

# Interacting With Climate Change: A Survey of HCI and Design Projects and Their Use of Transmedia Storytelling

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**Abstract.** Climate change is arguably one of the most debated issues today. The scale and global reach of this crisis doesn't afford a universal solution and requires widespread global mobilization. Public engagement is essential for the success of any initiative on this topic. However, sometimes communicating the facts is not enough. Interactive storytelling and transmedia narratives have an important part to play in communicating climate change, especially in shifting from a mere transmission of data to a narrative that is more engaging, positive and action focused, that considers diverse audiences and active participation. Following this premise, we conducted a survey on climate change applied research projects addressing the general public to understand how the fields of interactive media, HCI and Design are using transmedia narratives. The intention of this study is to gather what has been done regarding these topics and the strategies used, to further the debate among the community and inform future research.

**Keywords:** Communication; Climate change; Transmedia; Storytelling; Design; Interaction

## 1 Introduction: Climate Change – A Communication Challenge

Climate change is possibly the most pressing crisis of our time [1, 2]. All fields of knowledge can contribute to help mitigate the consequences of the Anthropocene and solutions to complex global problems require a multidisciplinary perspective. ICIDS theme for 2021 is “Interconnectedness and Social Impact” and it perfectly encompasses this need to connect diverse stakeholders and audiences to address the need for climate action in all areas of society – from individual action to systemic political and social shifts. Effective communication is a crucial part of this process [3, 4], and *how* this crisis-related information is imparted is of paramount importance to the success of the exchange. In this survey, we will map what has been done in applied research regarding transmedia storytelling as a way to foster engagement with the climate crisis.

Because of its pressing nature, the discourse around climate change has been mainly one of urgency, alerts, and, in many cases, “end-of-the-world” rhetoric. This way of communicating climate change has been effective in highlighting the scale and urgency of the issue [5, 6], but also in associating the topic with the frames of fear, anxiety and even hopelessness [7, 8]. Climate change is now a much debated and mediated issue, but arguably what we need now are effective ways of engaging the general public with positive, action-focused exchanges that will lead to action [9–11]. We argue that communication techniques such as storytelling and transmedia can play a crucial part in shifting the dialogue from the negative, defeatist tone into a more positive, entertaining, engaging, and inclusive one. Therefore, understanding what has been done to date will help position future work in these areas.

Interactive digital narratives (IDN) is a rapidly evolving area of research [12, 13] and transmedia narratives can contribute to the development of the field, especially when dealing with applied research. Previous work [14] has analysed how the HCI research community has been addressing climate change to the general public, especially their interaction, storytelling and media choices. In this study, we take this analysis further by doing a survey on interactive media, HCI and Design applied research focused on climate change interactions and looking specifically into their media strategies, with a special focus on transmedia. This analysis used the Grounded Theory Literature Review method [15]. By looking into the databases of ICIDS, SIGCHI, Interact, DRS, TDJ, JDR, DS, and She Ji it returned 680 results for the keywords “climate change”, “climate crisis” and “global warming” for Jan. 2010 to Dec. 2020. From these results, we gathered N=40 interaction projects that used storytelling. A keyword analysis points to a limited focus in narrative-related topics. Further inquiry on their media strategies concluded that n=33 use *mono-media*, n=2 use *multimedia*, and n=5 use *transmedia*. We focused on the five transmedia projects to gather their narrative choices based on current proposals for effective climate change communication.

## 2 Interactive Storytelling, Transmedia and Climate Change

### 2.1 The Message: Using Interactive Storytelling

In this analysis, we consider the definition of storytelling as a form of discourse shaped by an imaginative process of meaning-making, which organizes knowledge and experience according to a narrative form [16]. Therefore, we investigated how the projects transmitted their message and if there was an effort to transform the information, the raw data, into a form of structured discourse that would guide the audience in their process of interpretation.

When creating interactive experiences related to climate change, simply presenting data most likely will not engage the majority of people without a scientific background. Climate literacy is an important step in this communication path, but knowledge by itself isn’t likely to be enough for people to change their behaviours, promoting collective or systemic change. Other issues like incentives, barriers to action or social norms need to be addressed as well [17]. By using interactive storytelling in crafting

messages, communicators can leverage the use of emotion as it is a central part of people's decision making and ethical judgments about climate change [18], with messages adapted to their perceptions and values [19]. *Games for change*, for example, encourage game creators and social innovators to incentivize real-world change through games and immersive media [20]. Environmental topics, including climate change, are already being prolifically explored through this interactive venue.

