REASSESSING THE SOCIAL

UNDERSTANDING TRANSFORMATION

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DESIGN-BASED PRACTICES TOWARDS NEW ECOLOGICAL CONSCIOUSNESS THE CASE OF THE COLLECTIVE ARCHIVE OF THE CLIMATE EMERGENCY MEMORY

Abstract

Design has always been related to materialisation, which is the ultimate representation of human's ability to "make." In an era marked by human-induced climate change, it is imperative to rethink the ecological impact of design itself and to reflect on the role of design practices on the relational level instead of purely material one. The article presents ongoing research connected to data-related and participatory design practices for collecting and representing communities' experiences in extreme climate emergencies affected territories. The aim of the research is to construct a Collective Archive of the Climate Emergency Memory (CACEM). First, the conceptual and theoretical background of the research are presented, starting from a literature review illustrating the connection between design and ecological perspectives derived from various disciplines. Then, it is presented how critical data practices and archival practices can have a role in preserving memory around climate emergencies and other complex problems. The article then introduces the framework and outputs of the experimental application related to the case of Emilia-Romagna, Italy regarding several alluvial events that happened between 2023 and 2024. The research project proposes collective activities with communities and tools for qualitative data collection based on the experiences of subjects affected by flood events. By inviting them to reflect individually and collectively on their relationship with emergencies, the project aims to construct a geolocated Archive of alternative narratives and to enable the development of socio-political consciousness around climate risks. The article finally presents findings and elaborates on future research developments starting from an experimental activity aimed to test a first version of the Archive conducted in 2024.

Keywords: climate crisis; reflexive practices; archives; alternative narratives; ecological consciousness

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1. Introduction

The article presents ongoing research investigating ways to counteract the social effects of the climate crisis, starting from practices that focus on observing and representing the experiences of communities' affected by climate change-related extreme events. The research is part of the academic debate connecting design theory and the Social Sciences and Humanities (SSH), particularly with respect to the critique of the centrality of the human in design processes. The identification of theories, methods and practices that allow this centrality to be modified is considered fundamental at a time when design cultures are dealing with complex problems, such as climate change, which are largely human induced. In the experimental framework that led to the establishment of the Collective Archive for the Climate Emergency Memory (CACEM), the project itself is understood as an entity that is both reflexive – i.e., capable of stimulating individual reflection with respect to climate risks and their effects and with respect to the relationships that us as humans have with non-human agents – and relational – i.e., capable of stimulating the construction of a collective memory through multi-actor and agents dialogue. The form-archive is identified because archives play a crucial role in allowing the construction and representation of collective memory, profoundly influencing the way reality is narrated and perceived. Through the selection, classification and preservation of information, archives help to define which stories are told and which risk being invisibilised, offering a way to enable collective reflections. This perspective highlights the need to adopt conscious archival practices capable of promoting a more inclusive representation of social reality (D'Ignazio, 2024). The article presents the theoretical concepts underlying the research project and the results obtained from the first experimentation of CACEM, in the frame of the DIG-UP project, which are discussed to introduce future research developments.

2. Posthumanism in Design Theory: Traces for a New Ecological Thought

In recent years, in the light of the increasingly evident effects of the climate crisis, the need to shift from the human-centred approach has emerged in the design field. This concept is being problematised because causes arising from human-centredness can be identified in the climate crisis. What is of interest for this article is to trace the relationship between ecological and posthuman thinking derived from the humanities and design theory. Far from proposing an extensive literature review, the aim is to present some concepts that have been useful in the implementation of the CACEM project, related to how the relationship between ecology, posthumanism and design theory can be applied to situations that enable individual and

collective reflection around climate emergencies. The relationship between design and SSH that is needed to highlight here is linked to two aspects:

1. The matter of the relationship between humans and objects, including digital systems.
2. The matter of the critique of anthropocentrism.

