIhf deciphered: A critical analysis of reinforcement learning from human feedback for llms." *ACM Computing Surveys* (2024).
- Chen01 Chen, Wenzhi. "Exploring the Application of AI to Qualitative Data Analysis: A Comparative Study in the Field of Industrial Design Education." In *International Conference on Human-Computer Interaction*, pp. 131-142. Cham: Springer Nature Switzerland, 2025.
- HP1 Kalampokis, Evangelos, Nikos Karacapilidis, Areti Karamanou, and Konstantinos Tarabanis. "Fostering Multilingual Deliberation through Generative Artificial Intelligence." In *EGOV-CeDEM-ePart Conference*. 2024.
- HP10 Lohar, Pintu, et al. "Building Neural Machine Translation Systems for Multilingual Participatory Spaces." *Analytics* 2, no. 2 (2023): 393-409.
- HP11 Rosa, Paulo, and Ângela Guimaraes Pereira. "Harnessing Innovation in Online Deliberation: Lessons from the Conference on the Future of Europe." (2025).
- HP12 Barriere, Valentin, and Alexandra Balahur. "Multilingual multi-target stance recognition in online public consultations." *Mathematics* 11, no. 9 (2023): 2161.
- HP13 Cabrera, Luis. "Babel fish democracy? Prospects for addressing democratic language barriers through machine translation and interpretation." *American Journal of Political Science* 68, no. 2 (2024): 767-782.
- HP14 Llovido, Jennifer L., Michael Angelo D. Brogada, Floradel S. Relucio, Lea D. Austero, Lany L. Maceda, and Mideth B. Abisado. "BOSESKO: Designing A Synoptic Multi-Platform Digital System for Citizen Participation." In *2024 26th International Conference on Advanced Communications Technology (ICACT)*, pp. 1-8. IEEE, 2024.

- HP15 Kajava, Kaisla, and Nitin Sawhney. "Language of algorithms: agency, metaphors, and deliberations in AI discourses." In Handbook of critical studies of artificial intelligence, pp. 224-236. Edward Elgar Publishing, 2023.
- HP16 Cardellino, Cristian, Serena Villata, and Elena Cabrio. "From Political Debates to Deliberative Democracy: A Roadmap to Assess Semi-Supervised Argument Mining with DISPUTool." In DELITE 2024. First Workshop on Language-driven Deliberation Technology. 2024.
- HP17 Veliyev, Elburus. "Speech Culture and Deliberative Practices: Negotiating Local Norms in Multicultural Contexts." Journal of Azerbaijan Language and Education Studies 2, no. 3 (2025): 151-175.
- HP2 Verhasselt, Lisa. "Towards multilingual deliberative democracy: navigating challenges and opportunities." Representation 61, no. 1 (2025): 57-74.
- HP3 Karacapilidis, Nikos, Evangelos Kalampokis, Nikolaos Giarelis, and Charalampos Mastrokostas. "Generative AI and Public Deliberation: A Framework for LLM-augmented Digital Democracy." Proceedings <http://ceur-ws.org> ISSN 1613 (2024): 0073.
- HP4 VERHASSELT, Lisa Laura Maria. "DELIBERATIVE DEMOCRACY AMIDST THE TOWER OF BABEL: INSIGHTS FROM LUXEMBOURGISH DELIBERATIVE MINI-PUBLICS." (2025).
- HP5 Saggion, Horacio, John O'Flaherty, Thomas Blanchet, Serge Sharoff, Silvia Sanfilippo, Lian Muñoz, Martin Gollegger et al. "Making democratic deliberation and participation more accessible: The iDEM project." (2024).
- HP6 Hu, Ke, Bo Li, and Tara N. Sainath. "Scaling up deliberation for multilingual asr." In 2022 IEEE Spoken Language Technology Workshop (SLT), pp. 771-776. IEEE, 2023.
- HP7 Doerr, Nicole. "Deliberative Discussion and Languages in the World Social Forum Process." In Handbook on World Social Forum Activism, pp. 320-338. Routledge, 2015.
- HP8 Bonechi, Simone. "Development of an automated moderator for deliberative events." Electronics 13, no. 3 (2024): 544.
- HP9 Velikanov, Cyril, and Alexander Prosser. "Mass online deliberation in participatory policy-making." Beyond Bureaucracy. Towards Sustainable Government Informatisation (2017): 209-258.
- Kala01 Kalanda, Boniface Francis, and Asseneth Jerotich Cheboi. "Artificial Intelligence in the Analysis of Unstructured Qualitative Data: A Literature Review." Advances in Social Sciences Research Journal 12, no. 08 (2025): 199-205.
