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Navigating Interactive Story Spaces. The Architecture of Interactive Narratives in Online Journalism

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ABSTRACT

Over the past decade, journalists have created in-depth interactive narratives to provide an alternative to the relentless 24-hour news cycle. Combining different media forms, such as text, audio, video, and data visualisation with the interactive possibilities of digital media, these narratives involve users in the narrative in new ways. In journalism studies, the convergence of different media forms in this manner has gained significant attention. However, interactivity as part of this form has been left underappreciated. In this study, we scrutinise how navigational structure, expressed as navigational cues, shapes user agency in their individual explorations of the narrative. By approaching interactive narratives as story spaces with unique interactive architectures, in this article, we reconstruct the architecture of five Dutch interactive narratives using the walkthrough method. We find that the extensiveness of the interactive architectures can be described on a continuum between closed and open navigational structures that predetermine and thus shape users' trajectories in diverse ways.

KEYWORDS

Interactive narrative; digital longform journalism; multimodality; narrative space; architecture of interaction; user agency

Introduction

An African woman, dressed in a red shirt and black headscarf, is looking at you from your screen. Sitting at a table, she appears tired:

I'm not feeling well, but I can talk. I am married, but I do not love my husband. I uh I came here ... I didn't travel alone. I came here with Kees. I'm really having a hard time in Holland. I'm getting tired of everything. I can't sleep without my medication. In Guinea, I wasn't like this at all. After that first interview, I remembered everything. I do not feel good today.

The situation described above is a scene from the interactive multimedia production *Het Nader Gehoor* (The Detailed Hearing) created by freelance collective

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The data that support the findings in the article are available upon request.

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Lighthouse Reporters for Trouw, a Dutch national newspaper rooted in a Christian tradition. Here, “you”—one of the users in front of the screen—are asked to interview three asylum seekers and assess if they are eligible for temporary resident permits. Mariama, a 22-year-old woman from Guinea, has applied for a temporary resident permit at the Dutch immigration service (IND). She speaks to users as though they were sitting across from her at the table during an IND interview and they can virtually converse with her in an interactive video sequence. But before users can talk to her or the other two asylum seekers, an introduction video explains the setting: users are told that the immigration service determines who gets a permit based on an extensive interview (the detailed hearing) where asylum seekers are obligated to truthfully share all relevant information. The video instructs users to “watch, listen, and decide.”

This interactive narrative invites users to take on the role of an immigration officer in an interactive video sequence to discover how the immigration process works. *Het Nader Gehoor* is part of a growing body of in-depth journalism that involves users as active participants by making interaction an integral part of the narrative. Over the past decade, news organisations have invested in creating more and more elaborate in-depth journalistic stories like *Het Nader Gehoor* to provide an alternative to the increasing speed of the relentless 24-hour news cycle (Le Masurier 2015). Commonly described as *digital longform journalism* (Dowling and Vogan 2015; Dowling 2019), and also referred to as *interactive documentaries* (Aston and Gaudenzi 2012; Uricchio et al. 2016) in certain contexts, these narratives blend different media forms, such as text, video, audio, photography, and data visualisation with the interactive possibilities of digital and networked technologies. These narratives engage users by inviting them to navigate through an interactive story space. Studies of fictional interactive narratives have shown that interactivity can indeed contribute to empathy and engagement as part of the user experience (Hand and Varan 2009; Roth and Koenitz 2019). However, as Ducasse, Kljun, and Čopič Pucihar (2020) show in the context of interactive documentaries, moments of obligatory interaction lead to significant user drop-offs. Moreover, Groot Kormelink and Costera Meijer (2018) convincingly reveal that user activity does not equate to interest in or engagement with the news, but that its significance changes depending on the context. These ambiguous responses to interaction as part of narrative experiences, urges us to scrutinise these interactive texts in more detail. Therefore we focus in great detail on the strategies creating interactivity in such narratives.

The role of interactivity has been considered a means to achieve deeper audience engagement by giving users agency in journalistic productions (Dowling 2019; Picone 2016; Usher 2016). However, whilst research in journalism studies has particularly scrutinised the multimodality and multimodality of digital longform journalism (Hiippala 2017; Greussing and Boomgaarden 2019; Jacobson, Marino, and Gutsche 2016; Marino 2016; Pincus, Wojcieszak, and Boomgaarden 2017), little attention has been given to the distinctive role of interactivity and *how* this specific feature of online journalism enables user agency in the construction of a plot. A notable exception is the work of Anderson and Borges-Rey (2019), who examine the relationship between journalists and their audience in the context of data visualisations. Like in the early studies of narrative data visualisation by Segel and Heer (2010), the academic work on digital

longform journalism has mainly focussed on categorising the variety of interactive journalistic non-fiction. This has resulted in typologies that help identify the diversity in interactive and multimedia journalistic storytelling (Jacobson, Marino, and Gutsche 2016; Hernandez and Rue 2015; Hiippala 2017; Planer and Godulla 2021; Van der Nat, Bakker, and Müller 2021). However, to fully understand how interactive journalistic narratives give users agency, the architecture of interactivity of these narratives has to be addressed more in depth. This requires an approach that allows us to systematically describe how the narrative establishes navigational options for users, enabling them to create individual instantiations whilst exploring a narrative's story space.