Regarding the first point, contemporary design stems from a history that has always intertwined the materialisation of artefacts on the one hand, and the study of how these artefacts relate to humans, on the other (Vitta, 1981). The emergence of Object Oriented Ontologies – i.e., perspectives that envisage the existence of objects independently of human perception – has led to a rethinking of the fact that designing an artifact is an act strictly by and for human beings. Actor Network Theory (ANT) is particularly relevant, for to the introduction of the idea that objects can not only be considered as independent agents with respect to humans, but that they are also able to contribute to the construction of social reality (Latour, 1992, 2005), previously considered as a solely human "product." This first influences architectural theory, for instance as ANT contributes to introducing a view of architectural space as a dynamic environment of interconnection between humans and buildings themselves (Latour & Yaneva, 2017; Yaneva, 2022) and then it influences design disciplines in general (Forlano, 2017). This paradigm shift is further complexified when considering objects that present agency in a manifest manner, as in the case of digital devices, which contributes to the introduction of paradigms that problematise the concept of human-centred design because it is unable to deal with the negotiation processes that occur between humans and technological objects (Giaccardi & Redstrom, 2020).
Regarding the second point, in the contemporary design theory debate, the relationship with positions of critique of anthropocentrism derived from strands such as feminist materialism has emerged. If, in fact, an anthropocentric view has permeated human history at least since the Enlightenment, the emergence of the concept of the Anthropocene and the scientific and technological developments in the Modern period have contributed to shifting the boundaries between the categories of natural and cultural (Braidotti, 1995, 2013). In design terms, considering nature not as an independent entity but as "a dynamic, emergent and interconnected world of plants, animals, habitats and ecosystems" (Alaimo, 2024, p. 200) in which the human being is also included, introduces the need to adapt design practices even when the design goal is to act in a "sustainable" manner. How would it be possible to design in an environmentally friendly manner if, in any case, the human being is placed in a dimension of privilege? Referring to posthumanist theories involves being critical about the centrality not only of the humans as subjects vs. objects, but also, for example, about the human being as a colonial presence on nature. Such an approach involves making an effort of relativisation that questions the centrality of humans not only in design practice, but also in design knowledge.
Both aspects described above are central when applied to the issue of the climate crisis, and they take on particular connotations because the problem of climate change, even more than other wicked problems (Rittel & Webber, 1973), arises from causes that are human-induced and that are linked to economic models related to excessive production. This aspect is central when looking at the problem from a design theory perspective because design has always had to do with production or – at least – materialisation. However, design also has to do with finding solutions – or forms of mitigation – to problems. Is it possible to address a problem derived (also) from materialisation through a perspective – on the ontological and instrumental level – that has always had to do with materialisation?

2.1 Design for Natureculture Continuum: The Project as a Reflexive and Relational Entity

While there are many theoretical studies that introduce non-dichotomous perspectives, there is still an intense debate aimed at identifying how to put such a shift into practice (Poikolainen Rosén et al., 2025). By now, it can be said that virtually every ecosystem in the world has been impacted by humans to some extent. Can we still call an ecosystem "natural" when it is spread with waste generated by planned, cultural activities? This concept can be applied in the same way to the design project: even if it includes non-dichotomic "visions" or "values" still it is a projection of human thinking. Applying this concept to design practices is linear when it is acknowledged that all design actions are planned, but it may be less visible when the project itself integrates natural elements. Taking the example of a green zone in an urban context, although it may appear "natural" due to its vegetation, it is necessary to admit that its dimensional and morphological characteristics have been defined by human activities of planning, design, and construction. They are a hybrid of "natural" elements and a materialisation of a design activity. Clément (2018) makes no distinction between a forest managed by humans and other types of urban territories, defined as "exploited," even though it may be easier to think of the forest as a "natural" environment compared to, for example, a residential area with gardens. Conceptually, they are all the same: regulated spaces where the growth of vegetation is controlled and functional.
So, the design project cannot be considered as something "nature cantered" instead of "human cantered," but it can be considered as something that, rather than working for one side or the other, could act to make the hybridisation between these two sides visible. In this sense, the design project can be considered as the ensemble of techniques, methods, agents, contexts, and materialisations that enables two aspects:

1. The project is a reflexive entity as it fosters individual reflection on a common problem, enabling the construction of social and political consciousness around the issue itself and facilitating the ability to relativise the human position in relation to nature.
2. The project is a relational entity because it promotes human-human and human-non/human relationships concerning the same problem.