- S1 Liu, Haijiang, Yong Cao, Xun Wu, Chen Qiu, Jinguang Gu, Maofu Liu, and Daniel Hershcovich. "Towards realistic evaluation of cultural value alignment in large language models: Diversity enhancement for survey response simulation." Information Processing & Management 62, no. 4 (2025): 104099.
www.sciencedirect.com/science/article/pii/S030645732500041X
- S10 Qondias, Dimas, Ida Bagus Putu Arnyana, Nyoman Dantes, and Wayan Lasmawan. "Designing Multicultural Problem-Based Learning Model in 2013 Curriculum." In Proceedings of the 5th International Conference on Learning Innovation and Quality Education, pp. 1-4. 2021. doi.org/10.1145/3516875.3516950

- S11 MacCann-Alfaro, Nancy, Ana García-Valcárcel, and Erla Mariela Morales-Morgado. "Critical Debate in the Classroom using ICT: An Innovation Proposal with University Students." In Eighth International Conference on Technological Ecosystems for Enhancing Multiculturality, pp. 377-385. 2020. doi.org/10.1145/3434780.3436655
- S12 Trindade, Maria AM. "What Students Can Tell Us: Using Argumentation and Debate in e-learning times?." In 2021 16th International Conference on Computer Science & Education (ICCSE), pp. 76-80. IEEE, 2021.
- S13 Brailas, Alexios. "A systems thinking approach to reflective practice in blogs: Implications on social-emotional learning and resilience building." In Eighth International Conference on Technological Ecosystems for Enhancing Multiculturality, pp. 304-308. 2020. doi.org/10.1145/3434780.3436564
- S14 Fidalgo-Blanco, Ángel, Laura García-Ruesgas, Pilar Fernández Blanco, and Susana Sastre-Merino. "ACCI 3.0. Technique of classification, organization, creation and use of collective knowledge." In Eighth International Conference on Technological Ecosystems for Enhancing Multiculturality, pp. 345-352. 2020. doi.org/10.1145/3434780.3436594
- S15 Rodríguez-Conde, María José, Susana Olmos-Migueláñez, Adriana Gamazo, José Carlos Sánchez Prieto, and Joe O'Hara. "Challenges in evaluation in education and guidance: a perspective from 2020." In Eighth International Conference on Technological Ecosystems for Enhancing Multiculturality, pp. 770-774. 2020. doi.org/10.1145/3434780.3436715
- S16 Nájara Sánchez, Olga, and Erla Mariela Morales Morgado. "Collective Intelligence and Web tools in the educational process." In Ninth International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'21), pp. 680-688. 2021. doi.org/10.1145/3486011.3486554
- S17 Nájara Sánchez, Olga, and Erla Mariela Morales Morgado. "Knowledge Management and Collective Intelligence through Web Tools." In Eighth International Conference on Technological Ecosystems for Enhancing Multiculturality, pp. 1078-1084. 2020. doi.org/10.1145/3434780.3436694
- S18 Torres-Torres, Yucnary-Daitiana, Marcos Román-González, and Juan-Carlos Pérez-González. "Specific didactic strategies used for the development of computational thinking in the female collective in primary and secondary education: A systematic review protocol." In Ninth international conference on technological ecosystems for enhancing Multiculturality (TEEM'21), pp. 25-29. 2021. doi.org/10.1145/3486011.3486414
- S19 Bowen, Gordon. "Digital leadership, ethics, and challenges." In Strategy, Leadership, and AI in the Cyber Ecosystem, pp. 23-39. Academic Press, 2021. www.sciencedirect.com/science/article/pii/B9780128214428000136
- S2 Xu, Xinmao, Li Zhao, Yu Long, Jie Pan, and Lihua Jiang. "Exploring Online Courses Integrating Service Learning into Public Health Amid the Pandemic." In Proceedings of the 2024 Guangdong-Hong Kong-Macao Greater Bay Area International Conference on Education Digitalization and Computer Science, pp. 21-26. 2024. doi.org/10.1145/3686424.3686428
- S20 Gorwa, Robert. "Elections, institutions, and the regulatory politics of platform governance: The case of the German NetzDG." Telecommunications Policy 45, no. 6 (2021): 102145. www.sciencedirect.com/science/article/pii/S0308596121000495

- S21 Pedrosa-de-Jesus, Helena, Cecília Guerra, and Mike Watts. "Active co-constructive written feedback: Promoting students' critical thinking in a higher education context." In Proceedings of the Seventh International Conference on Technological Ecosystems for Enhancing Multiculturality, pp. 129-136. 2019. doi.org/10.1145/3362789.3362825
- S22 Karkina, Svetlana V., Balwant Singh, and Roza A. Valeeva. "Signature pedagogies of music learning by the Means of MOODLE across Russian and Indian Approach." In Proceedings of the Seventh International Conference on Technological Ecosystems for Enhancing Multiculturality, pp. 575-581. 2019. doi.org/10.1145/3362789.3362848
