

Nicole Basaraba\*

# A communication model for non-fiction interactive digital narratives: A study of cultural heritage websites

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**Abstract:** Interactive digital narrative (IDN) is an umbrella term used to encompass the various formats of digital narrative such as hypertext fiction, transmedia stories, and video games. The study of IDNs transverses the disciplines of narratology, game studies, and media studies. The main question this article addresses is how does the digital medium affect narrative in cultural heritage websites? This question is examined by proposing a new communication model that considers the role of digital media — the *Creator-Producer Transaction Model* — and adapting existing “tools” of narrative analysis into a “narratological toolkit” for the study of non-fiction IDNs. The transaction between creators and *producers* and how an IDN narratological toolkit can be applied are exemplified through the analysis of three cultural heritage websites: *Open Monuments* (“Otwarte Zabytki”), *Belgian Refugees of 1914–1919*, and *Storymap*.

**Keywords:** interactive digital narrative, non-fiction, rhetorical narratology, narratological toolkit, cultural heritage, transdisciplinary

## 1 Introduction

Interactive digital narrative (IDN) is an umbrella term to describe scholarly work in the areas of intelligent narrative technologies, interactive drama, interactive storytelling, and narrative games (Monfort 2015: x). The concept of IDN connects art and technology with the goal of permeating the fourth wall where users enter the narrative and participate in its unfolding (Koenitz et al. 2013: 1). There are many IDN formats such as hypertext fiction/non-fiction, interactive movies/drama/video installations, video games, and virtual reality narratives (Koenitz 2010). Regardless of format, an IDN is “an expressive digital narrative form realised in a

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\*Corresponding author: Nicole Basaraba, School of Languages, Literature, and Cultural Studies, ADAPT Centre for Digital Content Technologies, Trinity College Dublin, the University of Dublin, O’Reilly Institute, Dublin 2, Ireland, E-Mail: nicole.basaraba@adaptcentre.ie

system which contains potential narratives and is experienced through a *process* that results in *products* that represent instantiated narratives” (Koenitz 2010: 180). “Instantiated narratives” (Koenitz 2010: 180) are the different narrative products from the same system resulting from a participatory process. Rather than “instantiated narratives”, the term “emergent narrative” is used in this article because it self-sufficiently communicates how the resulting narrative emerges from the process of user participation and it is also widely used by other scholars. The study of IDNs grew out of disciplines within computer graphics and interactive systems (Spierling 2005: 64). Since then, IDNs have been studied by game studies (i.e., ludology<sup>1</sup>) scholars, narratologists and media scholars among others. Navigating between different disciplines is challenging because IDNs are inherently multidisciplinary, but it has historically been difficult to find interdisciplinary projects or perspectives on IDN (Koenitz et al. 2013: 2). This study of non-fiction cultural heritage IDNs takes a transdisciplinary approach (crossing disciplinary boundaries) and will discuss how the concepts of participatory/digital culture through social media, the narratological toolbox, and ludonarrative dissonance impact narrative.

IDN analysis needs to account for the impacts digital culture<sup>2</sup> has on narrative. The previously well-understood methods of communication and storytelling are changing due to an increasingly participatory digital culture, which calls for an examination of the changes taking place between media production and consumption (Jenkins 2004: 36). Throughout history the recipients of cultural content – communicated through books and television, for example – have always engaged in responsive activities, but digital media provides users better access to networked media and enables them to respond using the same multi-modal communications used by the content creators, which were formerly only available to those with the technology, finances and infrastructure (Van Dijk 2009: 43). Media consumers, referred to as “readers” of printed texts, are called “users” of digital media, and IDN “users” can respond in same modalities used by IDN creators because “on the Web everyone has the potential to be a publisher” (Bruns 2005: 15).

Narratological theory intended to be valid for all narrative formats, but early narratology drew only on fictional texts and rarely addressed the differences between fiction and non-fiction (Schaeffer 2013: para 9). This digital cultural

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1 The term ludology comes from the Latin word “ludus”, meaning game. Ludology includes the study of games, how they are played, the players and cultures around gaming.

2 Digital culture is sometimes used interchangeably with digital society, Digital Age, Information Age, Computer Age, or cyberculture.

impact on narrative requires a re-examination of existing narratological communication models (e.g., Chatman 1978; Phelan 2018), which are applicable to fictional printed narratives and require modification for application to non-fiction IDNs due to the new participatory role of users. Digital interactivity by IDN users raises the issue of ludonarrative dissonance (i.e., the narrative paradox), a concept coined by game designer Clint Hocking in 2007, which describes the feeling of detachment “players”/“users” experience when there is discrepancy between their actions and the narrative/story (Hocking 2007). Hocking (2007: para 4) explains that the video game, *Bioshock* (2007), cannot be enjoyed as a story because its ludic structure works in opposition to its narrative structure. The concept of ludonarrative dissonance can be applied to the analysis of different IDN formats beyond video games because a significant challenge in building IDNs is that as the level of interactivity increases, it becomes more difficult to maintain the shape of the narrative (Louchart and Aylett 2003). As video games emerged as a new academic field, a narratology-versus-ludology debate ensued for nearly a decade. The debate was two-fold and focused on the design of game-based narratives and on question of whether video games contain narrative (Aarseth 2012: 130). The narratology-versus-ludology debate drew attention to the major challenge for IDN creators to ensure a balance between narrative structure and interactivity in order to avoid ludonarrative dissonance. A new narrative communication model that accounts for user interactivity in digital media is required for studying IDN. The *Creator-Producer* Transaction Model is proposed in this article as it considers the impact of digital media and participatory culture on narratives, which existing narratological models (Chatman 1978; Phelan 2018) do not account for.

While earlier narratology focused on communication models and developing a grammar of narrative, the 1980s narratology saw a shift in focus to new media and genres, new disciplines and approaches, and a move towards applying “tools” of narratological analysis (Meifert-Menhard 2014: 1). The metaphorical “narratological toolbox” is a concept used by many narratologists to describe different categories and concepts of narrative analysis (Dawson 2017). The narratological toolbox has grown along with narratology because existing tools need to be refined when new narratives are encountered for which the tools do not work, when new tools are needed to expand study across a range of media, and to increase narratology’s applicability to other critical practices (Dawson 2017: 229–230). This article adapts existing narratological tools into a “narratological toolkit” specifically for the analysis of IDNs which highlights how the affordances of digital media, such as user interactivity, impact the narrative communicated in non-fiction genres.

