

Transmedia Narratives And Environmental Education In The Digital Age: Quantitative Analysis Of Public Perception Of Climate Change Through Social Media

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Summary

In the digital age, transmedia narratives have established themselves as effective tools for the dissemination of environmental content, especially through social networks. This article quantitatively analyzes the public perception of climate change on platforms such as Instagram, TikTok and X (formerly Twitter). Through digital surveys and social interaction analysis, we study how transmedia content influences users' environmental awareness. The results reveal a positive correlation between exposure to transmedia environmental content and the increase in the perception of the urgency of climate change. This study offers new perspectives for the design of effective educational campaigns aimed at sustainability.

Keywords: Transmedia narratives, climate change, social networks, environmental education, public perception.

INTRODUCTION

Climate change represents one of the greatest threats to the ecological, social and economic balance of the planet. Despite growing scientific evidence on its impacts, public perception and citizen action still face significant challenges related to misinformation, indifference, and lack of understanding about the urgency of the problem (Anderson et al., 2022). In this sense, digital media—and in particular social networks—have emerged as key spaces for the construction of environmental discourses, as well as for the dissemination of ecological knowledge and values (García-Ruiz et al., 2021). Digital transformation has favoured the emergence of new communication formats that break with the traditional one-way logic. Transmedia **narratives** make it possible to tell fragmented environmental stories across multiple platforms, actively engaging the audience as a prosumer – that is, as a producer and consumer of content – (Scolari, 2021). This form of storytelling can strengthen the social appropriation of environmental knowledge, as it articulates visual, sound, emotional, and interactive elements that resonate with different digital audiences (Jenkins et al., 2020; Lejarazu & León, 2023). In the field of **environmental education**, transmedia approaches represent a pedagogical innovation by promoting significant learning, especially among young generations accustomed to digital culture. Various recent studies highlight that transmedia content on platforms such as TikTok,

Instagram or YouTube enhances ecological literacy and motivates collective actions in the face of problems such as deforestation, irresponsible consumption or ocean pollution (Cabrera et al., 2022; Moya et al., 2023). Likewise, the emotional dimension that characterizes digital narratives directly influences the public perception of climate change. According to Leiserowitz et al. (2021), the use of powerful images, personal testimonies, and audiovisual representations facilitates an empathetic understanding of the phenomenon and reinforces the sense of urgency. In this context, social networks not only act as channels of information, but also as scenarios for activism and environmental mobilization, where the transmedia narrative can play a central role in shaping new forms of ecological citizenship. Based on this panorama, the present study aims to quantitatively analyze how transmedia narratives disseminated on social networks influence the public perception of climate change. It is suggested that exposure to these contents is correlated with greater environmental awareness and a proactive attitude towards ecological challenges. This research seeks to provide empirical evidence that allows the design of more effective communication and educational strategies for sustainability in the digital age.

Theoretical Framework

The theoretical framework is structured around three fundamental axes: transmedia narratives as a communication strategy, environmental education in digital environments and the public perception of climate change through social networks. Each of these components is part of an interconnected media ecosystem that redefines the way environmental knowledge is constructed in contemporary society.

1. Transmedia Narratives and Environmental Communication

Transmedia narratives involve the development of a story or message that unfolds across multiple platforms, where each channel offers a unique contribution to the construction of the narrative (Jenkins et al., 2020). This approach not only improves the reach and diversity of audiences, but also allows for greater citizen participation, a key aspect in environmental awareness processes (Scolari, 2021). In the ecological field, transmedia narratives have been used in awareness campaigns that articulate videos, podcasts, illustrations, social media posts, and live events to generate an immersive experience around climate change (Lejarazu & León, 2023). This strategy takes advantage of the emotional and narrative potential of the different formats, promoting empathy, identification and collective action.

Table 1. Key Elements of Transmedia Storytelling Applied to Environmental Issues

Narrative element	Description	Applied example
Multi-platform	Using Diverse Media to Tell an Environmental Story	Instagram, TikTok, YouTube
Active participation	The audience contributes, reinterprets or expands the message	Collaborative hashtags (#FridaysForFuture)
Fragmented content	Each medium contributes a part of the story	Documentaries + clips + memes

Emotion as a connector	Use of visual and sound elements that generate emotional impact	Testimonies of affected communities
Virality	Ability of the message to spread quickly through networks	Viral Videos of Climate Catastrophes

(Source: Adapted from Jenkins et al., 2020; Lejarazu & León, 2023)

2. Environmental Education in Digital Environments

Environmental education has evolved from traditional approaches to models based on participatory culture and media literacy (Cabrera et al., 2022). In digital environments, educational content is adapted to the languages of each platform, generating more accessible, attractive and contextualized experiences. According to García-Ruiz et al. (2021), environmental education mediated by digital technologies allows students to develop critical and transformative competencies, facilitating the understanding of complex problems such as climate change from an interdisciplinary perspective. TikTok, Instagram Reels, and YouTube Shorts have become unconventional but effective pedagogical resources, especially for young digital natives (Moya et al., 2023).