The complexity of the issue and the diversity of people being engaged means that no single story will trigger widespread attention [21]. Likewise, physical vulnerability in general does not impact people's risk perceptions, but political or ideological affiliation and connection to local impacts of climate change does [22]. These results suggest that crafting a narrative linking climate change to local impacts is more effective than generalised information.

When discussing the importance of a more positive and action-focused story associated with climate change, highlighting paths for action are an important step in the interaction. If the information is not accompanied by specific recommendations on how to actually respond, the audience might just accept the fatalism of the situation and won't be prompted for action [23]. Furthermore, overdramatization can easily be exploited by skeptics to discredit the importance of the issue [24]. Pratten [9] advocates for this action and solution focused approach in a call for *transmedia for change* (T4C) stating that storytellers should engage the audience with positive messages that inspire and motivate, and that they should provide solutions to guide the audience in their path towards change.

Going forth, climate change storytelling is increasingly focusing on this need for change and action, and the best methods to achieve these goals. The present analysis of applied interaction experiences about climate change intends to understand how researchers have been developing these narratives, including if the message focuses on generalized or local issues, if it presents actionable steps, and if the storytelling/narrative process is a focus of the research.

## 2.2 The Media: Using Transmedia Strategies

Definitions and transmedia structures have been extensively debated in the academic community. We decided to focus on the definition of transmedia as "any story that is told through more than one medium" [25]. Transmedia storytelling allows for an exploration of the information through multiple media outlets, from more analogue to more digital, from more direct to more immersive. The challenge with crafting a transmedia story is taking into account the overall narrative so the different channels all work as a larger storytelling system [26]. Unlike multimedia strategies that convey the same content through different media (e.g., the same game that is available through a website or an app), transmedia supports the expansion of content in each channel. Another important aspect in transmedia is encouraging audience's participation [27].

Robert Pratten [28] has divided transmedia storytelling into three types: franchise, portmanteau, and complex. In transmedia franchise, we have multiple stories through multiple media. These stories are part of the same overall narrative but are somewhat independent, so they can be enjoyed together or as standalones, and allow for different

entry points to the narrative. In transmedia portmanteau, one story consists of multiple media that are somewhat dependent on each other for a good enjoyment of the experience. Complex transmedia is a combination of the previous two. We will use this classification in the transmedia project analysis.

Concerning climate change communication, if we consider the enormous scale of potential audiences to address, a transmedia project could potentially reach a wider range of people with different social backgrounds, interests, and even political affiliations. Each part of the story is a possible entry point to the discussion. Henry Jenkins calls transmedia storytelling “entertainment for the age of media convergence” [27], an age when computing, communication and content are brought together as a consequence of the digitization of media content and the ubiquitousness of the Internet. This media convergence transformed the established media landscape and allowed for the emergence of entirely new forms of content and storytelling. Furthermore, he presents this type of transmedia experience as entertainment for the age of collective intelligence – a shared or group intelligence that comes from collaboration and collective efforts from many individuals. This prescient notion has taken a deeper meaning recently, with many scholars arguing for more inclusive, plural, socially aware perspectives in sustainability and climate change research that account for participation, co-production and collective action [29–36], and for community and social interaction [37, 38]. The need for systemic change highlights the importance of these strategies [39–46]. Besides, digital media practitioners now need to work on services, experiences and networks that take into consideration these complex socio-technical systems [47].

In any transmedia strategy, the media literacy of the audience in question needs to be carefully considered. In a world of participatory culture, for example, true engagement comes only from active participation. If the person addressed does not possess the tools to actively take part in the exchange, then communication fails. However, if the medium is adequate for the public it addresses, the possibilities are endless. Users find transmedia stories engaging and versatile, evoking creativity and collaboration [48]. Participatory mechanisms allow for constant feedback and participation from the audience. Especially for social causes, this willingness for participation can be harnessed to help solve problems [49]. The potential offered by interactive media allows for storytelling to explore more deeply the intersection between personal experience and community action, and for a complex topic like climate change, this is a crucial factor to explore.

Nowadays, communicators deal with a complex media landscape where multiple media channels, shared authorship, social networks, sharing and interaction, are an everyday reality. Interactivity and entertainment should be leveraged to increase public engagement and allow for diverse pathways for different audiences to enter the conversation. With this in mind, we set out to understand if and how researchers are using transmedia in climate change related interactions.

### 3 Survey: Interactive Media and Transmedia for Change

#### 3.1 Interaction Projects on Climate Change: Analysis Criteria

For this survey, we conducted an analysis of interaction projects focused on climate change that made use of storytelling. We adopted the Grounded Theory Literature Review method [15] for a systematic and rigorous analysis from which we could derive themes and opportunities for future work. The analysis focuses on applied interaction narratives, so we looked at interactive media, human-computer interaction (HCI) and design. Therefore, the following databases were reviewed: ICIDS proceedings, ACM SIGCHI proceedings, IFIP-13 Interact proceedings, the Design Research Society proceedings, The Design Journal, the Journal of Design Research, Design Studies journal, and She Ji: The Journal of Design, Economics, and Innovation. These libraries allow for a multidisciplinary, comprehensive scope with an international representation.