The *Creator-Producer* Transaction Model and the “IDN narratological toolkit” will be used to analyse three cultural heritage websites. The focus on cultural

heritage is due to the increasing growth of cultural heritage institutions (CHIs) – museums, galleries, libraries, archives – experimenting with digital media to communicate cultural content and engage wider audiences. Many CHIs are digitising their multimodal materials, creating virtual tours, and personalising exhibitions for the public to see and experience histories and culture (Ardissono et al., 2012). The role of museums and curators are also changing as society is increasingly becoming sceptical of experts and due to this cultural shift museums need to re-evaluate their approaches to “interpretation, interaction and meaning making” (Nielsen 2017: 441) and IDN analyses can help inform this re-evaluation. With these changes, multiple formats of cultural heritage IDNs are emerging and analysing these IDNs could subsequently inform future best practices for creation.

To date many museums have focused on live interpretation, living history and guided tours, but exhibition creators, designers and curators are becoming more involved in storytelling (Neilson 2017: 448). The concept of “virtual museums” has emerged to define “a logically related collection of digital objects composed in a variety of media” (Styliani et al. 2009: 521). Virtual museums employ a variety of technologies such as imaging technologies, Web3D, virtual reality, augmented reality, mixed reality, haptics (i.e., navigation through physical touch), and the use of handheld devices (e.g., cell phones, personal digital assistants, and tablets) (Styliani et al. 2009: 520–524). For example, the *mARCHive* which is a 360-degree video exhibition in Museum Victoria, Australia (Kenderdine 2014) and *Imago Bononiae*, a 3D real-time application projected onto a screen where people use physical body movements (i.e. haptics) to change the content displayed about Bologna, Italy (Fanini and Pagano 2015). Other cultural heritage IDN formats include serious games and interactive documentaries. Serious games apply gaming principles to non-fiction or serious topics and are used in multiple fields such as business, health, education, and archaeology, cultural heritage and tourism (Xu et al. 2017: 245–246). Many serious games require specific gaming devices, software or mobile applications. Examples of location-based cultural heritage games include *The Voices of Oakland Cemetery* (USA), *Riot 1831 at Nottingham Castle* (UK) and *Viking Ghost Hunt* (Ireland) (Haahr 2015: 114). Interactive documentaries involve navigation and interaction, are structured around different modes of representation and have often been combined with gaming (Gifreu-Castells 2014: 158). Viewers can interact with content online and they are often used as simulations of the situations presented in the films to test theories or see the opinions of the viewers on the subject matter. Examples of interactive documentaries include *JFK: Reloaded*, *Fort McMoney*, and *911 Survivor* (Gifreu-Castells 2014: 161). As IDNs are still developing into new formats and genres, there is wide experimentation with different digital media and narrative subjects. The focus of this article are website-based cultural heritage projects because websites

are widely used by CHIs, they are more accessible for users in terms of technology/devices required, and the Internet is a highly participatory medium.

The three cultural heritage websites that will be examined in this article are: the digital archive, *Open Monuments* (Poland), the digital exhibition, *Belgian Refugees of 1914-1919*, and the interactive web documentary, *Storymap*. The most common format for digital cultural heritage projects are digital archives and the creators tend to focus more on interactivity rather than on creating a narrative which often causes ludonarrative dissonance. *Open Monuments* is one example of CHIs experimenting with the digital medium with the goal of crowdsourcing public participation in cultural preservation and narrative creation in the form of a searchable archive. Another common format for cultural heritage projects are digital exhibitions, which tend to focus on using new media to engage the public rather than on communicating a narrative. The *Belgian Refugees of 1914-1918* project is an example of a digital exhibition that aims to communicate a narrative using digital media. Finally, interactive documentary is another web-based format used for cultural heritage storytelling. *Storymap* was created by two filmmakers who are skilled storytellers and they incorporate interactivity through website navigation. These three websites focus on narratives from three European countries to demonstrate a range of creative experimentation, they cover three different web-based IDN formats to test the applicability of the Creator-Producer Transaction Model and the IDN narratological toolkit, and allow for comparative examination of the narrative potential and limitations of websites as an interactive narrative medium for cultural heritage topics/projects. Most importantly, these cases also actively draw upon and encourage public participation to create shared cultural heritage narratives, which shifts focus away from experts only. Therefore, the following article proposes the Creator-Producer Transaction Model and provides an applicable IDN narratological toolkit (as will be exemplified) to aid scholars in analysing non-fiction IDNs as a new frontier in narrative studies.

## 2 Existing models of rhetorical narrative communication

The first requirement for analysing non-fiction IDNs is an applicable narrative communication model. Chatman's (1978) communication model (cf. Figure 1) has been widely used to analyse fictional narratives, but it does not account for increased reader/user participation in IDNs.

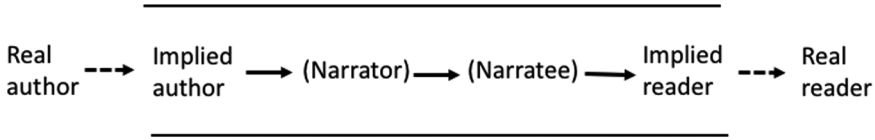


Figure 1: Chatman's (1978) narrative communication model

Chatman's (1978) model has been used as *the* model for narrative analysis for decades, but Phelan (2013: 51) argues that it describes only a special case of narrative communication which occurs along one of several channels that print narrative offers. As Chatman's (1978) model was based in fictional printed narratives, it is not applicable to non-fiction IDNs, which can have many different paths of communication. Phelan (2018: 3) recently proposed a new communication model – the “Authors, Resources, Audiences chart” (ARA chart) – to account for other types of texts such as those without a narrator as the mediator of the communication. While he does not specifically define the “resources”, they refer to different narrative techniques or poetics such as paratexts, genre, fictionality/non-fictionality, arrangement, voice, style and tone of voice, space and temporality (Phelan 2018). Phelan (2018: 7) argues that his rhetorical communication model cannot be visualised in two dimensions and instead provides a “chart of possibilities” (cf. Figure 2).

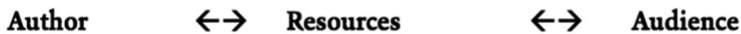


Figure 2: Phelan's (2018: 7) Authors, Resources, Audiences Chart

The ARA chart aims to allow for different “resources” as required by specific texts and to recognise that “human agents” possess agency as represented by the back-and-forth arrows between the “author”, “resources” and “audience”, which differs from Chatman's unidirectional communication model (Phelan 2018: 7–10). However, like Chatman's (1978) model, the ARA chart is also not applicable to the study of non-fiction IDNs for three main reasons. Firstly, as Iversen (2018: 89) has noted and Phelan (2018b: 165) later confirmed, the ARA chart aids in understanding the rhetorical poetics of fictional narratives rather than casting a wider “net in the seas of genres and modes” such as non-fiction IDNs. Secondly, the terminology of “author” and “audience” also pose issues for application to IDNs, which will be discussed further in the following section. Thirdly, the ARA chart lacks consideration for how the “author” and “reader” may directly be connected through digital media technologies (e.g., social media), which is an affordance of many IDNs. Non-fiction genres and the various IDN formats call for a different

narrative communication model with different terminology applicable to non-fiction and fiction and different tools for narrative analysis.