In this research, the reflexive practice is proposed as a mode of relating to the climatic dimension, which, among other things, loses the positive connotation that "nature" has in many narratives because it materialised in the effect of climatic risk. The "natural" and the human are relocated in a dimension of equity that allows for reasoning about the problem of

climate change, starting from a project that feeds on the memory and direct experiences of people, relates them, processes them, and synthesises them into a collaborative system – the archive – with a high degree of transmissibility. The archive thus becomes a key element for the circulation of shared knowledge.

3. Designing Archives: Devices for Collective Memory and Civic Engagement

The archive has always represented a tool for the preservation of historical memory and cultural heritage (CH). It is not merely a storage space, but rather a structured system equipped with rules for the preservation, selection, and transmission of documents. The term "archive" refers both to the documentary collection and to the physical place where it is preserved (Lodolini, 1995). Historically, archives have served as the foundation for the construction of collective memory, acting as custodians of tangible and intangible testimonies of a society. They contribute to shaping the cultural and social identity of communities and nations, thereby influencing how the past is interpreted and transmitted to future generations.
In the digital age, archives are evolving into dynamic systems that integrate information technologies and database logics, enabling the automatic retrieval and reconstruction of relationships among documents, enriching typological, thematic, and chronological connections (Arms, 2000). The archive is an active tool of interpretation and cultural production, fostering the continuous construction of new identities and meanings (Tufarelli, 2019).

3.1 Archiving as a Cultural and Political Act

Digital archives are increasingly characterised by the plurality of data they collect: qualitative data, such as personal testimonies and narratives, intertwine with quantitative data, such as statistical indicators and measurements. This plurality reflects cultural and political choices, since every archive is the result of decisions that privilege certain memories while excluding others (Loukissas, 2019; Caswell, 2014). Archiving should be understood as a significant cultural act, as it determines not only which elements of collective memory are worth preserving, but also who holds the power to make such selections. So, archives should not be considered neutral repositories but spaces of co-construction of historical and cultural memory. Community archives play a crucial role as "counter-archives," serving as sites of resistance and challenge to dominant official narratives, offering visibility and recognition to marginalised communities (Caswell, 2014). This perspective on archives has also been explored by the research group through ongoing doctoral research activated in the frame of the CHANGES project (Cultural Heritage Active Innovation for Next-Gen Sustainable Society), part of Italy's National Recovery and Resilience Plan (PNRR), Spoke 4 PE5. This research is focused on the use of digital technologies and storytelling to enhance the accessibility and valorisation of cultural heritage archives.
The digitisation and dissemination of information through global networks amplify the circulation of memories, transcending geographical boundaries and fostering a more inclusive and plural dialogue. However, this political dimension of archiving is accompanied by new challenges, particularly the risk of digital memory loss. In a global context marked by the climate crisis and the progressive erosion of local cultures, dynamics related to corporate interests, temporary distribution models, and cyberattacks threaten public access to our shared cultural history. This represents a serious threat to collective memory, undermining society's ability to access, understand, and transmit its own history (Internet Archive, 2024). For these reasons, it is essential to strengthen the role of public archives, ensuring that digital CH remains accessible and collectively constructed. Moreover, since every archive is situated and reflects specific conditions, it is necessary to adopt inclusive and reflexive approaches that embrace marginalised memories and alternative perspectives (Loukissas, 2019).