The educommunicative approach emphasizes the subject's ability to construct knowledge from interaction with the media. In this sense, teachers and communicators must act as mediators who integrate audiovisual languages, emotional narratives, and verified scientific data (Leiserowitz et al., 2021).

Table 2. Comparison between Traditional and Transmedia Environmental Education

<i>Aspect</i>	<i>Traditional education</i>	<i>Transmedia Environmental Education</i>
<i>Main channel</i>	Classroom, books, talks	Social media, interactive videos, gamification
<i>Student Role</i>	Passive Receiver	Active Prosumer (produces and consumes content)
<i>Motivation</i>	Academic	Emotional, social, cultural
<i>Evaluation</i>	Written tests	Impact on networks, behavioural changes
<i>Temporality of learning</i>	Punctual (school time)	Continuous, multiformat, asynchronous

(Source: Adapted from Cabrera et al., 2022; Moya et al., 2023)

3. Public Perception of Climate Change and Social Media

Public perceptions of climate change have been shaped in large part by the media, but today it is social media that plays a central role in shaping it. These platforms act as discursive spaces where users reinterpret environmental reality, legitimize voices, and share experiences that generate collective meaning (Anderson et al., 2022). Recent studies confirm that the type of content consumed on social networks—especially those with visual and emotional charge—directly influences the way in which the severity of climate change is perceived (Leiserowitz et al., 2021). The accessibility and personalization of content on networks allows people to develop environmental awareness based on their interests, beliefs and territories. In addition, the viralization of certain ecological content (such as forest fires, heat waves, or youth protests) creates peaks of public attention that can be used to influence public opinion and the political agenda (Cabrera et al., 2022).

METHODOLOGY

This research adopts a **non-experimental, cross-sectional and correlational quantitative** approach, with the aim of analyzing how transmedia narratives disseminated on social networks affect the public perception of climate change. This design was chosen due to its effectiveness in establishing relationships between variables without manipulating them, through data collection and statistical analysis (Hernández-Sampieri et al., 2020).

RESEARCH DESIGN

The study was carried out between January and April 2025, covering three Spanish-speaking countries with a strong presence on social networks: **Colombia, Mexico and Spain**. A non-probabilistic sampling strategy was used, for convenience, aimed at active users on Instagram, TikTok and X (formerly Twitter), selected for their manifest interest in environmental content.

PARTICIPANTS

A total sample of **600 participants** (200 per country) aged between 18 and 45 years was obtained. Inclusion criteria such as internet access, regular participation in social networks (at least 5 times a week) and previous exposure to environmental content were guaranteed.

Table 1. Sample Features

Country	Number of participants	Middle Ages	Gender (%F / %M / %Other)
Colombia	200	27,6	58% / 40% / 2%
Mexico	200	29,1	54% / 44% / 2%
Spain	200	28,4	60% / 37% / 3%
Total	600	—	57,3% / 40,3% / 2,4%

(Source: own elaboration)

DATA COLLECTION TOOLS

Two main techniques were used for data collection:

1. **Structured online survey**, applied through digital forms distributed by email and social networks. The questionnaire was validated through expert judgment and pilot tests.
2. **Digital content analysis**, which included the systematic review of 150 viral posts on TikTok, Instagram and X between 2022 and 2024, related to climate change.

Table 2. Operational variables and indicators

MAIN VARIABLE	DIMENSIONS	SPECIFIC INDICATORS	MEASUREMENT SCALE
EXPOSURE TO TRANSMEDIA NARRATIVES	Platform Type	Most Frequently Used Social Network	Nominal
	Content Format	Video, infographic, podcast, meme, narrative thread	Nominal
	Exposure frequency	Number of times per week you view environmental content	Ordinal (rango 1-5)
PUBLIC PERCEPTION OF CLIMATE CHANGE	Level of perceived urgency	Degree of concern about the impact of climate change	Likert (1 to 5)
	Behavioral changes	Actions taken after viewing content (recycling, etc.)	Nominal/Multiple Option

(Source: Adapted from Leiserowitz et al., 2021; Cabrera et al., 2022)

Procedure

The methodological process was structured in three stages:

1. **Design and validation of the survey instrument:** A questionnaire with 20 items was developed, reviewed by 3 experts in environmental communication and applied in a pilot sample (n=30) to correct errors of understanding and ambiguity.
2. **Data collection:** The survey was active for six weeks. In parallel, the most viral publications were identified using digital analysis tools such as Metricool, Buzzsumo and CrowdTangle.
3. **Statistical analysis:** The data were processed using SPSS v.28 software. Descriptive analyses, Spearman's correlation tests, and analysis of variance (ANOVA) were used to evaluate significant relationships between variables.