### 3 A rhetorical communication model for non-fiction IDNs

The terms “author” and “reader” are traditionally used in the context of printed novels, but IDNs challenge the role of the author because the audience takes on an active role and the narratives are malleable (Koenitz et al. 2013: 91). In digital media contexts, people are referred to as “users” because they can interact with, or use, the content and there are opportunities for back-and-forth communication between the audience and the narrative. Establishing a terminology to describe the different roles involved in the rhetorical communication model for IDNs is a challenge because they are studied across disciplines. For example, computer scientists often use the terms “sender,” “message,” and “receiver”; literary scholars use “author,” “text,” and “reader”; along with narratologists who may also refer to the “narrator,” “narrative” and “narratee”; and media scholars often refer to the “artist/designer,” “(digital) work”, and the “audience/user” (Wei and Wei: 2006).

The terminology that most closely describes IDN participants is the latter of “artist/designer”, “(digital) work”, and “audience/user”, but these terms also pose issues. Firstly, the term “artist/designer” is problematic because IDN creation may also involve a team of authors, editors, content curators/experts, graphic designers, computer programmers, project managers, etc. The term “content creator(s)” is proposed because content can encompass textual, graphical, photographic, video, and other modes of content (e.g., augmented reality, data, geographic information, etc.) and the term “creator” could be applied to any creative team member involved. Secondly, the term “digital work” accurately describes IDNs, but can be further specified for each IDN format, such as a transmedia story, video game, or interactive documentary. Finally, the term for “audience/user” is the most challenging.

“Audience” has been used in media studies to refer to consumers of one-way mass media or transmedia stories and “user” is seen widely in computer science literature. Some ludologists (e.g., Koenitz 2010) use the term “player” to refer to the IDN consumer because he focuses on video games, however, “player” does not apply to all IDN formats (e.g., transmedia stories, interactive cinema). Interactive fiction (IF) scholars (Monfort 2003: 29) use “interactor” to describe a consumer’s back-and-forth interaction with the IF system, but “interactivity” is

often used interchangeably with “agency”. Murray (1997: 128) explains, “the pleasure of agency in electronic environments is often confused with the mere ability to move a joystick or click on a mouse. But activity alone is not agency”. A unique feature of some IDNs is that they provide agency through narrative choices, which allow for emergent narratives. Thus the term “interactor”, and similarly “user”, are not sufficient to describe agency. Using a literal description of the role, the term “agent” could apply, but literary scholars use “agent” for the narrator (Walsh 1997; Hühn et al. 2009; Shoulson et al. 2011) and computer scientists use “agent” to refer to artificial intelligence (AI) machines or “virtual agents” (Rist et al. 2003; Aarseth 2012). Not only do IDNs present opportunities for agency but they may also inspire, encourage or result in further consumer participation through social media.

The role of audience-as-participant has been examined by communications and media scholars, such as Bruns (2007) who coined the term “*produser*” – a portmanteau of “producer” and “user” – to describe “citizen journalists” who both consume news articles and engage in social media participation to create their own narratives. *Produser* also accurately describes the role of the IDN consumer/producer because within any genre of IDN, *produsers* can both use (or consume) the system and contribute to (or produce) the emergent narrative based on their choices. The term *produser* is preferred over “co-author” or “co-creator” because authorship suggests that the user worked with the IDN creators to co-author the original narrative content in the system rather than being given a predetermined level of agency to contribute after the IDN is published. The term *produser* clarifies that the role is on the receiving end of the IDN system. Thus, the “creator-*produser*” terminology is proposed to describe the role of the participants in an IDN narrative communication model in place of “author” and “reader/user/audience”.

In addition to the terminology the possible direct communication between creator and *produser* is not accounted for in existing narratological models of narrative communication (Chatman 1978; Phelan 2018a). IDN removes the division between active creator and passive audience to form a new interactive relationship between creator, dynamic narrative artefact, and audience-turned-participant (Koenitz et al. 2013: 1). While Phelan’s (2018a) ARA chart signifies a back-and-forth relationship between the “author” and the “resources” and the “audience” and the “resources”, there is no direct connection between the author and the audience. Although he does not represent it visually in his model, Phelan (2018a: 155) views rhetorical poetics in narrative communication as a feedback loop where authorial agency, textual phenomena, and reader response form a system of checks and balances. The process of *produsage* is “a collaborative, participatory environment which breaks down the boundaries between producers



and consumers and instead enables all participants to be users as well as producers of information and knowledge” (Bruns 2007: para. 8). The feedback loop or connection between creators and *producers* in digital environments has been examined by in studies of human-computer interaction (HCI) and AI.

IDN scholar, Szilas (2015), has addressed the relationships between the creator (i.e., author), “interactive system” (i.e., IDN), and *producer* (i.e., user) through three different AI systems— the “one-actor”, “two-actor” and “three-actor” (cf. Figure 3).

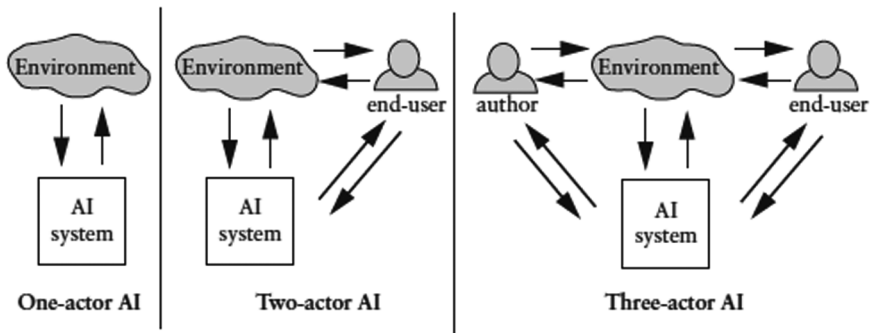


Figure 3: Artificial Intelligence Systems (Szilas 2015: 140)

He explains that early one-actor AI systems were built to model intelligent human functions and then disseminated and put into action by users (Szilas 2015: 138). The one-actor AI model mirrors Chatman’s (1978) model where the author wrote the text, which was then distributed to and consumed by readers. In a two-actor AI system, there is direct interaction with a user, where the user’s input results in system output (Szilas 2015: 138). Examples of the two-actor AI system are interactive dramas such as *Façade*, *Scenejo*, and *Fear Not!*, which allow the user to change the course of the generated fictional story by communicating with characters (Schoenau-Fog et al. 2013: 5). In two-actor AI systems the system developers (i.e., computer programmers) are also the authors of the narrative. In the three-actor AI system, Szilas (2015) explains that the third actor in the system is the “author” (i.e., creators) who are not the system developers and need the ability to populate the IDN with content. Szilas (2015: 138) notes that a storytelling software is not useful if creatives, who are often not computer programmers, cannot use it.