3.2 Design's Role in Collective Memory and Civic Engagement

In this context, the Faro Convention (European Council, 2005) recognises cultural heritage as a fundamental right and promotes the active participation of communities in its construction. Design can play a central role in this process (Zannoni & Formia, 2018), contributing to the creation of processes, methods, and tools dedicated to the interpretation and management of cultural data. The CACEM project aligns with this perspective, proposing an archive that encourages active reflection on individual and collective responsibility. A critical approach to data enables a more inclusive representation of a phenomenon, questioning who is represented and who is not (D'Ignazio & Klein, 2020). The design of digital interfaces, participatory platforms, and data visualisations makes it possible to transform heterogeneous data into shared narratives, overcoming technological and cultural barriers and fostering a sense of collective responsibility (Celaschi & Trocchianesi, 2004; Mauri & Ciuccarelli, 2013; Tufarelli, 2019).

4. Collective Archive for the Climate Emergency Memory (CACEM)

Between 2023 and 2024, the Emilia-Romagna region experienced severe flooding events that caused significant damage to infrastructure, buildings, and the local socio-economic system (ARPAE, 2024). These events highlighted the need to rethink climate risk management practices and to consider social perceptions as integral parts of such management.
In this context, the CACEM project aims to experiment with design-based practices that, on the one hand, encourage individual reflection on the relationship between the individual and climate risk, and on the other, stimulate collective reflection around climate change. This collective reflection is not intended as a univocal synthesis but as a heterogeneous sum of individual perceptions. These perceptions are presented in the form of a collaborative archive, designed as a tool to build datasets that make the social perception of climate risk visible. The archive is not conceived as a static container of information but as a dynamic and relational infrastructure to make visible the social and political aspects of climate events starting from communities' perspective. This infrastructure enables processes of co-construction of knowledge, memory, and political awareness, directly involving the multiple actors affected by extreme climate events.

4.1 The Digital Archive: Concept and Features

The research is currently in an introductory phase, with the development of an initial experimentation. The prototype of the archive is characterised by the collection of qualitative data, that are visualised in an integrated and accessible manner, and the adoption of digital tools designed for use even by individuals with basic digital skills, with the aim of reducing the digital divide. The methodological inspirations include projects such as Queering the Map[1], a collaborative platform that collects geolocated LGBTQIA+ stories, and the Syrian Archive[2], a digital platform designed to document evidence and testimonies of human rights violations during the Syrian conflict. In both cases, the use of digital systems enables the emergence of narratives and experiences that often remain invisible within institutional channels.
The enrichment of the CACEM archive occurs through participation in data (in the form of images, texts, and geolocated testimonies) and metadata collection and it is articulated in phases of individual reflection followed by moments of discussion. A central element of CACEM concerns critical data visualisation (D'Ignazio, 2024; Dörk et al., 2013), understood as a reflective and political practice of representing data. In fact, the archive is configured as a mode of deconstructing dominant knowledge, fostering the questioning of official narratives and the valorisation of situated knowledges (Haraway, 1988).[3] The digital maps created in the CACEM prototype, for instance, do not aim to represent an objective and exhaustive "truth" but rather to reflect the complexity, contradictions, and gaps present in the collective perception of climate risk. This vision is grounded in the recognition of the value of situated knowledges, belonging to those who directly experience the consequences of climate emergencies, that are needed for constructing a plural understanding of ongoing ecological and social transformations. The participatory dimension of the archive materialises through co-design activities, workshops, and storytelling practices, which invite members of the involved communities to reflect on their experiences. These activities are generative processes, in which participants actively contribute both to the content and to the structure of the archive. In this sense, the archive is conceived as a meeting space with the objective of transcending the traditional dichotomy between researcher/expert and citizen.
The initial prototype of the archive was developed using tools such as Google Drive for collecting sources and Google Earth for geolocating data. The choice of these tools was motivated by their intuitive interfaces, which make them accessible even to individuals without advanced digital skills. Those platforms were selected also because the provider, even if US-based, is in compliance with the US-EU Data Privacy Framework Program.[4] However, the strategic objective is to migrate the archive to entirely open-source platforms, through a process of progressive refinement guided by footprint reduction, transparency, and technological independence. This transition will offer advantages such as compliance with international standards, customisation possibilities, and long-term data security and collaboration among diverse institutions.