To do so, we find fertile ground in interactive narrative theory. In this study, we discuss digital longform narratives as story spaces (Jenkins 2004; Ryan and Thon 2014) that involve users in a narrative process through narrative and navigational cues displayed on the screen. Our approach is inspired by the neoformalist approach to filmic narrative as a process that occurs between creators, text, and spectators (Bordwell 1985; Thompson 1988). Conceptualising the interactive narrative as a process that depends on the navigational structure of the digital story space, and the choices users make within that space, enables us to reveal how creators have predetermined the potential interaction between users and the narrative. In the following text, we focus on what we call the *interactive architecture* of the narrative, referring to Jenkins's (2004) approach to interactive narratives. Specifically, we want to scrutinise how the interactive architecture of a story space shapes the agency users have in the narrative process, and thus, in the construction of a plot.

For this study, we have reconstructed the *architecture of interactivity* of five Dutch journalistic interactive multimedia narratives created between 2016 and 2019. By mapping the navigational structure of these five narratives through iterative walkthroughs (Light, Burgess, and Duguay 2018), we reconstruct a variety of more open and more closed architectures that guide users in their exploration of the story space. Before we present the reconstructions of the interactive architectures of the selected five Dutch narratives, we want to discuss our theoretical framework in more detail.

Digital Longform and Interactivity

Digital technologies have provided journalists with a range of new creative possibilities to develop and present their stories. Interactive narratives have, as a form of digital longform journalism, been seen as the digital progeny of "narrative" or "literary" journalism (Dowling 2017; Dowling and Vogan 2015; Giles and Hitch 2017; Jacobson, Marino, and Gutsche 2016; Van Krieken 2018). Narrative journalism has its roots in the literary narratology of new journalism (Blanken and De Jong 2014), an American journalistic movement from the 1970s spearheaded by prominent journalists like Tom Wolfe and Truman Capote (Giles and Hitch 2017; Blanken and De Jong 2014). This journalistic genre, closely related to the feature story, uses literary narrative techniques to engage readers. However, traditional textual approaches are not sufficient to understand the decisive interactive qualities of these productions since interactive multimedia narratives combine not just techniques from written and audiovisual journalism, but also use genuine digital techniques such as interactive data visualisations and the

parallax scroll, which were famously used in *Snow Fall: The Avalanche at Tunnel Creek* (Dowling and Vogan 2015; Hiippala 2017; Van Krieken 2018). To grasp this convergence of textual, audiovisual, and interactive storytelling as a key characteristic of the genre, and to describe the visual techniques used in interactive narratives, concepts such as “the animation of literary techniques,” (Jacobson, Marino, and Gutsche 2016) “cinematic techniques,” (Dowling and Vogan 2015; Hiippala 2017) and “embedded and interactive multimedia” (Giles and Hitch 2017) have been introduced. For example, Hiippala (2017) shows in detail how visual transitions between different media modalities are employed to connect diverse textual and audiovisual elements. However, the focus on multimodality and multimediality has left the interactive dimension of the genre somewhat underappreciated. Studies in the fields of data journalism (Anderson and Borges-Rey 2019; De Haan et al. 2018; Drucker et al. 2018; Segel and Heer 2010), interactive documentary (Nash 2012), and news games (Bogost 2008; Ferrer-Conill et al. 2020) suggest that interactivity plays a role in the construction of meaning regarding the news. Focussing on digital longform journalism, Hernandez and Rue (2015) analysed the design of multimedia narratives with an emphasis on interactivity. To describe user experiences related to the narrative design of a production, Hernandez and Rue differentiate between “continuous,” “comprehensive,” and “immersive” experiences (2015, 96-98). But their model is of limited use for our approach, since these three categories are of different conceptual levels. Whilst the first two categories refer to the ordering of the story elements (from linear to non-linear), the latter describes a supposed overall effect of the narrative design on audience engagement.

What’s more helpful to tackle the structuring and navigation of different parts of an interactive narrative is the term “page-flow” introduced by Hiippala (2017, 425). It describes how different media modalities and story elements of interactive multimedia narratives are organised and connected to each other. This term “page-flow” thus covers the relation between different media modalities within the narrative design of a production. It implies that users need to interact with the production to navigate between different elements of the narrative, specifically when story elements are not presented in a linear way. Whilst Hiippala focusses in his analysis on the multimodal presentation, the ways in which users can interact with and navigate between the different elements and modalities of a production is not discussed in detail.