The three-actor system considers the system design, the process of *producer* interaction, and the content production (i.e., emergent narrative product) not as a linear process, but as a “participative methodology” so that all actors are involved

throughout the narrative creation process (Szilas 2015: 140). In some IDN formats the author can continually edit the existing digital content and the *producer* could, if given the agency, contribute to the narrative and thus, the creation process may not necessarily end so it is cyclical rather than linear. Szilas' (2015) three-actor model can also be applied to a visual representation of the transaction between IDN creators and *producers* (cf. Figure 4).

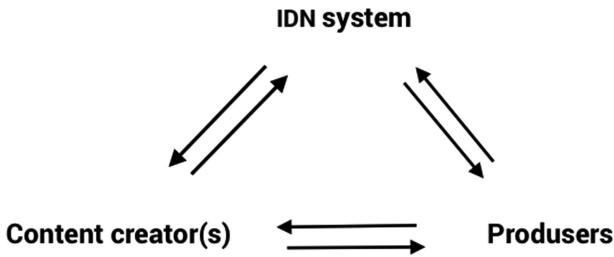


Figure 4: IDN Creator-Producer Transaction Model

The Creator-Producer Transaction Model thus accurately describes the three roles involved in IDNs, it accounts for the possibility of continual back-and-forth communications between the IDN system, the creators and *producers* which in digital media is cyclical rather than linear, it focuses on how digital media affect the narrative rather than on the specific poetics of a narrative, and it is applicable to both fiction and non-fiction genres. How the IDN Creator-Producer Transaction Model functions will be systematically examined in three cultural heritage IDNs using a digital-media focused “narratological toolkit” for individual analysis and/or comparison of the narratives.

## 4 A narratological toolkit for analysing IDNs

Websites, the medium of focus in this article, are not commonly viewed as narratives or a common storytelling medium. For example, Manovich (2001: 227) argues that websites are “databases” where the “user” follows links between records and an interactive narrative is the sum of multiple paths through a database; while Ryan (n.d.) argues that websites have “narrativity” rather convey narrative. “Narrativity” is the evocation of a script with or without authorial intent to produce a story (e.g., paintings, relics, theme parks, websites) (Ryan n.d.: 3). Thus, this study will examine whether each cultural heritage website conveys a narrative or narrativity. How narrative is defined in this transdisciplinary study needs to be specified because scholars from and within different disciplines use

different definitions. IDN theorist (Koenitz 2010: 178) prefers Herman's definition of narrative as a "forgiving, flexible cognitive frame for constructing, communicating, and reconstructing mentally projected worlds" because it "de-couples narrative from specific forms or media and opens up the space for experiments in IDN". Herman (2004: 54) says that what defines narrative "is, the way a sequence of (medium-specific) cues must be structured for it to encode a narratively organised (but non-medium-specific) sequence of participants-in-events". Narrative can be examined as an entity separate from its medium, but narratives are affected by the constraints and affordances of a given medium.

When analysing IDNs, it is important to ask questions such as, what is the narrative potential of the media and modalities employed; how can the narrative affordances of a given medium be emulated in another medium; and what can the narratives of a certain medium do that others cannot (Ryan 2016: 2)? Different media have different affordances and limitations and media are selected for their affordances (Ryan 2005: 11). A narrative can take full advantage of its medium, ignore its specificities by using it purely as a transmission channel, fight some of the medium's properties for expressive purposes, or expose latent properties and expand the expressive potential (Ryan 2005: 13). One media-centred "narratological tool" that will be used to analyse non-fiction IDNs to understand the impact of the medium are Murray's (1997) four affordances of digital media—spatial, encyclopaedic, procedural and participatory. Digital environments, and thus IDNs, are spatial because they present spaces that can be virtually moved through rather than being described or pictured, encyclopaedic because computers offer "infinite resources", procedural because they exhibit rule-based behaviour, and participatory because they are responsive to human input (Murray 1997: 83).

Spatiality in IDNs will be examined through the interface design of each cultural heritage website in terms of the aesthetics, how multimodal content is incorporated, and the functionality of the navigation. The aesthetics can be seen in the interface design such as through layout, colour usage, and the types of multimodal content used. With digital media, there are now increasing choices about how what is to be represented should be represented, in what mode, what ensembles of modes and on what occasions (Kress 2003: 117). Each mode can carry a part of the message for which it is best equipped (Kress 2003: 117). The navigation will be analysed in terms of how intuitive it is, whether there are any missing hyperlinks, and how it impacts the communication of the narrative (e.g., whether ludonarrative dissonance occurs).

The encyclopaedic affordance will be analysed in terms of the size of the narrative by drawing upon Aarseth's (2012) "game variable analysis" (cf. Figure 5), the inclusion of links to external content, and/or calls to action for further participation from *producers* through in-person or social media contributions.

Aarseth’s “game variable analysis” raises the narratology-ludology debate because games and narratives are arguably different genres, but as Murray (2005: para 7) argues, some games have story elements and some stories have game elements. Interactivity is often examined in games rather than narratives, but IDNs are developing into many different genres and formats which call for methods of analysis (a “ludonarrative approach”) that factors in the affordance of interactivity that digital environments provide. Aarseth (2012: 130) argues that regardless of specific genre, narratives and games share four common elements, a world, agents, objects, and events, which are based on many different variables (cf. Figure 5). Aarseth (2012) invites scholars to test these common game variables and thus, they will be applied as a “narratological tool” to analyse the following three selected cultural heritage IDNs (i.e., websites).

Ontic level:	World	Objects	Agents	Events
Narrative pole	Inaccessible Single room	Noninteractable Static, usable	Deep, rich, round characters	fully plotted
	Linear corridor	Modifiable	flat characters	Dynamic sate- lites/ playable story
	Multicursal labyrinth	Destructible		Dynamic kernels
	Hubshaped quest landsape	Creatable		
Ludic pole	Open landscape	Inventable	Bots, no individual identity	No kernels (pure game)

Figure 5: Game variables (Aarseth 2012: 130)

The procedural affordance will be examined through the underlying structure, which is a function of the narrative potential of an interactive text (Ryan 2015). Ryan’s (2015) nine narrative structures – Complete Graph, Network, Tree, the Vector, Maze, Flowchart, Hidden Story, Braided Plot, and Action Space – function as prototypes of possible narrative structures. The Complete Graph has every node linked to one another and allows for total freedom in navigation; the Network provides many options for movement which are link-dependent; the Tree presents multiple branches that are isolated and linear; the Vector preserves linearity with optional side branches; the Maze is similar to a network, but offers one or more exits; the Flowchart has a horizontal progression along a chronological sequence with branches leading to a single or multiple different endings; the

Hidden Story has two narrative levels, one level is fixed, unilinear and consists of temporally directed events and the other is an atemporal network of choices; the Braided Plot allows for many variations by providing a sequence of physical events from different perspectives which connect at certain points; and the Action Space prioritises interactivity and provides the general outline of a plot so the user can make decisions for its realisation (Ryan 2015: 166–175). These structures can be used to better understand whether the selected cultural heritage websites communicate an intended narrative or if narrativity is conveyed.

