



Data-Driven Webdocs: A Genre in Consolidation

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Abstract:

Documentaries and data visualizations have long sought innovative approaches to narrate data-driven stories, striving to balance effective storytelling and insightful data visualization. Despite the growing interest in this intersection, limited research has been published on the convergence of these two domains. This article aims to bridge this gap, offering a preliminary exploration into their points of convergence. Our study centers on data-driven webdocs – a novel form of web documentary that places data visualization at its core while incorporating other multimedia elements to enrich the narrative experience. In this paper, we compile existing research and analyze specific examples to identify the distinctive features of data-driven webdocs. Furthermore, building upon prior studies, we propose that this emerging format be recognized as a new genre for narrating stories through data.

Keywords:

Interactive documentary; webdoc; narrative visualization; data visualization; data stories.

Resumen:

El documental interactivo y la visualización de datos llevan años buscando formas de contar historias con datos, concretamente, intentando hacer que las visualizaciones sean más narrativas, aunque existe poca literatura al respecto. Por este motivo, este artículo pretende ser un primer paso para ampliar el conocimiento actual en torno a la convergencia de ambas disciplinas. Esta investigación se centra en los denominados data-driven webdocs, un tipo de documental web que utiliza la visualización de datos como contenido principal, dando acceso a otros elementos multimedia a través de ella. En este paper hemos recopilado las publicaciones existentes sobre este tema y realizado un análisis de aproximadamente una treintena de ejemplos para identificar las características distintivas de este tipo de piezas. Finalmente, y teniendo en cuenta investigaciones previas, proponemos este tipo de webdoc como un género en consolidación para contar historias con datos.

Palabras clave:

Documental interactivo; documental web; webdoc; visualización de datos; visualización narrativa.

1. Introduction

Interactive documentaries have emerged as a leading innovative format in journalism over the past decade, developing along multiple trajectories. While substantial research exists on this format, studies examining its integration with data visualization remain limited. Despite numerous scholars acknowledging the symbiotic relationship between documentaries and data visualization (Fallon, 2016, 2019; Takahashi, 2017; Nash, 2021; Ocak, 2021; Freixa, Pérez-Montoro and Codina, 2021; Kim, 2022), their convergence has not yet been systematically analyzed.

Webdocs, or web documentaries, represent a journalistic genre that emerged with the Internet's development (Gifreu, 2013, 2021; Rose, Gaudenzi and Aston, 2017; Alkarimeh and Boutin, 2018; Nash, 2021; Kim, 2022), reflecting the confluence of traditional documentary practices with novel interactive possibilities. While early web adaptations of documentaries maintained conventional structures (Dovey and Rose, 2012; Gaudenzi, 2013), technological advancement has facilitated increasingly interactive and non-linear formats, integrating video content with diverse multimedia elements. Within this evolution, data visualization has progressively emerged as a crucial component in certain productions (Gaudenzi, 2013; Fallon, 2019; Nash, 2021; Kim, 2022).

Journalism and data visualization have long employed innovative techniques to explain abstract and complex phenomena (Dick, 2020). From the statistical charts traditionally used in science to the more artistic and creative visualizations of today (Vizoso, Figueiras, and Dick, 2020), these disciplines have continually adapted to meet the social, academic, and

informational needs of their time, becoming particularly popular in the modern digital ecosystem, especially in an interactive format (Dick, 2020; Kennedy and Engebretsen, 2020).

In an era of increasing behavioral quantification (Mayer-Schönberger and Cukier, 2013), data visualization has attained “a social relevance on a scale we have not seen before” (Kennedy and Engebretsen, 2020: 19-23), and the capacity to process, visualize, and communicate data has become fundamental (Kennedy and Hill, 2017, 2018). Nevertheless, practitioners face persistent challenges in managing and representing data effectively, particularly in incorporating narrative elements that render complex information both accessible and engaging.

Web technologies of the past two decades have enabled journalists, designers, and developers to create innovative documentary pieces incorporating data visualization. Given the proliferation of such works, our research specifically examines webdocs that employ data visualization as their primary content.

1.1. Theoretical Framework

Initial predictions of the Internet supplanting traditional media have given way to a more nuanced understanding. Contemporary scholarship demonstrates that media forms coexist through continuous processes of remediation and genre hybridization, with reciprocal influences (Manovich, 2002; Jenkins, Ito and Boyd, 2015; Baetens, De Graef and Mandolessi, 2020; Belcher, 2023). Today, digital media is considered to function less as a replacement and more as a “super medium” (Baetens, De Graef and Mandolessi, 2020: 101), enabling unprecedented convergence and combinations of existing media forms.

Scholars have long examined digital media, including the web, as a remediation of cinema (Manovich, 2002; Baetens, De Graef and Mandolessi, 2020; Nash, 2021), progressively incorporating elements from photography, radio, literature, and print journalism. Technological advancement has fostered hybrid forms that challenge, though do not preclude, distinctions between adapted traditional genres and emergent forms since the web’s distinctive characteristics — particularly multimedia content and hypertext — have profoundly influenced genre evolution, generating medium-specific hybrids that often become inextricable from their platform (Nielsen and Askehave, 2005; Murray, 2011; Baetens, De Graef and Mandolessi, 2020; Nash, 2021).

The Internet’s emergence has necessitated an ongoing academic reconsideration of genre conceptualization, as content diversification challenges traditional analytical frameworks (Nielsen and Askehave, 2005; Baetens, De Graef and Mandolessi, 2020; Belcher, 2023). This study employs specific definitions of *medium* and *genre*. We adopt Véron’s (1994: 52) definition: “a set composed of technology and social practices around the production (...) and appropriation of the generated message, when there is public access to these”, understanding the *medium* as the support for the various genres that materialize in it.

Our genre conceptualization draws from functional theory and Yates, Orlikowski and Okamura’s (1999: 84) definition: “socially recognized types of communicative actions that are habitually performed (...) to achieve particular social purposes. A genre can be identified by its socially recognized purpose and the shared characteristics of the form”. This

definition encompasses both communicative function and “appearance” (Yates, Orlikowski and Okamura, 1999: 122), including lexical and grammatical elements (Eggins, 1994; Swales, 1990, cited in Nielsen and Askehave, 2005), textual arrangement, and visual composition (Martin, 1992, cited in Nielsen and Askehave, 2005).

Multiple authors have recognized the strong connection between digital medium and genres. Baetens, De Graef and Mandolessi’s (2020) influential framework distinguishes between *digital-borne* works (existing physical formats digitized without substantial modification) and *digital-born* works, which are “created on a computer and intended to be read on [it] (...) that can no longer be done adequately in print form” (p. 111) or any prior medium. To explicate medium and genre evolution, they reference Gaudreault and Marion’s (2005) three-phase theory of “appearance, emergence and constitution” (p. 5), which particularly illuminates webdoc evolution, as we will examine in Results and Conclusions.