- S23 MacCann-Alfaro, Nancy, Ana García-Valcárcel, and Erla Mariela Morales-Morga. "Use of ICT to promote and analyze argumentative and metacognitive processes in higher education." In Proceedings of the Seventh International Conference on Technological Ecosystems for Enhancing Multiculturality, pp. 1028-1034. 2019. doi.org/10.1145/3362789.3362927
- S24 Verdugo-Castro, Sonia, Alicia García-Holgado, and M^a Cruz Sánchez-Gómez. "Analysis of instruments focused on gender gap in STEM education." In Proceedings of the Seventh International Conference on Technological Ecosystems for Enhancing Multiculturality, pp. 999-1006. 2019. doi.org/10.1145/3362789.3362922
- S25 Gamazo, Adriana, Fernando Martínez-Abad, Susana Olmos-Migueláñez, and María José Rodríguez-Conde. "Assessment of students with special education needs in PISA: Participation guidelines and data treatment." In Proceedings of the seventh international conference on technological ecosystems for enhancing multicultural, pp. 187-191. 2019. doi.org/10.1145/3362789.3362919
- S26 Torres-Torres, Yucnary-Daitiana, Marcos Román-González, and Juan-Carlos Pérez-González. "Implementation of unplugged teaching activities to foster computational thinking skills in primary school from a gender perspective." In Proceedings of the seventh international conference on technological ecosystems for enhancing multicultural, pp. 209-215. 2019. doi.org/10.1145/3362789.3362813
- S27 Blanco-Herrero, David, and Carlos Arcila Calderón. "Spread and reception of fake news promoting hate speech against migrants and refugees in social media: Research Plan for the Doctoral Programme Education in the Knowledge Society." In Proceedings of the Seventh International Conference on Technological Ecosystems for Enhancing Multiculturality, pp. 949-955. 2019. doi.org/10.1145/3362789.3362842
- S28 Dorner, Wolfgang, Anne Weinfurter, and Simon Graf. "Uncertainty in the spatial metadata of historical photographs: A geomatic and photogrammetric driven argumentation." In Proceedings of the Sixth International Conference on Technological Ecosystems for Enhancing Multiculturality, pp. 872-877. 2018. doi.org/10.1145/3284179.3284321
- S29 MacCann-Alfaro, Nancy, Erla Mariela Morales-Morgado, and Ana García-Valcárcel. "Metacognitive and collaborative arguing through computers by university students." In Proceedings of the Sixth International Conference on Technological Ecosystems for Enhancing Multiculturality, pp. 1040-1045. 2018. doi.org/10.1145/3284179.3284352
- S3 Monteiro, Luis Flavio Ferreira, Cristiano Maciel, Daniele Trevisan, and Vinícius Carvalho Pereira. "Preserving Memories Together: Proposing Artifacts for Collective Digital Memorials." In Proceedings of the 20th Brazilian Symposium on Information Systems, pp. 1-9. 2024. doi.org/10.1145/3658271.3658301

- S30 Fernández-Gutiérrezdelalampo, Luis, David Bolonio, Miguel Izquierdo-Díaz, Fernando Barrio-Parra, Luis Felipe Mazadiego, and Ángel Fidalgo-Blanco. "The use of heterogeneity to improve the learning process of large groups of students." In Proceedings of the Sixth International Conference on Technological Ecosystems for Enhancing Multiculturality, pp. 794-798. 2018. doi.org/10.1145/3284179.3284297
- S31 Ronsivalle, Daniele. "Cities and skills for integration: what can urban planning do? Experiences and reflections between public spaces and collective interest for urban and community (smart) resilience." In 2018 IEEE 4th International Forum on Research and Technology for Society and Industry (RTSI), pp. 1-6. IEEE, 2018.
- S32 Espinosa, Angela, and C. Duque. "Complexity management and multi-scale governance: A case study in an Amazonian indigenous association." European Journal of Operational Research 268, no. 3 (2018): 1006-1020. www.sciencedirect.com/science/article/pii/S0377221717306768
- S33 Garcia-Murillo, Martha, and Ian MacInnes. "Così fan tutte: A better approach than the right to be forgotten." Telecommunications Policy 42, no. 3 (2018): 227-240. www.sciencedirect.com/science/article/pii/S0308596117303452
- S34 Elena, Panova, and Fedorov Vasilii. "Specifics of multimedia texts in the context of social networks media aesthetics." In Proceedings of the Sixth International Conference on Technological Ecosystems for Enhancing Multiculturality, pp. 954-957. 2018. doi.org/10.1145/3284179.3284340
- S35 Rully, Achmad, and Hidenori Nakazato. "Tamper-proof Election Result Verification System in Resource Constrained Environments." In 2018 International Conference on Computing and Network Communications (CoCoNet), pp. 250-257. IEEE, 2018.