The participatory affordance will be examined using Ryan’s (2015) five levels of interactivity which range from low to high. Level 1 interactivity does not affect the order of the discourse it presents (e.g., many printed novels); Level 2 has predetermined story content, but the order is variable (e.g., interactive fiction); Level 3 has the *produser* as a member of the storyworld progressing along a fixed storyline which is controlled by the system (e.g., video games); Level 4 narratives are generated based on data that comes in part from the system and in part from the user (e.g., AI environments), but they are authored and *produsers* respond to affordances built into it rather than being entirely responsible for constructing the narrative; and Level 5 involves permitting the *produsers* to access and modify the system for others to expand the possibilities of action offered by the existing system (e.g., open source systems) (Ryan 2015: 176–185). Digital culture favours narratives that promote “emergence and self-renewability” or re-play value (Ryan 2015: 185), which is in part determined by the level of interactivity. Thus, these different levels of interactivity can be used to determine the level of participation and the “renewability” or likelihood *produsers* will revisit the cultural heritage websites.

Table 1 summarises how Murray’s four affordances of digital media will be examined by using other “tools” of analysis provided by Kress (2003) Ryan (2015), and Aarseth (2012). This “narratological toolkit” (cf. Table 1) specific to IDN analysis aims to be useful for other scholars who may wish to examine narrative other digital formats and genres.

**Table 1:** A narratological toolkit for analysing IDNs

Spatial	Encyclopaedic	Procedural	Participatory
Interface; multimodality (Kress, 2003), and navigation	Narrative content (i.e., story) using Aarseth’s (2012) game variable analysis, and references/links to external content/ participation	Ryan’s (2015) nine possible narrative structures	Ryan’s (2015) five levels of interactivity

The *Creator-Producer* Transaction Model and the IDN narratological toolkit will provide the guiding frameworks for analysis of the three selected cultural heritage websites in the following section.

## 5 An analysis of cultural heritage narratives

### 5.1 *Open Monuments* – A participatory digital archive

The *Open Monuments* project, facilitates the preservation of and access to information and narratives about polish historical monuments around the world through a digital archive. The first stage of the project involved garnering public participation from an “Open Data Day” event from which 400 registered *producers* for their monuments archive were recruited to provide basic information about historical sites—a process known as crowdsourcing information. The second stage of the project, currently under development, is a social networking site about the historical sites (Otwartakultura 2018). The *Open Monuments* website is in the polish language and primarily aimed at polish historians, but the project also gained an unexpected following of tourists (Grabowska 2017). The following screenshots (cf. Images 1–3) were translated into English using the Google translate as prompted by the web browser (e.g., Chrome).

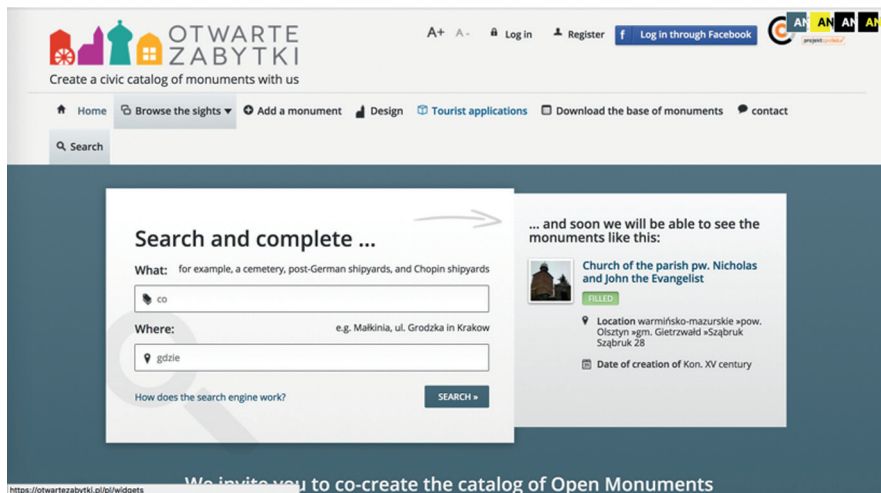


Image 1: *Open Monuments* homepage screenshot (Otwartakultura 2018)

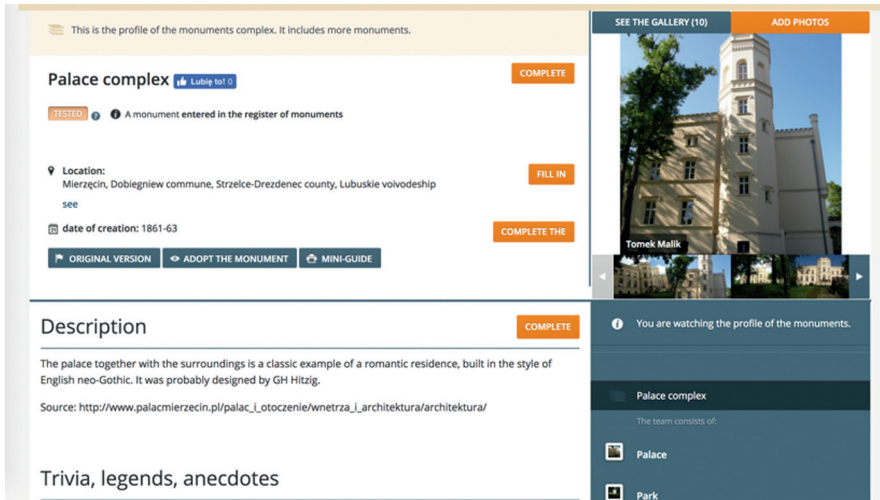


Image 2: Individual monument page screenshot (Otwartakultura 2018)



Image 3: Monument photo gallery screenshot (Otwartakultura 2018)

The *Open Monuments* website interface is easy to navigate because it has a standard text-based menu design with the titles of possible pages to explore as well as a search box in the middle of the page (cf. Image 1). As the search box is the largest and most prominent feature on the homepage, it is clear that the main function of the website is for *producers* to search for and add information to the archive. *Producers* can also browse and select different monument categories

such as castles, residential, military, park/garden, or industrial (Otwartakultura 2018), which brings up a results page where they can choose a specific monument, see photos of it and read more about it (where the content is available), and/or add content to the entry. The majority of the content is text-based with some entries including a photo gallery. The photo gallery can be clicked on to bring up a larger version of the photos that have navigational arrow icons (right or left) to permit *producers* to scroll through the images (forward or backward). The content for each entry is organised into categorised text-box spaces with maximum character limits. The content categories include: a description of the monument; stories, legends or anecdotes related to the monument; links, sources or connections; related tourist applications (e.g., phone apps); photos; categorical tags; alerts if the monument requires attention or care; important dates or events; official documents; and a list of “profile creators” including the names of those who created the monument’s entry on the website. The navigation is intuitive to use, the content is generally limited to the two modalities of text and images largely treated as separate content rather than complementary, and the interface design is simple to direct users to the call to action of searching for or adding new content.