Our analysis encompasses additional digital medium characteristics and features of the contemporary media ecosystem. We consider webdocs’ potential for openness and participation, allowing user-generated content beyond author-defined datasets (Green et al., 2017; Nash, 2021), and their trans- and cross-medialization –their narrative extension beyond the web. We distinguish between *crossmedia*, where content extends across platforms without requiring user participation or narrative expansion, and *transmedia*, where audience collaboration actively expands the narrative universe through new stories, perspectives, and content (Ryan and Thon, 2014; Karlsen, 2018; Freixa, Sora-Domenjó and Soler-Adillon, 2022).

2. Material and Methodology

Given the limited academic literature on this subject, our research methodology comprises three distinct phases:

1. A comprehensive literature review examining data visualization in traditional and interactive documentaries.
2. An analytical assessment of data-driven webdocs and their distinctive features.
3. Based on these analyses, a theoretical proposition of these webdocs as an emergent genre for telling stories with data.

The literature review employed systematic searches across Scopus, Web of Science, Google, and Google Scholar databases. We constructed Boolean search queries combining the terms *documentary*, *interactive documentary*, *i-doc*, *webdoc*, *web documentary*, *data visualization*, *narrative visualization*, and *dataviz* in both English and Spanish. For Google and Google Scholar, which yielded extensive results, we included the first three pages of search results. All results from Scopus and Web of Science were incorporated due to their more manageable volume. After removing duplicates, the initial corpus of 282 publications was refined to 59 based on the following inclusion criteria:

- Texts analyzing interactive documentaries where data visualization serves as the main content, rather than as an additional or secondary resource.
- Publications focusing on journalistic documentaries intended for the general public, excluding narrative data visualizations designed for the scientific community (e.g., in fields such as medicine, physics, or chemistry).
- Theoretical works explicitly addressing the relationship and convergence between the documentary genre and data visualization.

For the case study analysis, we utilized the sample identified by López-Lozano, Herrero-Solana, and Sánchez-Mesa Martínez (2024), focusing on 27 *data-driven* webdocs featuring interactive data visualization as their core content. Our analysis encompassed currently accessible webdocs and, for unavailable content, we consulted the Wayback Machine (<https://archive.org/>), relevant articles, YouTube and Vimeo documentation, and technical documentation from MIT Docubase, IDFA DocLab, NFB of Canada, and IMDb repositories. We systematically documented the following characteristics in a structured database:

- Type of data visualization: Categorized as either customized/tailored or traditional (e.g., maps, bar charts, pie charts) following Figueiras's (2016) typology.
- Testimonies or personal stories: Identifying whether these are included and if they can be directly accessed through the data visualization.
- 1:1 relationship: Evaluating the presence of a direct correspondence between testimonies and individual data records.
- Video content: Determining whether videos serve as introductory elements or are the primary format for including testimonies.
- User participation: Assessing whether users can contribute content to the documentary or data visualization, creating an open or participatory webdoc.
- Transmediality or crossmediality: Examining whether the webdoc's narrative or content extends to platforms beyond the web and how this adaptation occurs.

In proposing data-driven webdocs as a novel genre in data storytelling, we apply Gaudreault and Marion's (2005) double birth theory, as contextualized in Baetens, De Graef and Mandolessi's (2020) *Digital Reason: A Guide to Meaning, Medium and Community in a Modern World*.

3. Results and Discussion

Despite Gaudenzi's (2013) early recognition of data visualization's potential to guide interactive documentaries, research in this area remains limited. Our bibliographic analysis reveals that scholars have increasingly identified this research gap, noting the unique capacities of both documentary and data visualization to represent contemporary society (Kennedy and Hill, 2017; Nash, 2021; Kim, 2022).

While scholars have identified substantial connections between the documentary genre and data visualization (Fallon, 2016, 2019; Nash, 2021; Kim, 2022), particularly regarding the representation of phenomena resistant to camera capture, most analyses remain theoretical or limited to isolated examples and case studies.

3.1. *Documentary and Data Visualization: Making Visible the Invisible*

Fallon (2016) initially explored this convergence by examining documentary genre limitations in explicating abstract concepts and intangible phenomena that resist camera-based documentation. After analyzing historical parallels between both forms of non-fiction visual representation, Fallon proposes data visualization as “an expanded field of documentary expression” (2016: 296), offering solutions to these representational challenges.

Takahashi (2017) advances a similar perspective in “Data Visualization as Documentary Form: The Murmur of Digital Magnitude,” emphasizing both genres’ capacity to represent abstract, complex, and polyphonic phenomena. She positions data visualization as “a key form of contemporary documentary” (2017: 392) and “a new dominant rhetorical form that (...) produces the most coherent, authoritative and ‘audible’ arguments about today’s world” (2017: 381-383). Furthermore, the author conceptualizes data visualization as the primary representational form of “the murmur of digital magnitude” (Takahashi, 2017: 376) –the digital footprint of contemporary life that remains invisible until transformed through visualization.

Beyond academic discourse, practitioners have also noted this emerging convergence. Astle’s (2014) “Charting the Course: Data Visualization in Documentary Film” traces decades of synergy between these disciplines, from basic data visualization included in traditional documentaries to interactive documentaries “that invite viewers to manipulate and explore graphics” (2014: 7). While primarily examining data visualization as supplementary content, Astle acknowledges its potential to drive the overall story (Soyk, 2014, as cited in Astle, 2014).