The data selection criteria were: (1) climate change as the main topic of the project; (2) target audience: a general public outside academia; (3) projects that have an interaction component; (4) projects that use storytelling to convey a message.

The analysis was restricted to the past decade – from Jan. 2010 to Dec. 2020 – for timewise relevant results, and to the search terms “climate change”, “climate crisis” or “global warming” to focus on climate change related narratives.

The initial search returned 680 results, divided as follows: ICIDS: 7; SIGCHI: 395; Interact: 38; DRS: 102; TDJ: 58; JDR: 17; DS: 16; She Ji: 47. Each result was scrutinized through its title and abstract. If it mentioned an interaction or communication project, it was added to the list. This list was then refined by checking if the projects corresponded to the first three points of the selection criteria, resulting in a final list of 77 projects: ICIDS: 3; SIGCHI: 43; Interact: 9; DRS: 12; TDJ: 6; JDR: 1; DS: 2; She Ji: 1. Lastly, we analyzed if the projects used storytelling to convey a message – criteria four – and ended up with a final data set of 40 projects: ICIDS: 3; SIGCHI: 26; Interact: 2; DRS: 4; TDJ: 4; JDR: 1; DS: 0; She Ji: 0. Therefore, from the initial list of 680 results of papers and articles that mentioned climate change, 40 (5,9%) mentioned applied projects for the general public that use storytelling strategies to communicate a message. In the following section, we present further questions asked of this final dataset with the purpose of better understanding the storytelling strategies used.

#### 3.2 Keyword Analysis

In a first stage, we surveyed the keywords of each of the 40 papers, to gather if narrative, storytelling, or media choices were a key concern of the projects. Related with these issues, we found the following keywords: *visual rhetoric* (n=1); *visualization* related keywords (n=4); *design fiction* (n=2); *interactive narrative design* (n=2); *media narratives* (n=1); *storytelling* (n=1); *tangible narrative* (n=1). No project mentioned *transmedia* in their keywords, and one instance of *interactive narrative design* and *media narratives* are from the same article. There is some interest in the exploration of the visualization of data and a limited mention to narrative-related topics.

The fact that our dataset consists of 40 projects that explore a storytelling component points to the importance of using these strategies. However, the lack of specific keywords about storytelling, media use or media strategies, suggest that these areas of research are not one of the focuses of the evaluations of these works. The applied projects organically use storytelling as part of the message creation, but its development and potential is generally not one of the objects of study.

### 3.3 Analysis of Media Strategy

Since our dataset is already a selection of applied research that uses some form of storytelling to convey information, we intended to better understand the strategies connected to the use of interactive media. Therefore, we asked of our data set if the projects used one of the following media strategies: a) *mono-media* – one media output, either digital or analogue; b) *multimedia* – the same content presented in different media platforms; c) *transmedia* – different parts of the story conveyed across different media.

The analysis resulted in: a) *mono-media* n=33; b) *multimedia* n=2; c) *transmedia* n=5. Results highlight a minority of project adopting multimedia or transmedia strategies to communicate climate change and clear preference for the use of mono-media.

### 3.4 Analysis of Transmedia Application

In this section we look in more detail at the five projects that employed transmedia, including: a) summary of the project and its story/message; b) transmedia strategy employed (based on Pratten’s classification [28]); c) if the message focuses on local or generalized topics; d) what is the audience’s participation component.

1. *London Phenological Clock* [50]: a) Uses analogue clocks and a data visualization website to represent the annual timing of life cycle events for species in urban ecosystems. b) Transmedia franchise strategy. c) Local impacts: local plants and animal’s characteristics and habits. d) Participation component: the data is gathered by citizen scientists or volunteers from their neighborhood.
2. *Vox Populi* [51]: a) Uses a card game, software package support, and theatre performance to build an interactive narrative about the importance of media for elections, fake news, and the refugee crisis. This project is part of the ongoing transmedia storyworld “Shatterland”. b) Transmedia portmanteau strategy. c) Generalized topics (even though based in two European cities for an European context). d) Participation component: players have an active role inside the interactive story.
3. *Spilltime* [52]: a) Formed of three objects, each focusing on a different form of showcasing and experiencing one’s carbon footprint – a water tank, a wearable, and a mirror, also with the support of a coach. b) Transmedia franchise strategy. c) Generalized topics. d) Participation component: data based on user action.
4. *Angstfabriek* [53]: a) An interactive installation that uses different media to tell a story about people’s fears, including climate change – VR, corporate-like videos, QR code scans, analogue elements in lockers, etc, as part of the same interactive

- narrative. b) Transmedia portmanteau strategy. c) Generalized topics. d) Participation component: audience is part of the live experience and plays a part in the story.
5. *Econundrum* [54]: a) A sculpture and an app to input data and allow for user participation. The physical data sculpture represents the small community's food habits and the consequent carbon emissions. b) Transmedia portmanteau strategy c) Local impacts: individual's choices and their impact. d) Participation component: data inputted by the participants.