[1] https://www.queeringthemap.com/
[2] https://syrianarchive.org/

[3] The formula "situated knowledges" applies to this research because it includes the concept that some modes of producing or sharing knowledge are directly related to the viewpoint (and to the socio-economic characteristics) of who is producing it. Haraway's contribution highlights the opposition between situated knowledge and "scientific" knowledge by moving a critique related to how the latest is connected to objectivity while it is still influenced by a subjective dimension. However, Haraway's contribution is strictly connected to the context of American Feminist movements and studies in the 1980s. Discussing in detail the overlap between the original contribution and how the concept is interpreted in this research and how it may apply to the social perception of climate risk, even if interesting, it is not the objective of this paragraph.
[4] https://www.dataprivacyframework.gov/list

4.2 The Experimentation Inside the DIG-UP Project

The DIG-UP project, promoted by the University of Bologna and the Unione dei Comuni della Romagna Faentina, was developed in one of the areas most affected by the floods of 2023 and 2024 in the Emilia-Romagna region. It represented the first experimental context for CACEM. This context has been selected to include the first CACEM experimentation as it consists of a series of digital culture labs open to the public, carried out in a recently flood-affected area, with the goal of promoting digital literacy and inclusive civic participation. The intervention methodology proposed by DIG-UP aims to support the digital transition of younger generations and to promote an advanced digital culture in the territories of the Union. The territorial design process, which began in 2024 and will continue until the end of 2026, is structured as a participatory process. It actively involves institutional actors, teachers, students from primary and secondary schools, associations, and experts. Strategic intervention lines adopted in the project includes the implementation of digital literacy pathways, enhancement of competencies (in line with the strategies defined in the European Digital Competence Framework for Citizens), and active and inclusive citizenship. These challenges are particularly significant for small territories, where digital culture can represent a key to accessing new forms of knowledge, innovative services, and the ability to read and process data to learn how to adapt to the socio-technical changes of contemporary society. The strategic lines have included: (a) educational pathways on digital culture in schools; (b) initiatives focused on the relationship between young women and STEM disciplines; (c) Citizen Science actions aimed at spreading digital culture among citizens and urban actors; and (d) Open Innovation pathways and dissemination through events such as the Faenza Digital Days, a multi-stakeholder festival.
The DIG (Design and Informatics for Generative learning) methodology integrates practices from design and informatics fields, and it is based on the Challenge-Based Learning approach. This involves proposing the educational process for various project targets starting from an open and relevant challenge that stimulates participants to develop original, contextual, and coherent solutions with real needs. There are two fundamental pillars of the methodology: Design methods and visual programming used to explore and build technological solutions in an accessible yet effective manner. Both pillars develop through a structured alternation between theoretical moments and practical activities, following an incremental logic that progressively guides participants in tackling increasingly complex challenges. This methodological mix allows for the development of transversal and technical skills to make learning towards communities an active, generative, and deeply reality-connected process. The Digital Days represent a showcase for innovation processes related to digital culture but are also a testing ground for prototypical initiatives tested with varied target groups.

4.3 Test at Faenza Digital Days 2024

During the Faenza Digital Days organised in the frame of the DIG-UP project, an experimental initiative was conducted involving citizens directly affected by the floods of 2023 and 2024 (ARPAE, 2024). Within an open and participatory workshop targeting all age groups, an initial prototype

of the CACEM archive was tested, with the aim of creating a space where different people could share their memories, experiences, and perspectives related to the events.

