CO-CREATING VISUAL DIALOGS FOR CRISES AND EMERGENCIES: CLIMATE SCENARIOS AS OPPORTUNITIES

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Abstract
Today we live with the impacts of natural events causing complex transitions such as crises and emergencies – among them social, climate, and health – with large impacts on the experience and development of communities. Such a massive change brings an urgent need to adapt the scope and practices of design. Considering such challenges as opportunities, this paper presents two main focuses: on one hand, the importance of sharing and delivering simple visual information tools to optimize communication and interaction in critical contexts; a collaborative information kit for managing Covid-19 is one example. However, some local interpretations and practices affect the performance and involvement of effective communication for critical scenarios, constituting permanent challenges. On the other hand, emergent scenarios constitute complex transitions that stimulate new approaches to managing crises and emergencies. Here, participatory workshops that evolved from face-to-face to online platforms evidence practical ways to adapt. The cases presented here extensively utilize the Guemil Icons for Emergencies, a project developed by a team from UC School of Design, Chile (Diseño UC) and the National Research Centre for Integrated Disaster Management (CIGIDEN). Through the cases, this paper shows how exploring open tools – such as visual tools – and co-creating instances for dialog – such as participatory design – constitute approaches to the role of an adaptation defined by design, perceptions of experience provided by discovering what communities think and know. Therefore, new ways to communicate need innovative approaches to adapt to upcoming crises and emergencies. As the conclusion emphasizes, climate crises bring new opportunities and an open design approach facilitates collaboration, promoting resilient cultures; design for adaptation constitutes a starting topic.

Author Keywords
Visual; dialogs; crises; climate; adaptation; experience.

Introduction

Today, we live with the impacts of natural events causing complex transitions such as climate emergencies. In line with the topic of design adaptation, this paper explores the possibilities of developing projects that, starting from information needs, aim to contribute to dealing by design, generating the chance to co-create visual dialogs for crises and emergencies. Integrated into this complexity, design becomes a multidimensional key

resource, facilitating community communication in risk and emergency contexts. Principles of communication, information, and participatory design are explained as a part of this process. Two real study cases will be developed as examples:

- Case 1: Visual tool development involving open-access projects that integrate visual design, creative performance, and collaboration.
- Case 2: Participatory design to manage crises and emergencies that expands and integrates collaborative design into other disciplinary spheres.

Both cases complement each other in illustrating how such disruptive experiences might be adaptive by design and how they can contribute to creating new ways of approaching the management of crises and emergencies, enhancing participation. Examples demonstrate how visual information for crises and emergencies integrates visual communication and collaboration, revealing potential. Critical scenarios, such as the Covid-19 pandemic around the world, constitute opportunities for developing innovative approaches that articulate change. As this paper will present and discuss, design offers an opportunity to confront such challenges and create a culture of adaptation and resilience. Future scenarios such as the climate will bring new challenges; such final thoughts are explored in the conclusion.

Context: Crises and Emergencies

Crises and emergencies are considered a combination of local and global topics with implications for ways of living that modify design and communication, forcing us to think and act around new possibilities. Nowadays, approaches centered on risk reduction, such as those by the United Nations Office for Disaster Risk Reduction (UNDRR) (2015, 2017), constitute a paradigm in transformation: from dealing with disaster effects to a focus on preparation and prevention where approaches to communication and collaborative processes become fundamental, i.e. designing for moments such as before, during, and after a critical event (Twigg, 2015). This is defined by UNDRR (2015) as disaster risk reduction (DRR). Figure 1 illustrates a conceptual framework, with risk experience and information demands as a continuum of communication (Ramírez, 2020).