The five projects are quite balanced in terms of transmedia strategy used with  $n=3$  for Transmedia portmanteau, and  $n=2$  for Transmedia franchise. Likewise for the focus on local or generalized topics, with  $n=3$  for generalized and  $n=2$  for local. In terms of audiences, *Spilltime* considers the advantages of having different objects with different characteristics for different users – one possibly appealing more to an 80-year-old person while another to a seven-year-old child. The *London Phenological Clock*, being a physical installation and a data visualization website, allows for interaction with different types of users in different contexts. The *Vox Populi* interactive narrative, the *Angstfabriek* installation, and the *Econundrum* sculpture are experiences where the different media work for the same users. Nevertheless, having different outputs with varying levels of complexity and participation can help in considering users with varying media literacies even within the same experience.

### 3.5 Analysis of Suggestions for Action as Part of the Message

As discussed in 2.1, Pratten advocates that projects should provide solutions as a “pathway to success”, and we also pointed to the importance of associating new, more positive narratives with climate change. Therefore, we asked of the projects if they showcase solutions or actionable steps as part of the exchange. The results were: a) *No* ( $n=27$ ); b) *Yes* ( $n=13$ ).

If we look specifically at the five projects that used a transmedia strategy, the results are: a) *No* ( $n=4$ ); b) *Yes* ( $n=1$ ). The sample is very limited, but these results point to the need of developing more action-focused narratives within this subset of storytelling.

## 4 Discussion and Future Work

Discussions around *transmedia for good*, *transmedia for change* and *transmedia activism* have been around for years. This survey returned five transmedia projects linked to climate change topics to an audience of non-experts. This result points to a relative lack of actual applied research of these concepts. Nevertheless, 2020 was the year with the highest number of projects found in general, and all five transmedia projects are from 2017 and onwards, with two from 2019 and one from 2020. The growing interest in the topic and consequent increase in applied research is encouraging.

As Pratten states: “If future projects are to create greater impact, they need to connect to people where the people are – they're mobile, they're in the real world and of course they're across platforms” [9]. As highlighted in section 2.2, using a transmedia strategy to communicate climate change topics has the potential of engaging multiple audiences

with different characteristics and media literacies and engage them with a complex topic in a way that connects with them. However, deeper analysis on the impact and efficacy of these strategies when compared to others still needs to be further developed. Especially with a topic like climate change with long-term consequences and applications, testing of these strategies is challenging and new methods to analyze communication effectiveness need to be considered.

The need to shift climate change communication towards more positive stories is especially pressing since our survey only returned one transmedia project that communicated explicit suggestions for action. Pratten's call for positive communication echoes other scholars' [10, 11, 55, 56]. One way to support positive climate action is focusing more on systemic change and not only on individual behavior [36–38, 43, 46, 57]. Informing and empowering action related to social, political, and community issues, and system changes, can help avoid a defeatist narrative.

Other sources of inspiration for future work in applied climate change communication are the more inclusive and diverse perspectives being debated around sustainability and biodiversity. Many researchers are pressing for a deeper consideration of non-human agents and cohabitation [58–61], more-than-human perspectives and decentering humans in design [50, 62], more-than-human participation and co-production [29, 30]. Transmedia storytelling presents an exciting avenue of transposing these theories to design applications. These perspectives can lead to transmedia storytelling that engages audiences outside academia with nature-related issues through alternative lenses, as is already being explored by some research projects [63–66]. They are inspiring pathways for explorations in *transmedia for change*.

The way the message is crafted, the story it tells, and the media used, are essential elements in the success or failure of the communication exchange. However, these aspects are normally not the focus of the papers analyzed. Likewise, projects that we can consider using interactive storytelling or transmedia strategies don't study the impact of these communication choices. Future work in climate change related interaction should consider the impact of the different aspects of the narrative construction and their efficacy. Interactions related with this pressing topic have multiple challenges to overcome and engaging, participatory and impactful digital experiences are a versatile and stimulating entry point into the climate dialogue.

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