The narrative “world” (Aarseth 2012) of the *Open Monuments* website is mostly a series of “linear corridors” where each search present a series of new “doors” *producers* can select in order to explore the individual monument information. Other “doors” accessible through hyperlinked category tags have content on a similar topics within the website and externally hyperlinks have related information on hosted events for example. The “world” is represented geographically across the globe, but focuses on narratives about polish monuments. The “objects” (Aarseth 2012), or the entries for each polish monument, are “creatable” because a *producer* can create a new entry and fill in the information based on the editable categories of information outlined on each monument webpage. The “characters” variable is difficult to apply to non-fiction narratives because they may or may not have “characters”. As the *Open Monuments* website is focused on monuments (e.g., sculptures, buildings, etc.), there are no “characters” (Aarseth 2012), but some people or historical figures may be referenced in the “anecdotes” section provided for each monument. There is no linked sequence of narrative “events” (Aarseth 2012) between monument pages, but some pages may have historical, recent, or upcoming real-life events in the “anecdotes” or “important dates” content areas. The *Open Monuments* digital archive leans closer to the exploratory ludic pole in Aarseth’s (2012) model of analysis because there is no overarching macro-narrative, but rather a sense of narrativity is achieved through the exploration of the content and anecdotes or micro-narratives about different polish monuments. Digital archives have the tendency to convey narrativity



rather than communicate one larger narrative, but they can also be a valuable source of cultural heritage micro-narratives and they allow for a high level of *producer* participation. Therefore, ludonarrative dissonance is avoided in the *Open Monuments* website because the interactivity does not impeded the *producers*' understanding of the micro-narratives.

In regard to the procedural affordance of the *Open Monuments* website, the narrative structure follows a “Tree structure” (Ryan 2015) where the *producer* starts from the homepage and then navigates down through to the sub-pages. Once *producers* visit a monument sub-page, they need to navigate back up through the levels to either the “search results” page or the “homepage” to explore different content. The website offers a level 4 interactivity because the content is provided in part by the system and in part by *producers*, but as Ryan (2015) notes, the system is pre-authored rather than letting the *producer* be completely responsible for narrative creation. The website allows *producers* to search, explore, and consume the micro-narratives they are interested in while also providing them the opportunity to contribute to the archive by either adding to an existing monument entry or creating a new entry based on narrative guideposts of the standardised categories of content, the few sentences that act as prompts for contributions, and space limitations. *Producers* cannot edit the categories of information or change the order or design of the content for example. *Producers* must also be registered with the website through Facebook or their email address in order to enter information and their name will be shown as a contributor at the bottom right-hand side of the webpage under “profile creators”.

The *Open Monuments* website – as is common for many cultural-heritage focused websites – functions as an archive displaying thousands of searchable artefacts for public access and consumption. While the *Open Monuments* website does not make the most of the spatial affordance of the digital medium due to the simple interface design, it has a high-level of encyclopaedic value as it can be continually added to and easily searched, it has an easy-to-follow procedural nature, and it is highly participatory. Thus, it takes advantage of the affordances of the digital medium except for spatially. One danger of cultural heritage archives is that they often become “ghost websites” because there is little reason for *producers* to revisit the website after they explore it once (Grabowska 2017). However, the *Open Monuments* website shows how *producers* can be given the agency to participate in narrative contribution and allows them to choose different paths to create their own emergent narrative. This website shows how the Creator-Producer Transaction Model can function efficiently in practice because it allows for iterative, participatory creation with narrative controls to create an continually expanding and evolving IDN system with many emerging micro-

narratives rather than a single temporally-based macro-narrative, which increases the likelihood that *producers* would re-visit the website.

## 5.2 *Belgian Refugees of 1914-1919* – An interactive digital exhibition

The *Belgian Refugees of 1914-1919* website was created to communicate a narrative about the Belgian refugee movement to the United Kingdom (UK) during World War I (belgianrefugees14–18, 2018). The project involved crowdsourcing personal stories and artefacts from refugees and/or their families through an open call event held at the Red Star Museum in Antwerp, Belgium (Vermandere 2017), which were then compiled along with other historical materials into a web-based narrative. Applying the IDN narratological toolkit, the first affordance to analyse is the use of spatiality, which is seen in the interface design (cf. Images 4–6).



Image 4: *Belgian Refugees* homepage screenshot (belgianrefugees14–18 2017)



Image 5: Belgian Refugees “Religion” branch screenshot (belgianrefugees14–18 2017)

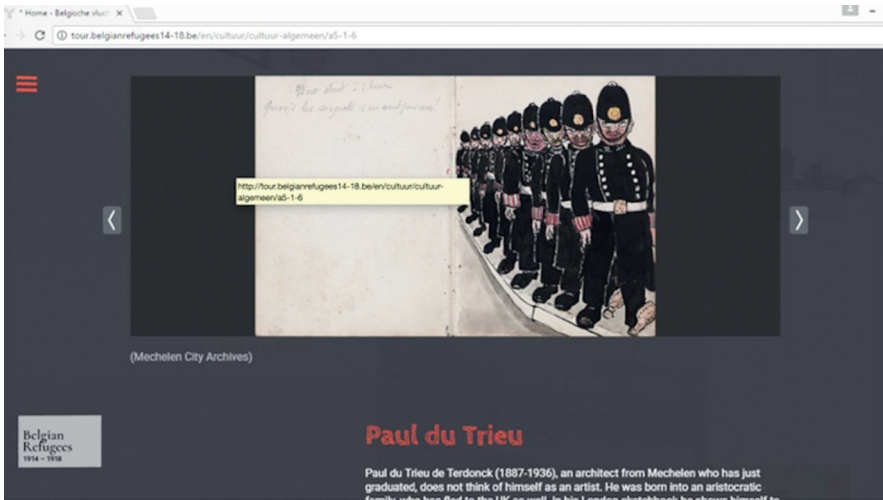


Image 6: Belgian Refugees pop-up content (belgianrefugees14–18 2017)