The workshop involved 10 participants, including students and citizens. Each participant focused on a specific aspect of the data collection (images, map, narratives) to collaboratively build the archive. Following a brief theoretical introduction, the participants began selecting significant digital traces connected to their flood experiences. The collected materials were then integrated into a shared digital map (Figure 1, Figure 2) that shaped a sort of emotional geography of the event: a fragmented and plural representation capable of highlighting both points of convergence and absences, nuances, and discrepancies between individual experiences and public narratives. The organisational structure and the taxonomy of the archive was co-created with participants.

What emerged clearly was a strong sense of personal involvement: the sharing process fostered mutual listening and made visible memories that often remain confined to the private sphere. In many cases, participating in the archive served to reopen a dialogue with the affected places, to rework what had been experienced collectively, and to give meaning to individual experiences through a collective dimension. The research now foresees the development of an open-source platform and integration with official databases such as those of ARPAE (the Regional Agency for Prevention, Environment and Energy of Emilia-Romagna, Italy) or ISPRA (the Italian National Institute for Environmental Protection and Research). At the same time, the possibility of replicating the experience in other territorial contexts is being evaluated, with the idea of building a network of interconnected local archives.

Looking ahead, the Collective Archive for the Climate Emergency Memory is envisioned as a potential cultural and civic infrastructure for building a shared memory of climate risk. A memory that also provides space for emotions and subjective experiences, elements often excluded from institutional narratives. The challenge is to complement technical data with innovative representational tools that foreground individuals, relationships, and participatory engagement.

[5] https://joint-research-centre.ec.europa.eu/projects-and-activities/education-and-training/digital-transformation-education/digital-competence-framework-citizens-digcomp_en

[6] https://fesr.regione.emilia-romagna.it/novita/notizie/2024/novembre/faenza-digital-days-2024

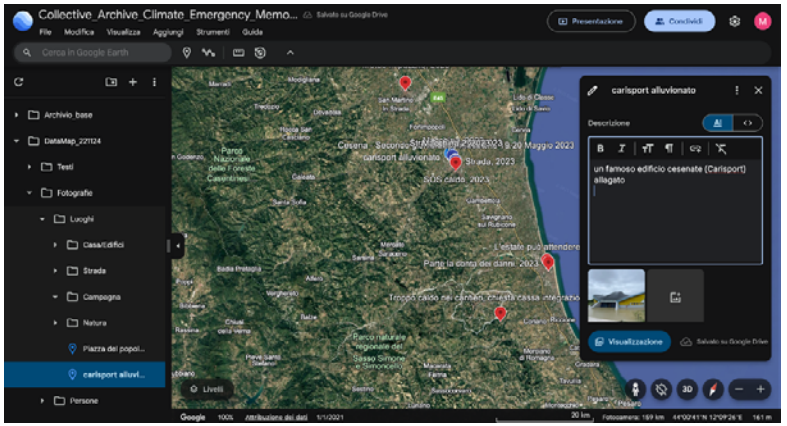

Figure 1. Screenshot from the CACEM v.0.1 on Google Earth. A photo of a flooded building in Cesena was included by a participant.

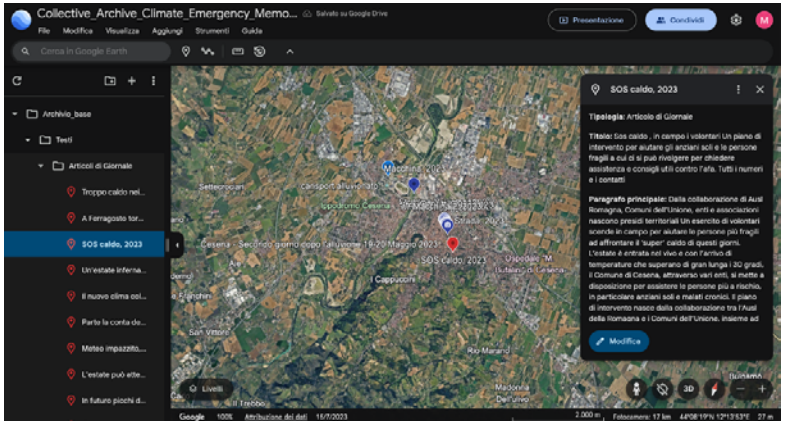

Figure 2. Screenshot from the CACEM v.0.1 on Google Earth. The CACEM can include different types of textual materials, both representing official/institutional and counter representation of a phenomena. This data point includes a newspaper article about urban heat in the same area where flooding happened.