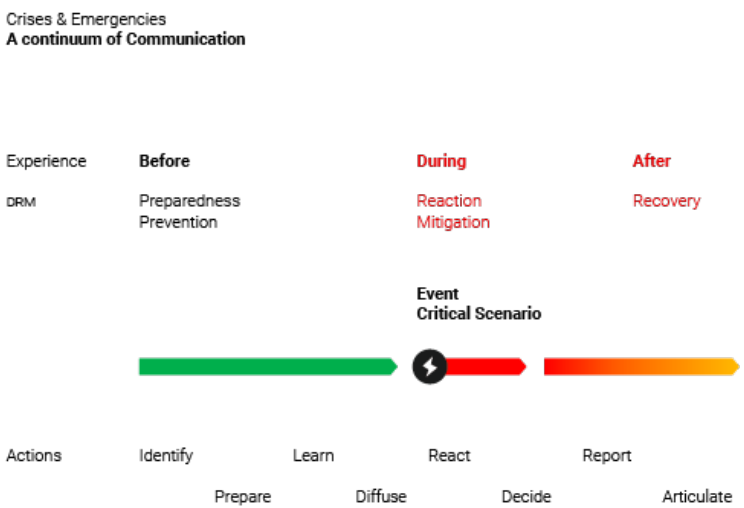

Figure 1. Conceptual framework. A continuum of communication: experience, disaster risk reduction, and actions considered in different moments (source: Ramírez, 2020).

The context of developing such activities allows for approaching design as a changing paradigm: from dealing with disasters and their consequences to the application of disaster risk reduction policies and strategies to manage risks. As observed from the experience of individuals and communities, DRR defines concrete actions, prioritized in multidimensional frameworks such as the *Sendai Framework for Disaster Risk Reduction 2015-2030* (UNDRR, 2015). Disaster risk reduction is aimed at preventing new disasters and reducing existing disaster risks. Considering the *Sendai Framework*'s priorities, such as "increase preparedness for disaster, in order to respond with effectivity and efficiency to facilitate recovery, rehabilitation and rebuild," the framework promotes the use of information tools – among them visual language-based applications – to effectively communicate critical messages, contributing to bypassing access, cultural, or language barriers (UNDRR, 2015). Such context poses essential questions and challenges for design, bringing new opportunities for developing innovative approaches that articulate experiences of adaptation, among them those for communicating the experience of crisis and emergency.

Critical scenarios emerge as activators of information and communication needs. Thus, actions – such as preparing for, reacting to, and recovery from – become articulators for designing information for crises and emergencies. However, to transform such experiences requires interactions with information to become visible, understandable, and simple to transfer into actions. It is fundamental not only to give shape to these concepts but also to provide users with the ability to understand visual languages and apply messages.

Designing for Adaptation

Design today is a reflection of contemporary challenges faced by humanity, articulated by solutions such as communication of causes, impacts, and procedures. Based on creativity

and social responsibility, designers detect needs and find solutions to facilitate everyday interactions, contributing to adapting and transforming scenarios. In all circumstances, visual information is a central part of everyday experiences. Precedents in graphic information design include visual campaigns that are educational/instructional, with the most well-known solutions including signage, infographics, or digital apps. However, such supports also have limitations, among them access, literacy, and technology. When designing for adapting to critical experiences, actions such as identifying, preparing, mitigating, and recovering become fundamental.

Information design has been defined as the art and science of preparing information to be usable by human beings with efficiency and effectiveness (Horn, 1999). As a multidiscipline, information design emerges as a response to people's need to "understand and use" everyday information, contributing to "mak[ing] the complex easier to understand and to use" (Barrat & Walker, 2005). Ideally, a designed message allows people to visualize, understand, and facilitate their decisions. Throughout their methods and developments (among them visual), diverse communication supports are developed, aspiring to be distinguishable, understandable, and applicable in multiple contexts.

In everyday contexts, interacting with information can be understood as a sequence developed in three steps: visualizing, understanding, and applying information which contributes to visualizing, seeing, comprehending, and applying visual contents that are clear, opportune, and transferable to actions (Allard et al., 2014). However such a sequence is also projectable to those needs generated by crises and emergencies, designing information is going beyond visualization to action in a permanent adaptation. Thus, designed information can impact transforming experiences in moments before, during, and after an emergency or critical event (Ramírez, 2018, 2020).

Designing information creates opportunities to prepare for potentially critical scenarios involving the climate or hazards, facilitating seeing, understanding, and applying the information for effective management of risks. In other words, optimally designed information requires advancement beyond the development of nice visuals or public relation messages: to adapt the messages to the experiences of communities at risk, it is necessary to explore and develop new ways to stimulate engagement and co-creation, focusing on meanings.

Adaptation might be considered a challenge for projects in design. Graphic elements with common interpretation can contribute to constructing meanings, then transform a visual language into action, promoting the identification of risks, preparedness, and adaptation, among other factors. However, a critical factor is that information is usually informed by local interpretations or meanings – cataloging the associations that a person can make from a particular representation such as a symbol is an example of this (cf. Ramírez, 2018, 2021).