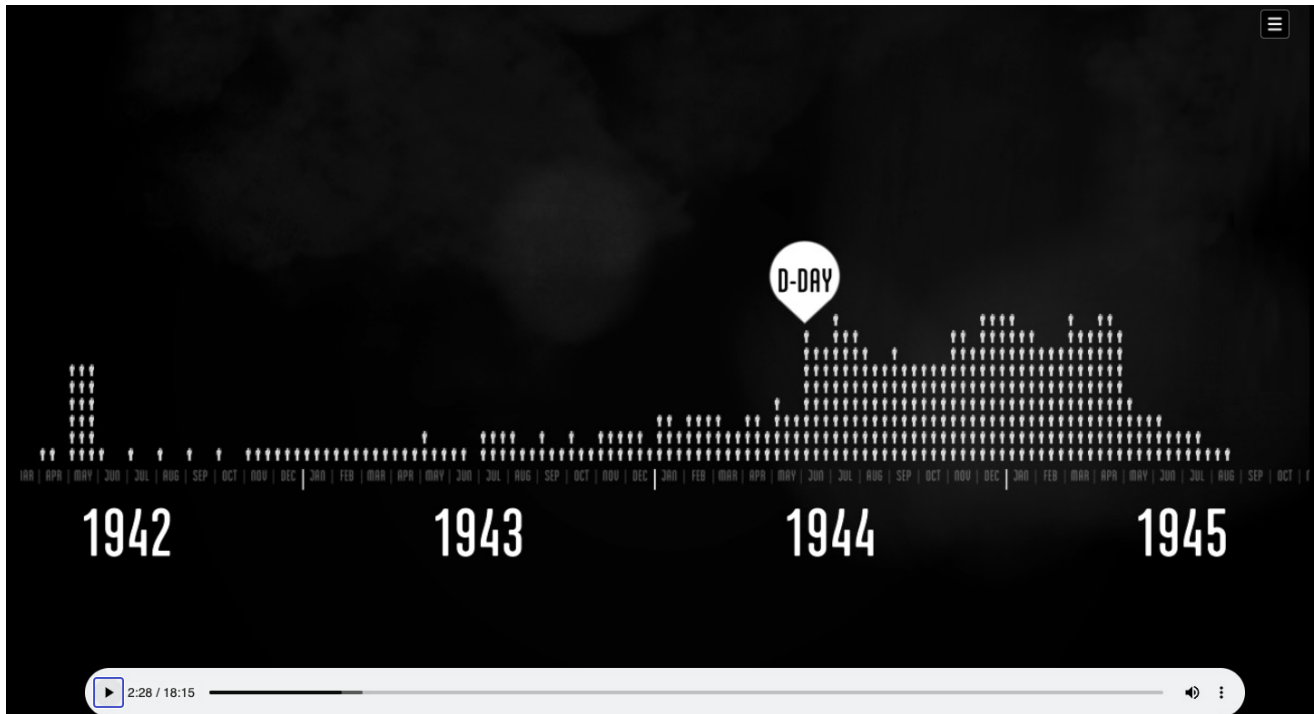
Smith (2020) predicts increasing convergence between documentaries and data visualization, citing a rise in the production and consumption of documentaries alongside a growing number of Google searches for *storytelling with data*. The author identifies journalistic works that combine “aggregated data with individual interviews (...) [that enable] people to tell their own story” (Smith, 2020: 12), a hallmark of the webdocs analyzed in this study.

In case study literature, Duijn and Koenitz’s (2017) analysis of *The Industry* (2017) examines a webdoc utilizing an interactive map as its primary navigation interface for accessing different video chapters. Their work, “Beyond The Timeline: A Data-Driven Interface For Interactive Documentary”, demonstrates how “the (...) video does not determine the narrative, but the data (...), combining data and multimedia clips into a compelling narrative experience” (2017: 34-35).

Hook (2018) extends this inquiry in “Facts, Interactivity and Videotape: Exploring the Design Space of Data in Interactive Video Storytelling”, analyzing 43 interactive video pieces, including interactive documentaries. While primarily focused on video-based projects, Hook (2018) acknowledges data visualization’s emerging role as a narrative interface, by mentioning the existence of pieces that use data visualization as the interface to access films and videos, which we consider a clear reference to this type of documentary.

Ocak’s (2021) “A Critical Inquiry on Data Visualization Based Interactive Documentary: ‘The Fallen of World War II’ as an example”, examines a webdoc that replaces traditional camera footage with animated data visualization. This format, variously termed ‘cinematic data visualization,’ ‘data video’ (Shi et al., 2021), or ‘data epic’ (Gray, 2023), integrates interactive elements by pausing the documentary film to enable user exploration of visualized data.

Figure 1. The Fallen of World War II Interface



Source: Halloran, Neil. (2015). The Fallen of World War II. <http://www.fallen.io/ww2/>

As Ocak (2021) defends, “though any camera record has not been used (...), the film has a very cinematographic language” (p.367), demonstrating data visualization’s capacity to replace traditional camera footage in documentary storytelling. While acknowledging this work’s relatively conventional structure –a linear narrative with an omniscient narrator intercepted with interactive intervals– Ocak identifies the emergence of “new modes [of documentaries] (...) based on data and its visualization” (2021: 368), suggesting that “data visualization is iconically pointing out the coming future of truth claim of the documentary” (2021: 370).

Nash’s (2021) seminal work, “Interactive Documentary: Theory and Debate”, dedicates significant attention to documentary and data visualization convergence. Through multiple case studies, the author positions these documentaries’ novel interfaces and navigational structures as “key sites of documentary expression” (Nash, 2021: 18), arguing that their interfaces function “as a form of documentary argument” (Nash, 2021: 19).

A comprehensive analysis of data visualization in webdocs appears in López-Lozano, Herrero-Solana, and Sánchez-Mesa Martínez's (2024) "Interactive Documentary and Data Visualization: New Approaches to Telling Stories with Data". Their examination of over 80 webdocs reveals that data visualization constitutes half or more of the content in nearly 65% of cases, indicating its growing prominence in documentary practice.

The authors identify three distinct trends among the analyzed documentaries. First, *text and image-driven webdocs*, where the primary content consists of texts and static images, with occasional data visualizations included. Second, the most prevalent type: *video-driven webdocs*, in which the main content comprises a film or series of videos, with data visualizations serving both as supplementary information and as an alternative means of accessing the multimedia content. Finally, they describe *data-driven webdocs* as a unique subset of documentaries that use data visualization as their primary content and as the main interface for accessing other multimedia elements. It is this latter category that forms the focus of our analysis.

3.2. Narrative Visualization: Telling Stories with Data

The term *narrative visualization* (Segel and Heer, 2010) encompasses data visualizations designed to create interactive online narratives, sometimes functioning as complete narrative vehicles that "function in place of a written story" (p.1). This approach synthesizes techniques from "oratory, comic books, video games, and film production" (Segel & Heer, 2010: 1), requiring diverse expertise spanning storytelling, screenplay writing, computer engineering, and data science –competencies equally essential in webdoc development.

Segel and Heer's (2010) taxonomy identifies two genres particularly relevant to the documentary practice: the *Annotated Chart*, featuring text annotations overlaid on charts and other graphical representations, and the *Film/Video/Animation* genre, comprising narrated animated data visualizations. However, these categories differ from our sample in significant ways: *Annotated Charts* lack multimedia integration beyond textual annotations, while the *Film/Video/Animation* genre remains confined to linear, non-interactive formats.