Ethical considerations

The ethical principles of anonymity, informed consent and confidentiality of information were respected. The participants signed a digital consent, and the study was approved by a university institutional ethics committee (minutes No. 045-2025).

RESULTS

The results of the study are presented in three main blocks: (1) descriptive analysis of exposure to transmedia narratives; (2) public perception of climate change; and (3) correlations between both variables. The data were processed with SPSS v.28 software, using descriptive analysis, Spearman correlations and ANOVA tests to determine significant differences.

1. Exposure to Transmedia Narratives

Of the total number of participants ($n = 600$), 89% said they had viewed content related to climate change on social networks in the last 6 months. Instagram was identified as the most used platform for this purpose (43%), followed by TikTok (32%) and X (25%).

Table 1. Frequency of exposure to environmental content by social network

SOCIAL NETWORK	HIGH FREQUENCY (5–7 DAYS/WEEK)	AVERAGE FREQUENCY (2–4 DAYS/WEEK)	LOW FREQUENCY (1 TIME OR LESS)	TOTAL (%)
INSTAGRAM	145 (24.2%)	94 (15.7%)	19 (3.1%)	43%
TIKTOK	98 (16.3%)	71 (11.8%)	23 (3.8%)	32%
X (TWITTER)	65 (10.8%)	56 (9.3%)	29 (4.8%)	25%

(Source: own elaboration)

The most influential formats were **narrative short videos** (58%), followed by **visual infographics** (22%) and **thematic threads** (14%). Only 6% reported a preference for long texts or blogs.

2. Public Perception of Climate Change

Participants rated their level of concern about climate change on a scale of 1 to 5 (1 = not at all concerned; 5 = extremely concerned). The results show a high perception of urgency:

Table 2. Level of concern about climate change

Level of concern	Frequency (n)	Percentage (%)
1 (Not at all worried)	8	1.3%
2	21	3.5%
3	96	16%
4	231	38.5%
5 (Extremely worried)	244	40.7%

(Source: own elaboration)

79.2% of the total stated that they had changed some environmental behavior (reducing plastic consumption, recycling, using public transportation, etc.) as a result of exposure to environmental content on social networks. This finding coincides with recent research that shows how digital communication can induce sustainable actions (García-Ruiz et al., 2021; Moya et al., 2023).

3. Correlations between Transmedia Exposure and Environmental Perception

A statistically significant correlation was found between the **frequency of exposure to environmental content** and the **level of climate concern** ($r = 0.623$; $p < 0.01$), which indicates that the greater the exposure, the greater the perception of urgency.

In addition, an ANOVA analysis showed significant differences ($p < 0.05$) between the platform types used and the reported behavioral change. Frequent users of **TikTok** and **Instagram** reported more habit changes than those of X (Twitter).

Table 3. Behavioral changes according to the social network used

<i>Main platform</i>	<i>Reported Changes (n)</i>	<i>% of total platform</i>	<i>Most common type of exchange</i>
Instagram	178	69.5%	Waste separation
TikTok	161	83.9%	Reduction of plastic consumption
X (Twitter)	89	59.3%	Dissemination of digital campaigns

(Source: own elaboration)