Visual Communication as a Dialog Activator

Design today needs to facilitate everyday experiences, contributing to new possibilities and transforming realities. Design is key to recognizing and understanding problems, needs, and eventual demands, from observing to proposing creatively to transform; as Sanders (2002) states, "Discovering what people think and know provides us with their

perceptions of experience."
Considering the *Sendai Framework* priorities – such as "understand the risk of disaster" – as activations, dialogs that apply visual components to facilitate the access and discussion of scenarios add information that is relevant and meaningful, giving participants a chance to create their own interpretations (UNDRR, 2015). In this context, an emergency becomes an activator of needs, among them those of communication and information. A focus on adaptation might be an exploration of possibilities for the communication of such scenarios, empowering communities to co-create their own approaches, transforming the whole experience.

However, variables such as access barriers, disinformation, and local interpretations constitute permanent challenges for effective communication. Through simple tools and engaging creative methods such as participatory activities, these are opportunities to discuss and create meaningful interpretations in local, regional, and global contexts. For example, for discrete units of meanings such as symbols or icons, theoretically, their ubiquitous use supposes they might be interpreted in an unequivocal way intended to be universal (Boersema & Adams, 2017). However, as Mejía and Zender (2013) state, in practice, this is a controversial variable, especially in critical contexts where the message delivered is highly meaningful. To test indicators such as meaning and representational preferences, different initiatives such as user tests allow us to collect and measure interpretations. Information about performance such as precision in interpretation is then analyzed to indicate their performance, following methods based on the work of Brugger (1999), ISO (2011), and Frascara (2015). Tests reveal if each representation is associated with the expected meanings, or if there should be other factors to consider such as the cultural background, language, previous experiences, or familiarity with the represented concepts (see www.guemil.info).

Thus, from discrete solutions to the implementation of design systems' reshaping of visual communication supports, experiences facilitate nurturing dialogs from scenarios, identifying hazards, or discussing disaster risks. It is crucial to involve different participants and communities to define performance, approaching what Sanders (2002) calls "design for experiencing." Such articulation by design is a permanent call to explore innovative, open collaboration processes where design is a way of thinking-doing, a node to facilitate the exploration of new scenarios.

How does the projectual approach create adaptations? The following developments will show opportunities to explore design processes and tools, and how co-creating visual dialogs is a way to adapt and re-design the experience of an emergency by enhancing participation. Approaches to disaster risk reduction through education as reviewed in Cabello et al. (2021) evidence the opportunities to approach these emergent and critical scenarios in multiple ways, empowering collaboration and creating new ways to adapt. Two study cases are showcased in this paper; these are supplemented with examples and discussion.

Case 1. Visual Tools for Emergencies
This is a design development to create a response for stating a common language that uses icons and texts, generating information pieces that explore adaptive participation in crisis scenarios by deploying visual information in simultaneous formats. Such different

pieces are open-access and available to use both in print and digital forms. Visual design, testing, and activities are being developed, adding participative co-creation. Examples of applications include:

- **Guemil Infokits Covid-19:** Observing critical scenarios and their information needs, opportunities arise to develop new tools and involve communities. One visual language activator for communicating in emergencies is Guemil Infokit, a set of pictorial instructions for Covid-19 management. These are visual information multiplatform pieces (print and digital) that facilitate access for managing Covid-19 through simple instructional messages. Considering cultural inclusion, texts are translated by collaborators locally and around the world, so far to 15 local languages, including Quechua, Hindi, Mapudungún, Náhuatl, Kreyòl, Guaraní, and Rapa Nui, among others. Figure 2 shows this system, composed of twelve boards.

Figure 2. Guemil Infokits is a set of visual tools to manage Covid-19 risks that integrates instructional messages and texts translated collaboratively in 15+ languages.

As a simple design system, Infokits exemplifies how systemic thinking contributes to implementing simple information solutions. Besides being easy to implement in digital and physical media, these can activate multicultural dialogs, resulting in meaningful communication devices for communities.

- **Guemil Activators:** This is an experimental set of visual pieces, where activation is driven by instructional design principles: how-tos and dos and don'ts for a specific situation (i.e. tsunami evacuation or heat wave). Activators are designed to combine both pictographic and textual information to be deployed as synoptical sequences (a sign or printed piece) and as discrete images for digital supports (scrolling or animations). Figure 3 shows examples of such graphic tools being co-developed by designers and validated by researchers and communities of practice (i.e. CIGIDEN).