Narrative visualization has been the subject of research in many fields, but journalism has emerged as a pioneer in its implementation (Kosara and Mackinlay, 2013). The past decade has witnessed concentrated efforts to craft narratives integrating data visualizations, text, and multimedia elements (Segel and Heer, 2010; Cairo, 2012), specifically aiming "to make visualizations (...) independent of other types of narratives" (Cairo, 2012: 138) rather than supplementary elements. This evolution aligns with observations by Diakopoulos, Kivran-Swaine and Naaman (2011) regarding journalistic innovations in creating visual narratives around a data set, and Figueiras's (2016) recognition of efforts to develop visualizations as "independent forms of telling stories that can exist by themselves" (Figueiras, 2016: 138).

Recent Stanford University research has explicitly examined the documentary-narrative visualization nexus. Through their concept of *Documentary Narrative Visualization*, Bradbury and Guadagno (2020) investigate how narrative visualization techniques influence audience engagement, revealing substantial parallels with traditional documentary approaches. Their analysis suggests documentary techniques can inform data visualization practices, as exemplified by *200 Countries, 200 years, 4 minutes* (Wingspan Productions, 2010), where Hans Rosling orchestrates discourse through animated statistical representation.

Figure 2. 200 Countries, 200 years, 4 minutes Video



Source: Wingspan Productions. (2010, November 26). Hans Rosling's 200 Countries, 200 Years, 4 Minutes - The Joy of Stats - BBC Four [Video]. Youtube. <https://bit.ly/43YmuHp>

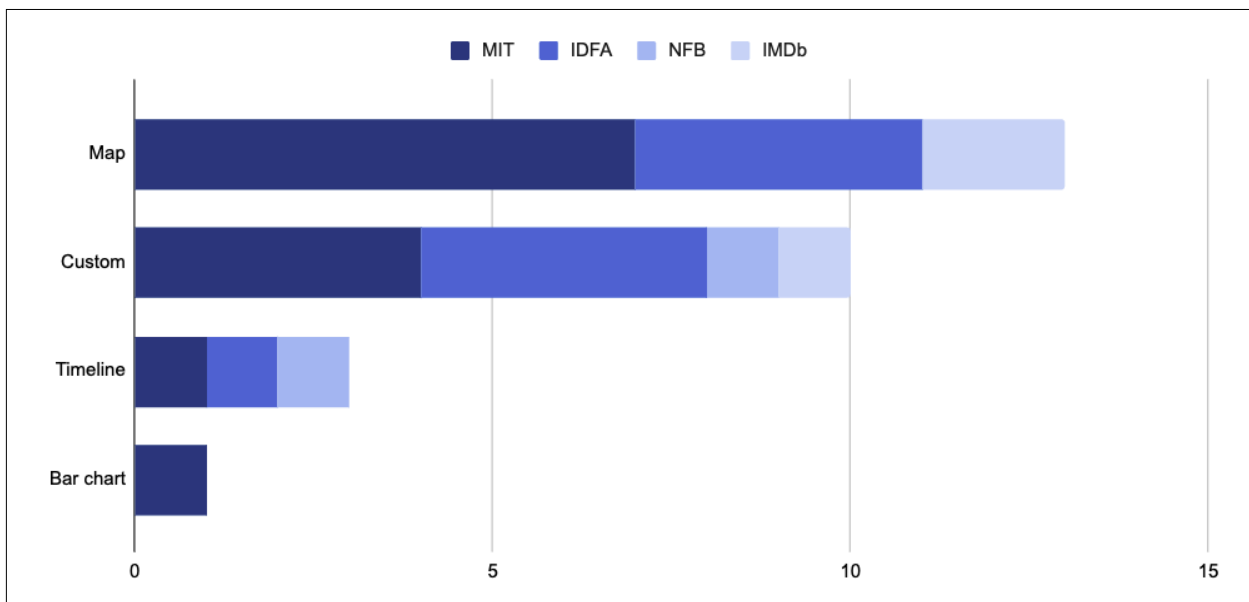
Edmond and Bednarz (2021) delineate three evolutionary trajectories for narrative visualization. The first, termed *leading narrative*, incorporates data visualizations within established narrative frameworks. The second, *integrated narrative*, elevates data visualization to “the predominant language” (Edmond & Bednarz, 2021:34), relegating traditional narrative elements to a supporting role. The third, *supporting narrative*, minimizes textual and conventional narrative techniques in favor of visualization-driven storytelling. The authors believe that approaches emphasizing robust contextual integration of data visualization will demonstrate the greatest proliferation, anticipating the emergence of increasingly sophisticated narrative forms in this domain.

3.3. Webdocs Analysis

Our analysis examined 27 webdocs from the MIT Docubase, IDFA DocLab, IMDb, and NFB of Canada repositories, all featuring data visualization as their primary content. The systematic assessment revealed several distinctive characteristics, summarized in Table 1, with notable patterns in visualization approaches:

In terms of data visualization usage, 37% of the webdocs employ custom visualizations specifically tailored to the documentary's content. Conversely, 63% utilize traditional visualizations, with maps being the most frequently used format (48%), followed by timelines (11%) and bar charts (4%).

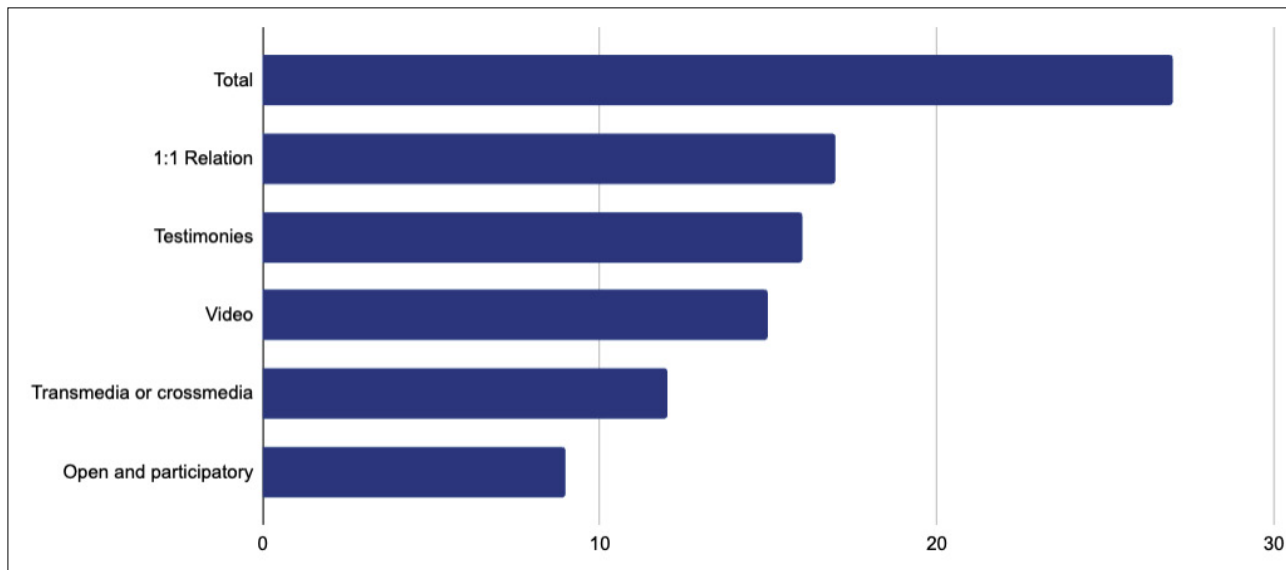
Figure 3. Type of data visualization by repository