How to navigate through the interface is not immediately apparent based on the design (cf. Image 4). Most websites are designed to be viewed from top to bottom, but there is no clear indication of where to begin the narrative. The website can be navigated in any order the *producer* chooses. The narrative plot branches out towards the left of the screen, comes back to the centre, and then branches out to the right, following this pattern to the top of the website. The ability to randomly

select areas of the website to explore causes ludonarrative dissonance because the narrative is intended to be experienced in chronological order of historical events from the bottom of the website upwards. If a *producer* does not follow the bottom-up chronology of the narrative, it can cause confusion and create a fragmented picture of the larger narrative. The interface has a variety of multimodal content including text, images, audio (e.g., music or verbal narration), and video. On the homepage the text and images complement each other, providing more contextual information, but the narrative often focuses on one mode at a time within the pop-ups. When a *producer* clicks on a hyperlink from the main homepage interface, the multimodal content appears in a separate pop-up window that needs to be closed by clicking on an “X” in the top right-hand corner. For example, when there is a video on the *Belgian Refugees* website, it appears in the middle of the screen with text below which is descriptive and provides a short synopsis of the video rather than adding additional narrative context or information. In other words, the text is repetitive/remediated video content. While the interface has a visually interesting multimodal design, the zooming in-and-out navigation style required to view the content on each branch and the pop-ups interrupt the general flow of the narrative and ludonarrative dissonance is likely to occur for each user.

The story “world” follows a “linear corridor” path because the narrative begins chronologically in Belgium and follows the movement of the refugees toward the UK. The “objects” are “static, and usable” because the multimodal content is only displayed in response to the *producer* zooming in or clicking a hyperlink, but does not change due to *producer* interaction and *producers* are not permitted to edit or add content directly to the website. The *Belgian Refugees* website does not focus on a specific person or character. People (or characters) often only appear once in a single pop-up so fully-rounded characters do not play a significant role in the narrative. People are briefly introduced in one or two sentences when the unique historical artefacts have been provided by family members (e.g., photographs, personal objects), but these “characters” are not present throughout the entire website. The “events” are “fully plotted” in that the design offers little room for narrative expansion, there is no opportunity for alternate narrative paths based on the *producer*’s choices, there are no hyperlinks to additional or related internal or external content, nor is there space for *producers* to add comments or share the content through social media icons (e.g., hyperlinks). The *Belgian Refugees of 1914-1919* digital exhibition thus leans very closely to the fully-plotted narrative pole rather than the exploratory ludic pole in Aarseth’s model of analysis.

Looking to the procedural nature of this website, the narrative structure can easily be seen in the directorial arrow graphics (cf. Image 4), which is a “vector

with side branches” (Ryan 2015). This narrative structure is mostly linear and does not make the most of the digital medium’s affordances of permitting non-linear navigation. The *Belgian Refugees* website offers a level 2 (Ryan 2015), or a low level, of *producer* participation as the order of the content is variable, but their choices do not change the narrative. As a result of the ability to navigate to different pieces of content in any order and the lack of narrative guidance or navigation instructions, the *producer* may not gain a clear understanding of the intended narrative about the Belgian refugees emigrating to the UK.

Overall, the *Belgian Refugees of 1914-1919* website offers a museum-like experience with a theme-based collection of artefacts that have been chronologically ordered and grouped into one narrative according to topics such as education, religion, work, and art. Digital exhibitions on topics of cultural heritage often emulate museum-based experiences, but there is a growing movement towards more storytelling (Neilson 2017: 448). Like museum visitors choose which area/hall of a museum to walk through and which displays to view more closely, *producers* of the *Belgian Refugees* website similarly can navigate through whichever branch they wish and zoom in on. The *Belgian Refugees* website makes good use of spatiality in the multimodal interface design and it has a unique navigation, it does not make the most of the encyclopaedic affordance as there are no internal or external hyperlinks, the procedural nature is lacking as the zooming and pop-ups and navigation are likely to cause ludonarrative dissonance, and it also is not very participatory as *producers* cannot add/edit content. While the *Belgian Refugees* website is an example of a strong narrative, the creators focused on a one-time participation from the public (e.g., submitting artefacts) rather than cyclical transactions, and the interactivity was not incorporated in a way that made the most of the digital medium and enhanced the narrative. *Producers* would have little reason to revisit the *Belgian Refugees* website as most of the content could be consumed in one visit or broken up into a few visits, but there is no indication that the narrative will be expanded with more content.

### 5.3 Storymap – An interactive web documentary

The *Storymap* website was created to persuade an international audience that there is more to Dublin city in Ireland than the negative press about unemployment, high living costs, and brain drain (Storymap 2017). The aim was to capture oral stories about Dublin through the medium of film. Each story was filmed in the location where it is set and then pin marked on an interface of a Google map (cf. Images 7–9).



Image 7: Storymap homepage screenshot (Storymap 2017)

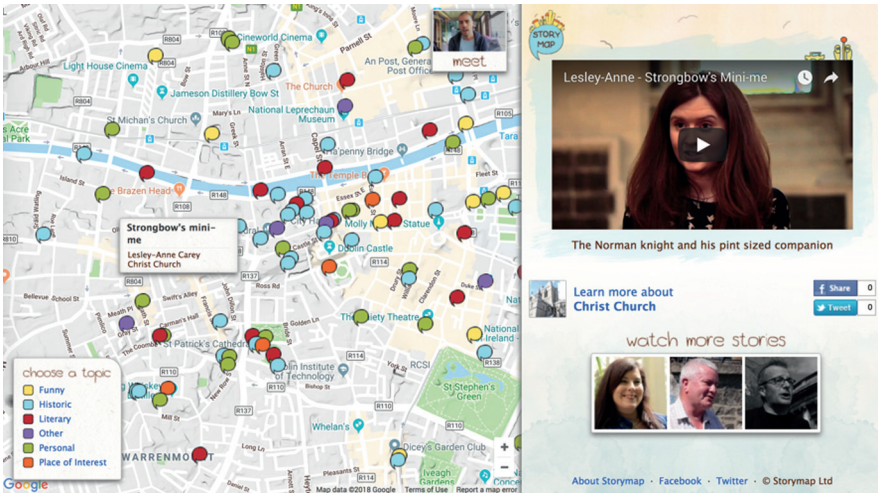
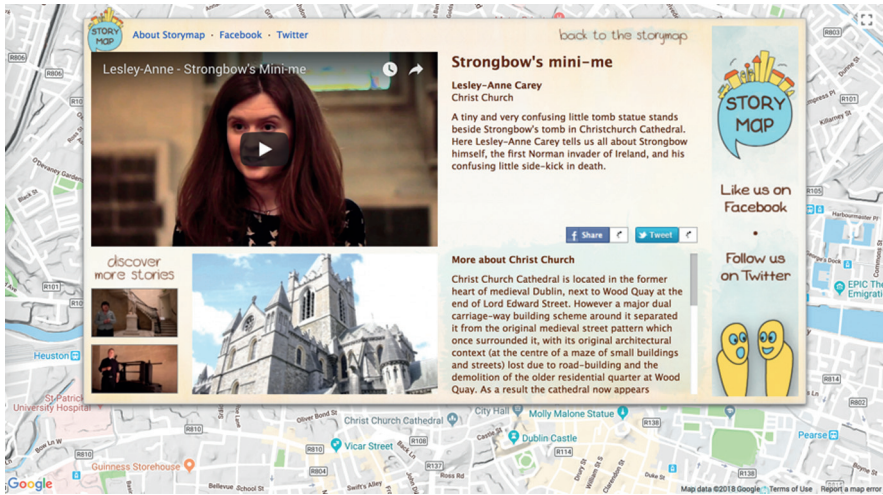