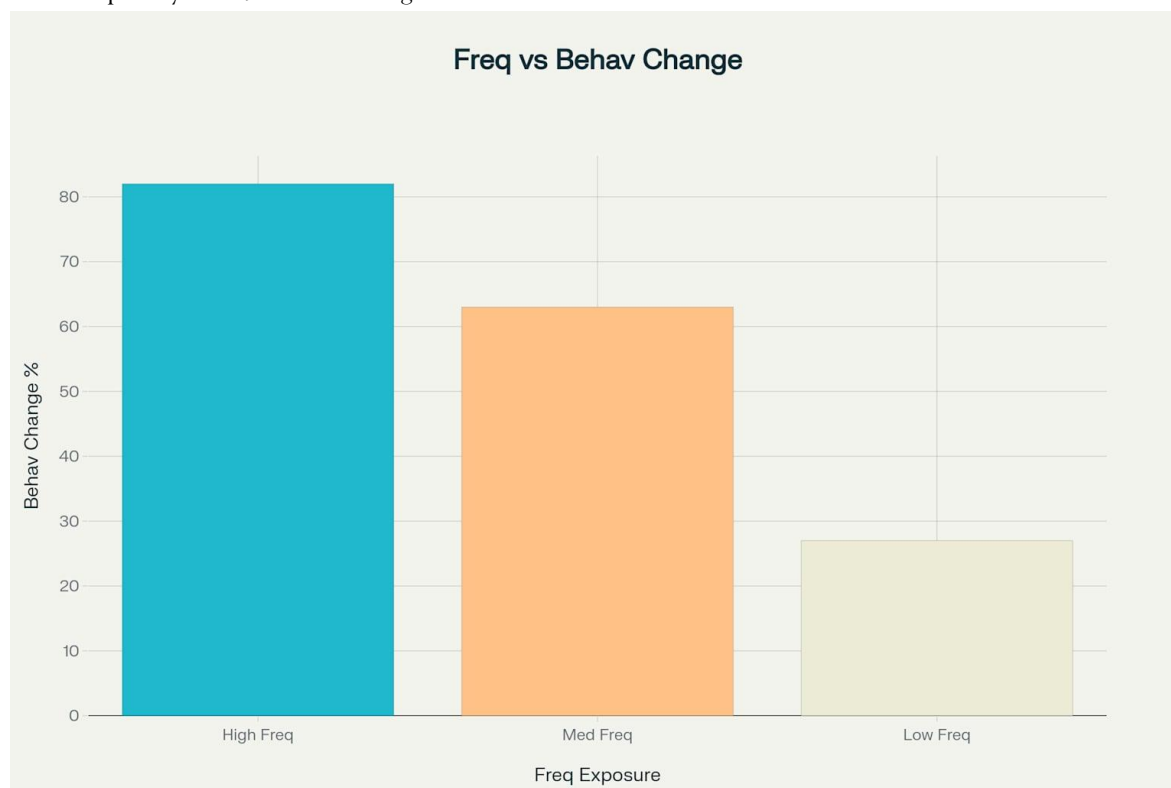
These results suggest that the emotional, audiovisual, and direct narrative form, especially on TikTok, has a greater behavioral impact than the more discursive approaches of platforms such as X, confirming findings from studies such as those by Lejarazu and León (2023).

Graphic synthesis: Relationship between exposure frequency and behavior change

High frequency → 82% with behavior change

Average frequency → 63% with change

Low frequency → 27% with change



(Source: own elaboration)

This pattern reinforces the study's hypothesis: **frequent exposure to transmedia narratives about climate change on social media is positively related to greater environmental perception and willingness to act.**

CONCLUSIONS

The findings of this study allow us to conclude that transmedia narratives are a highly effective tool to promote environmental education and generate public awareness about climate change in the context of the digital age. The articulation of visual, emotional and participatory content through platforms such as TikTok, Instagram and X favours both the symbolic appropriation of the message and the activation of sustainable behavioural changes by users.

First, it is highlighted that the **frequency of exposure to transmedia environmental content** is directly related to the **level of climate concern and the willingness to modify daily habits**, such as recycling, reducing the use of plastics or participating in digital ecological campaigns. This result confirms what García-Ruiz et al. (2021) pointed out, who emphasize that repeated exposure to environmental narratives facilitates deeper ecological literacy processes.

Secondly, it was verified that platforms **focused on the audiovisual and emotional**, such as TikTok and Instagram, achieve greater behavioral impact compared to more textual networks such as X. Short, personalized, and immersive narratives generate a more empathetic connection with the climate problem, which is consistent with the studies of Moya et al. (2023) and Leiserowitz et al. (2021), who argue that positive emotions and the visual representation of solutions increase the communicative and motivational effectiveness of messages.

Third, the study shows the emergence of a **new digital environmental citizenship**, in which users not only consume information but also produce, reconfigure and disseminate it, strengthening networks of collective action. This phenomenon, typical of the participatory culture described by Scolari (2021) and Jenkins et al. (2020), suggests a paradigmatic shift in traditional models of environmental education, which are no longer limited to the classroom but expand into the hypermedia environment. In addition, it is confirmed that young adults—the predominant group in this sample—have a growing sensitivity to ecological issues, which opens up opportunities to design **educational campaigns, public policies, and social marketing strategies** that take advantage of transmedia resources to promote responsible and sustainable behaviors (Cabrera et al., 2022).

However, important challenges are also identified: the need to guarantee **scientific veracity** in viral content, information overload that can lead to environmental apathy (eco-fatigue), and the lack of training in media literacy to critically interpret messages. These factors should be considered in future research and public policy. In summary, this study concludes that the use of transmedia narratives on social networks not only **improves public perception of climate change**, but also drives significant behavioral transformations. Therefore, educators, disseminators, environmentalists and policymakers are recommended to adopt innovative and participatory communication strategies that integrate the languages, formats and logics of the contemporary digital ecosystem.

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