Source: created by authors, using Google Sheets based on the data from Table 1

Regarding the use of video, 55% of the webdocs in the sample do not include any video content. Among the 45% that do incorporate video, its use varies: the majority employ it as a format for testimonials (30%), as an introduction to the data visualization that serves as the documentary's centerpiece (11%), or, in some cases, as a medium for observing nature (11%). Notably, these functions often appear in combination across several examples.

Figure 4. Characteristics of the analyzed webdocs



Source: created by authors, using Google Sheets based on the data from Table 1

Table 1. Webdocs that use data visualizations as the main content

Webdoc	Year	Source	Data Visualization	Testimonies	1:1 Relation	Video	Open and Participatory	Transmedia or crossmedia
Wordcount	2003	IDFA	Custom	No	No	No	No	No
Yellow Arrow	2004	MIT	Map	Yes	Yes	No	Yes	Yes
Flight Patterns	2005	MIT	Custom	No	No	No	No	No
The Dumpster	2005	IDFA	Custom	Yes	Yes	No	No	No
We Feel Fine	2006	MIT, IDFA	Custom	Yes	Yes	No	No	Yes
Lovelines	2006	MIT	Custom	Yes	Yes	No	No	No

Webdoc	Year	Source	Data Visualization	Testimonies	1:1 Relation	Video	Open and Participatory	Transmedia or Crossmedia
The Iron Curtain Diaries	2009	IDFA	Map	Yes	No	Yes	No	No
Invisible Cities	2010	MIT	Map	Yes	Yes	No	Yes	Yes
How Much Is Left?	2010	MIT	Timeline	No	No	Yes	No	No
This Land	2010	NFB	Timeline	No	No	No	No	Yes
Hip Hop Word Count	2011	MIT	Custom	No	Yes	No	No	No
Farewell Comrades!	2011	MIT, IDFA, IMDb	Map	Yes	Yes	No	No	Yes
Bear 71	2012	MIT, IDFA, NFB, IMDb	Map	No	No	Yes	No	Yes
Tidmarsh Farms: Living Observatory	2012	MIT	Map	No	No	Yes	No	Yes
Here at Home	2012	MIT, IDFA, NFB	Custom	Yes	Yes	Yes	No	No
Out of Sight, Out of Mind	2013	MIT, IDFA	Timeline	No	No	No	No	No
17000 Islands	2013	MIT, IDFA	Map	No	Yes	Yes	Yes	No
StreetMusicMap	2014	MIT	Map	No	Yes	Yes	Yes	Yes
A Cartography of Iconic Memory	2014	MIT	Map	No	No	Yes	No	Yes
The G Word	2015	MIT	Custom	Yes	Yes	Yes	Yes	No
The Counted	2015	MIT	Bar Chart	Yes	No	No	No	No

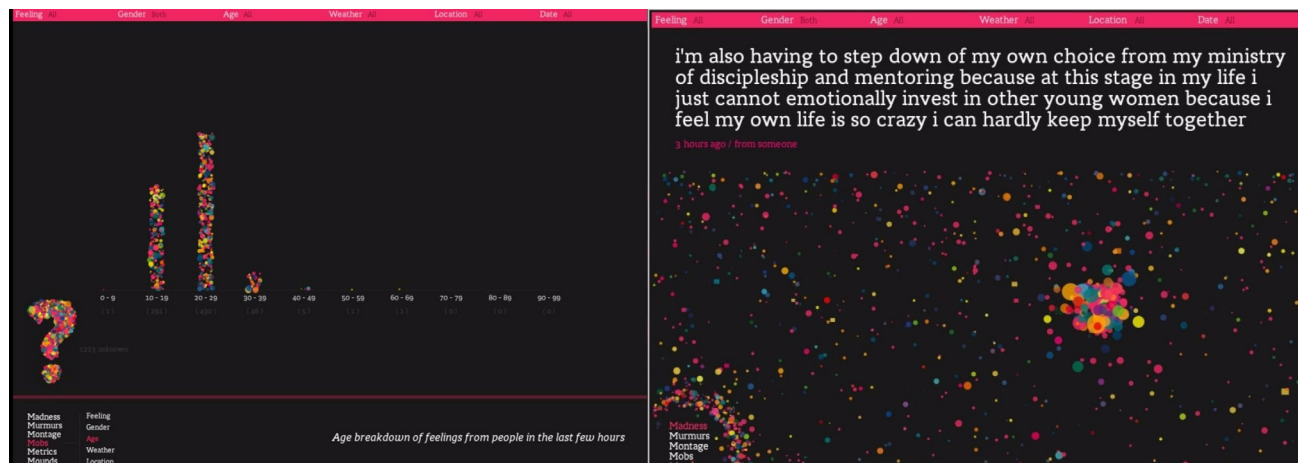
Webdoc	Year	Source	Data Visualization	Testimonies	1:1 Relation	Video	Open and Participatory	Transmedia or Crossmedia
Quipu Project	2015	MIT, IDFA	Custom	Yes	Yes	No	Yes	Yes
Radio Right Left	2017	MIT	Map	Yes	Yes	No	Yes	No
A Father's Lullaby	2017	MIT	Map	Yes	Yes	Yes	Yes	Yes
Mémoires des déportations	2017	IDFA	Map	Yes	Yes	Yes	No	Yes
Destruction and Return in al-Araqib	2018	IDFA	Map	Yes	Yes	No	No	No
Yesterday, Today, Tomorrow	2021	NFB	Custom	Yes	Yes	No	Yes	No

3.4. Examples of Data-Driven Webdocs

To exemplify the data-driven webdoc paradigm, we present four illustrative cases from our analytical sample that embody the genre's defining characteristics.