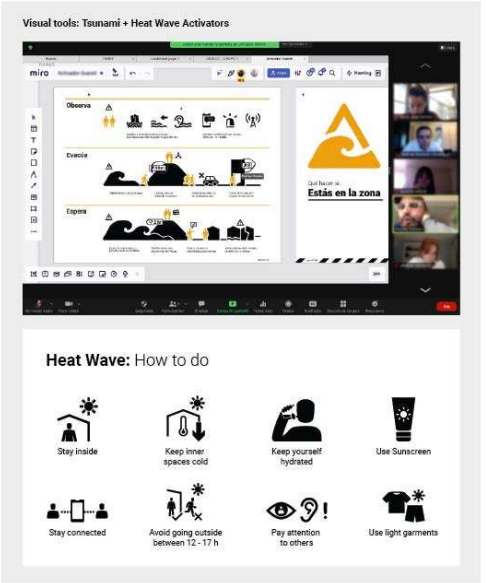

Figure 3. The graphic tools called Activators are designed to visually help users manage a critical scenario such as a tsunami evacuation or what to do in a heat wave.

A symbol set such as Activators and its information products constitute evidence of the potential role of visual language in critical scenarios. Graphic components are validated by experts and tested by users as a way to collect interpretations and measure if graphic language is effective in creating comprehensible and usable communication. As a result,

Design + Performance acts to obtain an articulator resource for the communication of risks and emergencies (cf. Ramírez, 2021).

Such a collaboration between design and validation generates a body of knowledge as content for research and development (different tools and kits can be viewed at www.guemil.info). The set also constitutes a design system that allows further participatory design initiatives, such as creative workshops, to activate dialog. Initially designed as face-to-face meetings, they were implemented as hands-on workshops, evolving to remote modes that adapted to pandemic challenges, expanding their limits. This participatory process is explained in the following section.

Case 2. Participatory Design: Adaptation with Users

Participatory design can be defined as a projectual approach where processes (i.e. involvement) are more important than outcomes. As Sanders (2002) indicates, this is "a shift in attitude from designing *for* users to one of designing *with* users." In participatory experiences, the participant becomes a critical component and designers become facilitators of the process. An outcome is usually a dialog, activated by the creative task (challenge), where the process (collective ideation) is equally as important as the result (prototypes). Co-ideation of disaster preparedness strategies with participatory activities have been described by authors such as van Manen et al. (2015). This case is mainly composed of six workshops adapted to the Covid-19 emergency (2020-2021), working with community groups from schools, research centers, and public organizations. These were organized with local organizations and academic institutions in Chile and Peru, giving shape to new ways to adapt and create transformative dialogs, from face-to-face activities to remote on-screen interactions and outcomes. An example of such a practical instance is:

- **Workshop "Visual Information for Emergencies":** As an instance first created to explore the application of Guemil Icons in educational situations, this workshop consisted of a creative activity based on an open design process and co-creative design principles, such as ideation and rapid prototyping. "Visual information design for emergencies" was a practical, hands-on workshop where participants started by discussing their own experiences in an emergency, generating dialog. Then, through templates and processes such as ideation and compositions using paper prototyping, they developed solutions in a limited timeframe (usually 60 minutes), displaying visual information in discrete signs or sequences.

Workshop outcomes are sequences of visual instructional or signage information, combining text, icons, and colors to identify hazards, manage risks, and transform the scenario originally defined. Both internal dialogs and external presentations enrich the participatory experience. For the implementation, diverse tools and digital platforms were explored, i.e. Miro, Unity, and Github, among others. All workshop resources are available from the Github repository (www.github.com/Guemil). Figure 4 illustrates the results from such experiences.

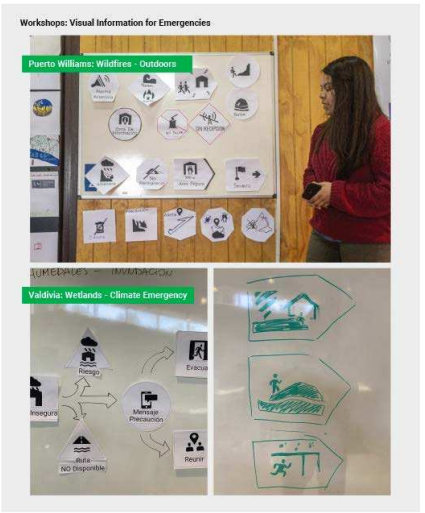

Figure 4. Participatory workshops applying rapid-prototyping. Puerto Williams Chile, 2020: the last in-person workshop before the pandemic, topics referred to outdoors and wildfires in Patagonia. Then, in late 2022 in Valdivia, Chile, topics referred to local climate emergencies such as floods and wetlands.