- S36 Pérez-Alcántara, Pedro, and Manuel Herrera-Usagre. "Improving health empowerment and evidence-based decision-making using collective intelligence and self-management health system: Em-Phasys project." In Proceedings of the 5th International Conference on Technological Ecosystems for Enhancing Multiculturality, pp. 1-4. 2017. doi.org/10.1145/3144826.3149548
- S37 Cabrera, Catalina González, and Juan José Igartua. "The narrative and media literacy as influential factors in the efficacy of programs for the prevention of teenage pregnancy." In Proceedings of the Fourth International Conference on Technological Ecosystems for Enhancing Multiculturality, pp. 1189-1196. 2016. doi.org/10.1145/3012430.3012668
- S38 Martin-Rodilla, Patricia, and Cesar Gonzalez-Perez. "Understanding user behavior in textual analysis: a thinking aloud approach for digital humanities research contexts." In Proceedings of the Fourth International Conference on Technological Ecosystems for Enhancing Multiculturality, pp. 269-276. 2016. doi.org/10.1145/3012430.3012528
- S39 Cachón, Diego, and Juan José Igartua. "Impact of the narrative formats on the behavior improvement in relation to the socially stigmatized groups: the effect of empathy and similarity in terms of social identity." In Proceedings of the Fourth International Conference on Technological Ecosystems for Enhancing Multiculturality, pp. 1197-1199. 2016. doi.org/10.1145/3012430.3012669
- S4 Monlezun, D. J. "Our Common Home: Artificial Intelligence+ Global Public Health Ecosystem." Responsible Artificial Intelligence Re-Engineering the Global Public Health Ecosystem, Elsevier (2024): 215-243. www.sciencedirect.com/science/article/pii/B978044321597100007X

- S40 Oleksy, Tomasz, and Anna Wnuk. "Augmented places: An impact of embodied historical experience on attitudes towards places." *Computers in Human Behavior* 57 (2016): 11-16. www.sciencedirect.com/science/article/pii/S0747563215302909
- S41 Dev, Animesh. "Interpreting modernity in culturally pluralized cities." *Procedia Technology* 24 (2016): 1782-1789. www.sciencedirect.com/science/article/pii/S2212017316303127
- S42 Goh, Debbie, and Natalie Pang. "Protesting the Singapore government: The role of collective action frames in social media mobilization." *Telematics and Informatics* 33, no. 2 (2016): 525-533. www.sciencedirect.com/science/article/pii/S0736585315000878
- S43 Lindy Ryan. "Chapter 4 - Navigating ethics in the big data democracy" In *The Visual Imperative. Creating a Visual Culture of Data Discovery* (2016), Pages 61-84 www.sciencedirect.com/science/article/pii/B9780128038444000042
- S5 Tiribelli, Simona. "Who decides what online and beyond: freedom of choice in predictive machine-learning algorithms." In *Ethics in Online AI-based Systems*, pp. 299-321. Academic Press, 2024. www.sciencedirect.com/science/article/pii/B9780443188510000123
- S6 Machado, Diego. "The protection of vulnerable algorithmic groups through collective data protection in the onlife world: A Brazilian perspective." *Computer Law & Security Review* 54 (2024): 106027. www.sciencedirect.com/science/article/pii/S0267364924000931
- S7 Ormerod, Richard, Mike Yearworth, and Leroy White. "Understanding participant actions in OR interventions using practice theories: A research agenda." *European Journal of Operational Research* 306, no. 2 (2023): 810-827. www.sciencedirect.com/science/article/pii/S0377221722006737
- S8 Eivazy, Nairy, Jan PL Peeters, and Sandy Claes. "The objects we carry; The memories we share: Recollecting collective memories through participatory stop-motion with personal objects." In *Proceedings of the Participatory Design Conference 2022-Volume 2*, pp. 317-320. 2022. doi.org/10.1145/3537797.3537890
- S9 Nadri, Reza, Gema Rodríguez-Pérez, and Meiyappan Nagappan. "On the relationship between the developer's perceptible race and ethnicity and the evaluation of contributions in oss." *IEEE Transactions on Software Engineering* 48, no. 8 (2021): 2955-2968.