We Feel Fine (2006) represents a pioneering exploration of digital emotional expression, analyzing sentiment data from 2.3 million blog entries. Its interface, which Kamvar and Harris (2011) term *Experiential Data Visualization*, combines quantitative visualization of aggregated emotional data with demographic filtering capabilities across variables including emotion, age, gender, and additional parameters. Users can navigate from macro-level patterns to individual narratives through interactive data points, creating an immersive experience that bridges quantitative analysis with personal storytelling. This structure exemplifies the potential of data-driven narratives to simultaneously capture broad social patterns and individual human experiences.

Figure 5. We Feel Fine Interface

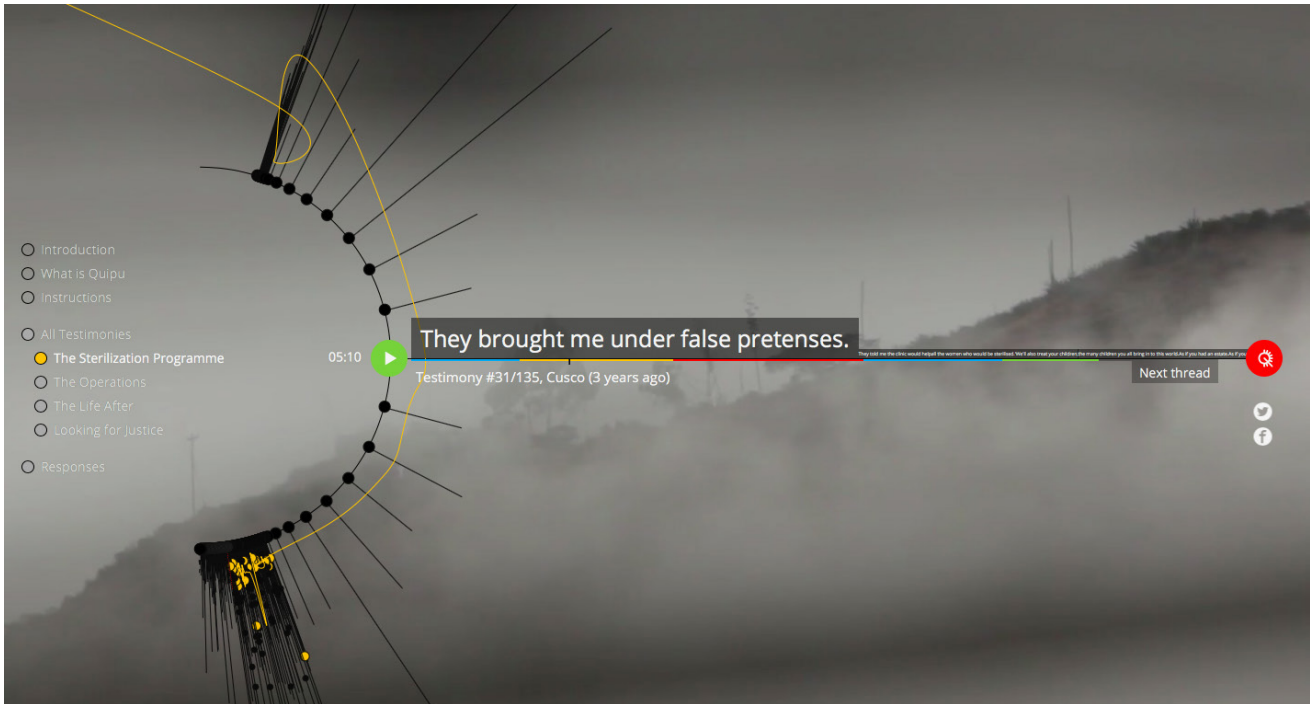


Source: Harris, Jonathan & Kamvar, Sep. (2006). We Feel Fine. <http://wefeelfine.org/>

We Feel Fine's structure foregrounds an innovative data visualization interface while maintaining deep connections to individual narratives. Each data point links directly to a personal testimony presented primarily through text and occasionally supplemented with static imagery. The project extends beyond its digital platform through a companion book offering enhanced statistical analysis and curated testimonials, exemplifying a cross-media approach to documentary storytelling that distributes content across multiple platforms.

The Quipu Project (2015) demonstrates similar structural principles while addressing profound human rights violations. This interactive documentary chronicles the experiences of over 300,000 individuals subjected to involuntary sterilization during Peru's Fujimori regime. The project's core interactive data visualization enables systematic exploration through multiple filtering criteria, with each quantitative data point providing direct access to survivor testimonials, creating a powerful synthesis of statistical documentation and personal narrative.

Figure 6. Quipu Project Interface



Source: Court & Lerner. (2015). Quipu Project. <https://interactive.quipu-project.com/>

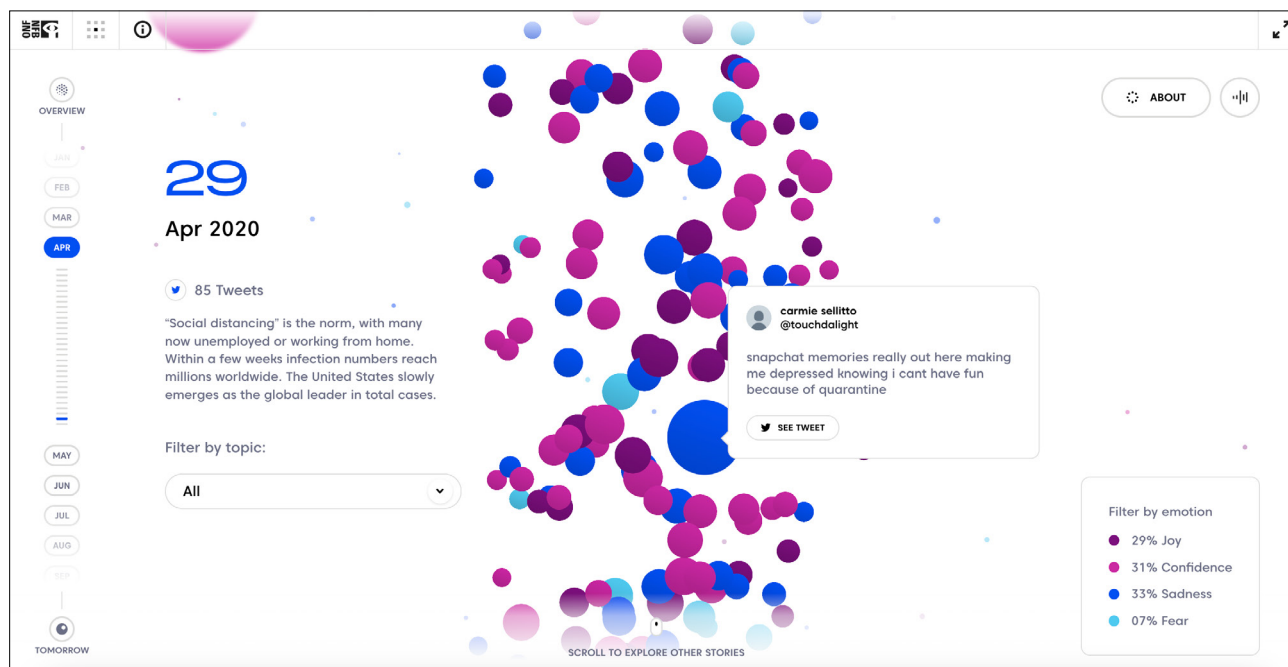
The Quipu Project exemplifies participatory documentary practice (Nash, 2022; Jenkins, Ito and Boyd, 2015) through the integration of audience response mechanisms, enabling viewers to transmit messages of solidarity to survivors. The visualization's deployment of the *quipu* – a traditional indigenous accounting system – introduces semiotic self-awareness to its data representation. The project transcends conventional digital boundaries through its innovative transmedia strategy: mobile phones distributed among indigenous communities with limited internet access enabled survivors to receive audience messages, establishing a dialogue between digital and traditional communities (Green et al., 2017).