- **Disaster Imagination Game (DIG):** A creative, hands-on method for disaster drills conducted in community-based workshops, DIG was originally developed in Japan and described in Huamán et al. (2019). This creative game uses a cartographic representation as a base for participants to work on a given challenge – a disaster scenario. They define how to deal with different situations, establishing roles and activities to solve the scenario through collaboration. Returning from online to face-to-face activities, we adapted DIG principles to explore ways to connect when working with communities. Figure 5 illustrates the DIG application, with a map of a local school being used to work on a tsunami evacuation challenge with the community in Cartagena, Chile.
- **CreaGuemil:** A web application that facilitates creative working with remote participants, CreaGuemil was designed as a game interface based on the Unity game engine. It is a digital adaptation of the "visual information for emergencies" workshop, designed to facilitate their online implementation during the Covid-19 crisis. It was supported by the Chilean National Arts Funds, Design Research, FONDART 2019. Figure 5 shows the results of participatory sessions during 2020 and 2021, applying DIG in massive online sessions using CreaGuemil with nearly 120 participants.

Figure 5. Participatory workshop in Cartagena, Chile using the DIG technique, identifying risks and hazards for a local school community in collaboration with CIGIDEN. An outcome from the remote workshops conducted using the web app CreaGuemil (2020, 2021).

Discussion

As shown, designing for the experience of crises and emergencies brings opportunities for new creative visions that become meaningful for individuals and communities. The cases highlighted illustrate how design requires continuously evolving for adaptation: from symbol sets to an exploration of multi-platform solutions to stimulating creative dialogs involving sharing how communities approach their own critical experiences.

Regarding specific tools and methods for approaching critical scenarios, different design-led approaches allow the designer to make, reflect, and involve communities in co-creating new ways to dialog. Such a development of instruments and platforms enhances their implementation, showing how to deploy new possibilities for facilitating the adaptation of communication through simple design systems and opening the scope to scenarios on global and local scales. Exploring needs and meanings and combining applied methods and tools, visions, ideas, and local adaptations to manage risks reduces vulnerability and fosters resilience. Most activities are customizable and can be integrated with others already available, making it possible to combine specific tools, procedures, and practical

principles. Such cases demonstrate how it becomes possible to explore innovative ways of creating conversation and networks through the adaptation of collaborative platforms.

It is fundamental to continue promoting open access to information, collecting interpretations, and involving interactions from those who participate, in parallel with refining creative processes. Drawing on a permanent adaptation, new roles for design become possible (i.e. designers as facilitators in participatory processes). However, beyond each of the solutions and systems presented, there are practical aspects to manage, and some questions to address through the implementation of different supports and dynamics as ways to manage critical scenarios for projectual disciplines. Going beyond the cases presented above, additional opportunities for collaborative development connecting topics in design and emergencies are:

- The "Integral Plan of School Safety" (Plan Integral de Seguridad Escolar (PISE) Chile) (2018). This is a public policy, oriented to integral safety through prevention, mitigation, and preparedness, considering challenges such as climate adaptation as a part of their integral approach. Topics such as drought or heavy rains evidence how exploring topics such as emergencies and combining education policies allow for collaboration between multiple actors. As an example, the participatory online workshops conducted during the Covid-19 crisis were presented in a Chilean National Conference for Public Education in December 2020.
- The Design for Emergencies workgroup from UC Chile School of Design. This multidisciplinary group involves design teaching applied to research and development, covering topics in crises, emergencies, or preparedness as opportunities to explore, prototype, develop, and test solutions by applying products, services, information, and user experiences. Collaborating with scientific research centers such as CIGIDEN and public organizations such as the National Agency for Emergency (ONEMI), their projects and results give shape to their research and development line in Design for Resilience, published on the website www.d4rs.info (2020).
- The *Workshop Guidebook Design for Emergency Management* is a practical guidebook edited by a multidisciplinary team at the Design Network for Emergency Management (www.DNEM.org , 2019). It is intended for designers, emergency managers, and other interested parties and provides an easily accessible overview of visual language, iconography, cognition, rapid prototyping, evaluation, and ethics in emergencies. The guidebook is available in both print and digital formats and includes activities such as design workshops for emergency management.