5. Conclusions: Findings and Next Steps

The CACEM research is focused on recognising the interdependencies between people and the physical, social, political, economic, and cultural environment as part of a whole. This recognition is a key step in understanding and limiting the impact of the climate crisis across all human and non-human domains. A genuine path towards ecological transition (Dewberry, 2018; Boehnert, 2019) requires models capable of influencing social groups and territories. It also necessitates sharing the urgency of addressing digital, ecological, and social transformative processes with the aim of activating resilient innovation processes, even when temporal and spatial dimensions are unpredictable (Gunderson & Holling, 2002). Overcoming limited knowledge of both natural and anthropogenic phenomena, cultural barriers, and misinformation about a holistic concept of sustainability, as well as the impacts of climate change, can only occur through a triple process. In this process, the digital, ecological, and social components underlie a transformation through collaboration among various forms of knowledge. This collaboration unites technical and humanistic culture with every productive sector, including the creative one. When applied to design,

this theory can only be imagined as a heterogeneous set of adequate, transversal, interscalar, and interdisciplinary tools. This is achieved through initiatives that represent the result of a collective effort of imagination, aiming to systemise groups of new actors capable of understanding the potential and limits of design, technology, and cultural production. It also involves building agile, committed, and deeply participatory relationships with the context, going beyond through creative and visionary forms of design. CACEM concerns both the individual and collective levels and appears essential for operating, building, and nurturing a relationship of strategic complementarity among the various dimensions (cognitive, political, technological) that characterise the climate crisis. This is pursued through approaches, advancements, experiments, and results seeking equity in the human-environment relationship. Furthermore, CACEM represents an open-ended project where the future is considered as fundamental as contemporary desires and needs. Collective Memory thus becomes a device for activating new awareness, involving extended timelines in a lasting action akin to that of an archive. It allows us to shift our attention from immediate results to transgenerational change and resilience.

Initial findings from the early stages of the CACEM project indicate several enabling factors in fostering participatory engagement.

First, the sharing of experiences was significantly facilitated using digital tools which presented codified interaction modes. This made the process more intuitive and accessible, especially during the onboarding phase. Even if future research plans envision the development and use of open and independent digital tools, this finding highlights the importance of adopting simple, codified and accessible interfaces in order to avoid digital exclusion.

Second, the experimentation showed that participants were able to anchor their experiences related to flooding events using both visual (e.g., photographs, Streetview imagery) and textual and geolocated data, enhancing contextual relevance. This highlights the importance to consider different formats of representation and vehiculation of data to represent different aspects of the same phenomenon.

Third, the experimentation showed that although participants had diverse individual profiles and backgrounds, the shared experience of living in the same flood-affected territory emerged as a powerful common denominator. This underlines the importance of emphasising shared elements when engaging diverse publics around a collective reflection, to support inclusive dialogue and co-creation.

Looking ahead, the next steps will focus on scaling and testing these initial insights across broader and more diverse community settings. Particular attention will be given to refining the digital tools to enhance their inclusivity, reduce technical barriers, and ensure a fair and independent approach to data collection and storage. Furthermore, there will be an emphasis on developing open-source and interoperable platforms that can sustain long-term engagement beyond the initial activation phase. Future phases of CACEM will also explore how to systematise the identification of shared experiences in multi-stakeholder contexts, reinforcing their role in fostering collective resilience and situated innovation.

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