Another example of a data-driven webdoc is *The G Word* (2015), created to combat discrimination and gender violence. Its interface visually represents each personal story as a circle, organizing them around themes such as emotional abuse, consent, and classism. Clicking on a circle reveals a personal story presented in text, audio, image, or video format. Users can also contribute their own stories to be added to the webdoc. Alongside the visualization, two introductory videos provide additional information about the project.

Unlike previous examples, *The G Word* incorporates video content, though it is not a central feature of the webdoc. Instead, the video serves as one of several formats for presenting personal stories and introducing the project. As in the other cases, the core of the webdoc is a data visualization, with a 1:1 relationship between each data point and the corresponding story. Notably, the dataset remains open, allowing users to add their own stories and experiences, thereby enriching the project's scope.

Yesterday, Today, Tomorrow (2021) examines the COVID-19 pandemic's emotional impact through sentiment analysis of social media discourse. Its visualization interface enables exploration of over 600,000 tweets, categorized by emotional valence -fear, joy, sadness, trust- revealing temporal patterns in collective emotional response. This data-driven approach illuminates macro-level emotional trends while maintaining connections to individual experiences.

Figure 7. Yesterday, Today, Tomorrow interface



Source: Jam3 and NFB. (2021). Yesterday, Today, Tomorrow. <https://yesterday.nfb.ca/>

The timeline used to explore the content offers three navigation options: chronology, topic, and sentiment. This visualization consists of a series of circles, each representing an individual tweet that users can access by clicking on it. Additionally, the interface highlights key milestones and events, providing context for understanding shifts in collective emotions. These interaction options enable users to transition from observing global trends to delving into the feelings and personal stories behind them. Notably, the project remains open, allowing users to contribute tweets through a designated hashtag, further expanding its scope and relevance.

3.5. *Specific Characteristics*

Our analysis reveals several defining characteristics of data-driven webdocs. Primary among these is the centrality of data visualization –not as supplementary content, but as the documentary’s core structural element. Unlike traditional webdocs anchored in video content, these productions position data visualization as the primary interface for accessing multimedia elements (Geenen and Wieringa, 2020).

Many of these documentaries transcend conventional data visualization formats such as bar charts, pie charts, and maps (Figueiras, 2016), instead employing bespoke visualization designs that emphasize aesthetic and artistic innovation (Manovich, 2008). These custom visualizations function “as a new abstraction (...) transforming the visual chaos of the data (...) into clear and orderly forms (...) to map such phenomena” (Manovich, 2008: 7-8), drawing inspiration from “new media art (...) and data modernism” (Manovich, 2000: 1-3).

A distinctive feature of these documentaries is their open-data architecture, enabling audience contribution through multiple modalities. Users can submit textual, audio, visual, or video content via structured forms, as demonstrated in *The G Word* (2015); contribute telephonic audio messages as in the *Quipu Project* (2015); or participate through hashtag-based content aggregation, as seen in *Yesterday, Today, Tomorrow* (2021). These projects often extend beyond digital platforms through transmedia or crossmedia strategies, exemplified by *We Feel Fine’s* (2006) emotional almanac publication and *Quipu Project’s* (2015) voice messaging system connecting digital audiences with affected communities.

These webdocs serve dual representational functions: documenting collective, polyphonic phenomena while enabling two levels of exploration. They facilitate a numerical and objective analysis, through data visualization, and an emotional and subjective experience, understanding through linked personal narratives. This approach aligns with Takahashi’s (2017) vision of documentary-data visualization synthesis in representing complex, multivocal phenomena. The web environment’s inherent characteristics, particularly hypertextuality, fundamentally shape these documentaries’ functionality, enabling direct connections between quantitative visualizations and personal stories. This technological affordance facilitates seamless navigation between macro-level patterns and micro-level personal experiences.

3.6. Differences Regarding Narrative Visualization

While narrative visualization and data-driven webdocs share foundational elements, their distinctions emerge primarily through their function and intention. Narrative visualization, applicable across domains from scientific articles to press infographics, constructs stories around data visualization to illuminate topics ranging from sports to economics. However, the examples documented by Segel and Heer (2010) fundamentally differ from these webdocs beyond their multimedia integration since documentaries focus on social representation.

The divergence lies primarily in intentionality. Narrative visualization prioritizes complex data comprehension, whereas data-driven webdocs probe deeper social realities, contextualizing numerical data within personal narratives. These documentaries illuminate the human dimension of statistics, transforming navigation from quantitative exploration into an emotionally resonant, subjective experience. Nash's (2022) observation that documentaries aim to "reveal realities (...) (to) make sense of the complex and controversial challenges of contemporary societies" (p. 11) crystallizes this distinction. Data-driven webdocs transcend data exploration by providing access to individual narratives behind each data point, creating an experiential layer absent in traditional narrative visualization. While narrative visualization techniques prioritize data comprehension, they typically exclude first-person testimonies, resulting in a fundamentally different user experience where visuals and graphics remain primary, with narrative serving a supplementary, contextual function.