Such opportunities demonstrate the importance of promoting interdisciplinary collaboration and embracing a permanent adaptation. Empowering communities with simple and accessible platforms for participation and preparedness, such projects combine tools for interaction, validation, and a permanent transformation of the experience in order to adapt to incoming scenarios, since "discovering what people think and know provides us with their perceptions of experience" (Sanders, 2002). Such topics constitute reflections to conclude this paper.

Final Reflections: Opportunities for Adaptation

Approached from a design perspective, the cases presented here show how crises and emergencies constitute challenging topics to create participative and creative dialogs to deal with adaptation. In recent times, limitations such as those from the Covid-19 global crisis have constituted opportunities to explore and develop new ways to create visual information supports, expanding their reach as a tool for adaptation to upcoming scenarios such as multicultural exchanges.

Transforming experiences is a permanent opportunity for collaboration and creating cultures of resilience: as the cases demonstrate, designers consider such perceptions a new way to explore joint solutions and co-develop possible futures with new ways to adapt through dialog, imagination, and interpretation. Collaborative design possibilities stimulate discussion of tools and activities such as open platforms and participatory instances. Following the presented cases, opportunities for adaptation appear by applying visual languages, education, and information:

- **Visuals as a Common Language**
  It is important to focus on common challenges that are permanently open to inclusion as a topic for workshops and conversations. Participants provide their perceptions of experience on local and global scales, sharing a visual language for adaptation (i.e. open-access). Visual tools allow us to contextualize, dialog, and apply, promoting a collective consciousness about critical experiences. By generating and verifying common languages, it is possible to co-create possible futures, contributing to mitigating the effects of events that turn into disasters. Facilitating open access to information is key to confronting coming challenges.
- **Educate for Adaptation**
  Another opportunity to amplify the action field of design is to create collaborative networks that face adaptation at local and global levels; education is a key asset to construct such adaptation as a permanent task. Multicultural variables are also key to facilitating access to visual tools, instruments, and methods that allow us to visualize hazards or eventual crises, understand scenarios, and activate preparedness – for example, those derived from displacements or pandemics. Moreover, design based on creative collaboration constitutes opportunities for visualizing local knowledge; a long-lasting impact is oriented to educate for resilience.
- **Information for Preparing**
  A third opportunity is to design information systematically, integrating multiple supports and applications from those needs that are promoted by communities towards the facilitation to generate their own instruments and methods. Information systems can facilitate preparedness and adaptation to incoming scenarios. Evolving from discrete solutions such as symbol sets to design systems, new applications are being explored for visual communication created with communities. The cases presented here go beyond the graphical exercise of developing supports or

campaigning towards deploying creative possibilities, activating communities, and facilitating measurable and meaningful dialogs. Sharing design principles allows us to observe the reach of information by involvement, permanently inviting us to participate in interpreting meanings for risk, hazards, or disasters. All contribute to preparing, adapting, and transforming the experience.

Climate Scenarios: The Next Adaptation

As mentioned before, critical scenarios become opportunities for participation. Aiming to amplify the field of action, identifying common challenges as a matter of concern is key. Such scenarios demand new roles, approaching both practical and collaborative levels. Climate challenges are an urgent topic to manage with design. The projects shown provide the opportunity to explore both creative and social approaches, balancing reflection and doing. Risks, crises, and emergencies will continue bringing challenges and changing behaviors, systems, and environments for design makers and practitioners. Such transformations bring massive challenges that constitute opportunities to explore and develop innovations for permanent adaptation. In a rapidly changing context, climate impacts need open-access design approaches: such solutions materialize in information products and creative dialogs, contributing to reducing the perception of vulnerability, helping to identify potential risks, and aiding in transforming the experience.

Specifically, visual communicators must question and adapt, from the creation of messages containing meaningful contents to the representation of global identities while also considering singularities in a process that involves communities and creates ways of adaptation. How do we activate adaptation by design? In our experience, information designed with active participants can enhance preparedness, contribute to decision making, and create adaptive ways to face incoming scenarios.

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