Image 8: Storymap video selection screenshot (Storymap 2017)



**Image 9:** *Storymap* “learn more about Christ Church” screenshot (Storymap 2017)

The *Storymap* interface design is unique, intuitive and offers multiple navigation options. *Producers* can enter a narrative by selecting a single coloured-coated speech bubble icons, which represent six different story topics – funny, historic, literary, other, personal, and place of interest – as seen in the “choose a topic” legend (cf. Image 7). Another navigation option is to select a topic, which causes other icons to become transparent on the map making the selected topic options is easier to see. *Storymap* has many varieties of multimodal content including a Google map, graphics, text, photos, and videos. The text below each video, describes the video content rather than adding new content, but the “Learn more” hyperlinks add value by leading to another sub-page of descriptive text and a photo. *Producers* exit the sub-page by clicking the “back” button on the browser because the interface is missing a built-in navigation option back to the selected narrative or homepage.

As for the procedural affordance, the narrative “world” is a “open landscape” (Aarseth 2012) that can be explored in any order by the *producers*. The narrative content is contained in sub-pages accessed by selecting a speech bubble icon, but *producers* can also explore the Google map beyond Dublin city. The “objects” are “static and usable” (Aarseth 2012) as *producers* can select different content, but cannot modify it. The videos are directed and edited by the filmmakers and authored by the narrators. These narrators are real people and are “well-rounded characters” (Aarseth 2012) with unique personalities that influence their storytelling. The “events” are “dynamic satellites” (Aarseth 2012) as they exist in isolated areas around Dublin city and can be selected in any order by the *producer*

(i.e., accessed via bubble icons). Considering these variables, *Storymap*'s world, objects, characters and events are well-developed and unchangeable so it leans closer to the narrative pole of Aarseth's (2012) game variables analysis.

The narrative structure for *Storymap* follows a "complete graph structure" (Ryan 2015) because each video can be linked to any other video and any video can be navigated to from the homepage. For example, the "related videos" below each selected video are suggested randomly and do not have a cohesive narrative connection thematically, categorically, chronologically, or geographically to the selected video. Ryan (2015) notes that the complete graph narrative structure is rarely used in storytelling, but *Storymap* experiments with the interactive web documentary format by only offering topical guidance through the colour-coated bubble icons. *Storymap* offers a level 2 interactivity, where the narrative content is pre-determined, but the order is variable for each *producer*. Since it was published, the website does not appear to have been updated with new narratives. *Producers* can share links to certain videos through Facebook and Twitter, but there is no opportunity to send content to the creators or add/edit directly on the website.

*Storymap* generally conveys narrativity through autonomous micro-narratives rather than one overarching storyline. Other examples of web documentaries allow more *producer* interactivity and are often used tools for predicting human behaviour, but *Storymap* intends to change the narrative or conversations about Dublin across the world. Overall, *Storymap* uses spatially very well through the open-landscape navigation on a Google map, it captures untold stories in the modality (i.e. oral) that is natural to the storytellers, the encyclopaedic affordance is recognised through internal linking and the possibility to share content via social media hyperlinks, the procedural nature does not cause ludonarrative dissonance because it focuses on the micro-stories although there are a lack of links between the different stories, and the low level of participation prioritises exploration. *Storymap* serves as an example of a non-fiction IDN created for a rhetorical narrative purpose, but more follow up would be required to determine whether new conversations about Dublin occurred after *producers* visited the website as there is little opportunity for direct Creator-*Producer* transaction. *Producers* may revisit the website because there is a lot of content to explore, but once a user is satiated, there is no indication that new content would appear in the future.



## 6 Conclusion

This article examined how digital media impact narrative in IDN formats and more specifically in non-fiction websites. Narratology was drawn upon to consider how communication between the “author” and “reader” has changed in the context of digital media and the *Creator-Producer* Transaction Model was proposed for this study and future IDN analyses. The *Creator-Producer* Transaction Model is limited as the simplification of communication levels to only the roles of the “real creators” and “real *producers*” focuses on how the medium impacts the transaction rather than analysing the poetics of narrative communication. Furthermore, communication/media scholars have also shown how digital identities are different than offline identities and that Internet user behaviour can differ according not only to their historical-cultural and educational background, but also due to the distance and anonymity that digital media provides. However, the focus of this analysis is not on all the possible different layers of interpretation or meaning-making, but instead on how the digital medium affects the narrative and more specifically on how websites can be used as a medium to communicate cultural heritage narratives in different formats (e.g., an archive, exhibition or web documentary). The proposed *Creator-Producer* Transaction Model aims to serve as a media-focused guide for future research on a larger corpus of non-fiction IDNs in different formats and topics.

In addition to an updated narrative communication model for the digital age, this article adapted existing tools of analysis into a “narratological toolkit” for IDNs, which includes the four affordances of digital media (Murray 1997), how the interface, multimodality and navigation impact communications (Kress 2003), Aarseth’s (2012) game variables analysis and the issue of ludonarrative dissonance (Hocking 2007), and Ryan’s (2015) narrative structures and levels of interactivity. This toolkit was applied to three different cultural heritage IDNs to exemplify how it can lead to fruitful analyses and insights on digital narrative communication. These three examples show how the affordances of digital media can be used well and how they can cause confusion in IDNs. Websites are an accessible medium that contain the potential to tell non-fiction narratives about cultural heritage, but balancing narrative and interactivity and strategic media usage are important for successful rhetorical communication between creators and producers. Future considerations and questions for discussion from this study are: how does the proposed *Creator-Producer* Transaction Model change the process of interpreting and analysing narratives in digital media? What role can/should the metaphorical “IDN narratological toolkit” play in analysing new narrative formats and different genres? Are any “narratological tools” missing for IDN analysis? How can websites be optimally used as an interactive digital narrative medium?

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