In comparison with traditional print journalism, these webdocs parallel press reporting, integrating statistical analysis with personal testimony. However, they transcend written press limitations by enabling comprehensive exploration of all the individual narratives, structuring content in dual layers: a quantitative visualization interface and an underlying stratum of personal stories. Conversely, narrative visualizations more closely resemble infographics, where visual elements dominate and textual annotations just provide contextual information.

Despite varying approaches to multimedia integration across examples (audio, video, text, etc.), these documentaries share a fundamental objective: representing contemporary society or distilling collective experience. This representational aim, as noted by Kennedy and Hill (2017, 2018) and Nash (2021), distinguishes documentary work from other informational content forms.

3.7. Appearance, Emergence, and Constitution

Gaudreault and Marion's (2005) theory of the double birth of genres and mediums provides an illuminating framework for understanding the evolution of data visualization in webdocs. Their three-phase model –*appearance*, *emergence*, and *constitution*– maps remarkably onto the developmental trajectory of these documentaries.

In the initial *appearance* phase, the new medium typically adheres to established practices, functioning as "a simple auxiliary to existing genres" (Gaudreault & Marion, 2005: 12). This pattern manifests in productions like *Hazardous Hospitals* (2013), *First World War* (2014), and *Seven Digital Deadly Sins* (2014), where data visualization serves an ancillary function to primary video content. These early implementations exhibit two distinct patterns: non-interactive visualizations

integrated within video footage, as in *Hazardous Hospitals* (2013); or interactive elements accessed during programmed video pauses, as exemplified by *First World War* (2014).

The *emergence* phase marks the development of a distinctive identity, where the medium becomes “fertile ground for new experiments in communication or artistic creation” (Gaudreault & Marion, 2005: 12). During this period, it “adapts itself to the mediascape, to become acceptable (...) bringing something new to the field and offering the guarantee of being recognized by the users” (Baetens et al., 2019: 92). Works like *Unspeak* (2013), *Last Hijack* (2014), and *Network Effect* (2015) exemplify this evolution, elevating data visualization to equal prominence with the documentary film and incorporating it as an alternative navigational structure.

The final evolutionary stage manifests in works like *We Feel Fine* (2006), *Invisible Cities* (2010), *The G Word* (2015), *Quipu Project* (2015), and *Yesterday, Today, Tomorrow* (2021), where data visualization becomes the central organizing principle. In these productions, traditional documentary elements such as video or film become optional or absent, with narratives conveyed through text, static images, or audio. As a consequence, this transformation raises fundamental questions about genre classification and the essential characteristics of the documentary form: can webdocs without video or film be considered mere adaptations of the traditional documentary film genre? Or do they have sufficient distinctive characteristics to be considered a new genre?

Gaudreault and Marion’s theory of double birth –comprising *integrating* and *distinguishing* births– illuminates the emergence of data-driven webdocs as a distinct genre. While the final phase, *institutionalization*, marked by institutional control and regulation (Gaudreault & Marion, 2005:3), remains incomplete, significant indicators of this process have emerged. Major institutions have begun systematic documentation of data visualization webdocs, including MIT Docubase’s categorical organization and the Digital Storytelling Index maintained by the Novos Medios Research Group. Investigative journalism platforms like Inkyfada, through initiatives such as Inkylab, actively produce data visualization-driven documentaries.

The academic sphere further evidences this institutional recognition. Beyond existing scholarship on documentary and data visualization convergence (Fallon, 2016; Takahashi, 2017; Duijn and Koenitz, 2017; Bradbury & Guadagno, 2020; Nash, 2021), significant institutional developments include Princeton University’s establishment of the VizE Lab for Ethnographic Data Visualization in 2017, aimed at “bring[ing] data visualization and documentary media together” by combining “data sets (...) with person-centered perspectives”. In addition, the introduction of “Visible Evidence: Documentary Film and Data Visualization” into Princeton’s Film Studies curriculum in 2018 further signals the genre’s growing institutional recognition.

4. Conclusions

The identification of emergent genres presents inherent challenges, as evidence of novelty typically manifests in fragmented, sometimes contradictory patterns. While some nascent formats dissipate without lasting impact, others demonstrate increasing coherence and stability –as observed in the case of data-driven webdocs.

Despite limited scholarly attention, our cross-disciplinary literature review reveals growing recognition of documentary-data visualization convergence. Interactive documentaries increasingly incorporate data visualization elements, ranging from supplementary roles to primary narrative interfaces for multimedia content access.

Our comprehensive analysis demonstrates data visualization's integration across the interactive documentary spectrum. This ranges from linear productions like *The Fallen of World War II* (2015) and *The Shadow Peace: The Nuclear Threat* (2017), where animated data visualizations replace traditional camera footage under omniscient narration, to highly interactive, participatory platforms enabling user exploration and content contribution. While linear documentaries maintain traditional video player interfaces with occasional interactive pauses, more innovative productions like *The Industry* (2017) replace conventional interfaces with data visualizations that facilitate navigation through video chapters and diverse multimedia content.

This evolution emerges from the convergence of interactive documentary practices with data visualization capabilities enabled by web technologies. Data visualization has transcended its supplementary role to become increasingly central to documentary storytelling, sometimes comprising half the content, offering alternative navigation pathways, or serving as the primary interface and organizational framework. Our analysis specifically examines documentaries that have abandoned traditional video player interfaces in favor of data visualization-driven navigation systems.

These productions distinctively represent polyphonic social phenomena by integrating quantitative data with personal narratives. Rather than privileging traditional film content, they employ interactive data visualization as a portal to multimedia narratives, with each data point linking to individual testimonies. This structure enables dual-layer exploration: a macro-level examination through quantitative visualization and a micro-level engagement with personal, subjective experiences.

The absence of traditional video content in many examples suggests these works represent not merely an adaptation but a fundamental evolution of documentary form. Their distinction from narrative visualization lies in their commitment to constructing polyphonic social representations rather than simply facilitating data comprehension and engagement.

Applying Gaudreault and Marion's (2005) double birth theory, we propose that these webdocs constitute a new genre in constitution within the web medium, entering early institutionalization as evidenced by their integration into academic curricula at institutions like Princeton University and the establishment of dedicated research facilities. While acknowledging the need for further research, this analysis represents an initial theoretical framework for understanding data-driven webdocs as a distinct genre recognized across disciplinary boundaries.

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Data collection and analysis	Andrea López-Lozano
Discussion and conclusions	Andrea López-Lozano, Víctor Herrero-Solana and Domingo Sánchez-Mesa Martínez
Drafting, formatting, version review and approval	Andrea López-Lozano, Víctor Herrero-Solana and Domingo Sánchez-Mesa Martínez

7. Conflict of interest

The authors declare that there is no conflict of interest contained in this article.

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