The Architecture of the Story Space

When addressing the implications of interactivity in narratives, narratologists, literary scholars, and film critics highlight the difference between traditional linear and new interactive media forms (Montfort 2007; Ryan 2014). Ryan (2014) argues that narratology traditionally focussed on two dimensions of narrative: the text as designed by the creators and the cognitive construct of the narrative as created by the recipient when perceiving the text. For interactive narratives, Ryan highlights that it is relevant to consider the difference between the presentation of a narrative via a linear media form as opposed to the interactive narrative text; the structuring of the narrative presentation of the former is defined exclusively by the creators whilst for the latter, the structuring

depends on user activity. This aspect of interactive narratives has been referred to as “procedural” (Koenitz 2015; Montfort 2007; Murray 1997) or, in the context of persuasive games as “procedural rhetoric” (Bogost 2008). Essentially, procedural approaches to interactive narrative forms acknowledge that both the structuring of the presentation and consequently, the cognitive reconstruction of the narrative, are dependent on user activity. The ability to affect the structuring of the presentation is what is considered “user agency” (Laurel 1993; Murray 1997).

In neoformalist narrative theory, user activity has always been considered part of the narrative process (Bordwell 1985; Thompson 1988). Developed for the analysis of film, and thus for linear forms of presentation and reception, neoformalism considers the text a collection narrative cues steering recipients in inferring a film’s story based on what they call the text’s plot (Bordwell 1985). The plot is a particular structuring of the narrative cues that determines what and how narrative information is presented to recipients (Bordwell 1985, 52). Jenkins argues that this approach to narratives is particularly suitable as the basis for interactive narratology, as a narrative is considered “less a temporal structure than a body of information” (2004, 126). For interactive narratives, next to narrative information, this body of information also includes what we call *navigational* information or *navigational cues* that guide users’ activities; for example, clickable buttons opening an earlier undisclosed part of the story space. Building further on the procedural nature of interactive narratives, Koenitz (2015) introduces a set of terms for the analysis of interactive narrative design. Central to Koenitz’s theory is the “narrative system” that contains what he calls the “protostory.” He defines the protostory “as a space of potential narratives” (99). This concept is particularly useful for an in-depth analysis of the interactivity of such narratives. However, we suggest that what Koenitz calls the *protostory* can better be understood as a *story space* for potential narrative constructs, or individual trajectories, that occur as the result of individual explorations based on user-story space interactions shaped by navigational cues and the narrative’s interactive architecture.

Obviously, spatial metaphors are prominent in the above-discussed approaches as is in our approach to interactive journalistic narratives. Spatiality is commonly featured as a key characteristic of the narrative potential of digital media (Jenkins 2004; Jenkins 2006; Laurel 1993; Murray 1997; Ryan 2004; Ryan 2014). Spatial metaphors are used in particular to describe the non-sequential manner in which the navigational cues and the story information of interactive narratives are structured. In this context, *spatiality* does not refer to the spatial setting of the represented narrative world, nor to an actual physical space, but rather, it indicates that the plot is not presented in a fixed order, like in a book or a film. Rather, the presentation of the story information happens as users explore the story space, guided by navigational cues.

Building on Jenkins (2004), here we adopt the term *architecture* as a metaphor to describe the structure of an *interactive story space* in journalistic interactive narratives as its architecture of interactivity. The interactive architecture of a narrative, as designed by its creators, describes how the navigational cues of the story space are configured to shape the interactive process. As our analyses show, this structure of cues can vary between linear sequencing and multi-linear or even non-linear structures (Hiippala 2017; Dowling 2017; Hernandez and Rue 2015). The story space can be

modelled as the total of narrative and navigational cues, whilst the narrative's architecture of interactivity describes how the relationship between all navigational cues shapes users' potential activities. The architecture of interactivity thus establishes what Anderson and Borges-Rey (2019) call a "constructed audience." Navigational cues direct and guide user activity, and hence, the potential choices users can make within the boundaries of the story space result in individual instantiations of the narrative.

Method

In this study, we focus on the interactive architecture of the story spaces of five Dutch journalistic interactive narratives. Commonly, interpretative, textual, and narratological analyses are done through a close reading of the media text, though the methodological practice is fractured at best (Fürsich 2009). Furthermore, since for interactive narratives, the presentation of text depends on user interaction (Ryan 2014), traditional textual approaches are unsuited for the study of the interactive architectures. Therefore, we structure our "close-reading" by reconstructing the interactive architecture through iterative "walkthroughs" of each narrative. Light, Burgess and Duguay suggest in their instruction for walkthrough analyses of apps to include a "step-by-step observation and documentation of an app's screens, features, and flows of activity" (2018, 882). Following this approach, we generated and accumulated in our walkthroughs different instantiations of the five narratives by engaging with the narrative and navigational cues.

The data was gathered by one researcher following the same protocol for all five interactive narratives, consecutively focussing on (1) an in-depth description of the narrative, (2) generating visualisations of the interactive structure of the narrative, (3) mapping navigational cues that guide users through the story space, including the available choices, and (4) representing these findings with a final walkthrough as wireframes (see figures below). Wireframes are schematic visualisations of the possible interactivity, a common practice in software development and web design. By documenting the iterative instantiations¹, we generated rich data to reconstruct the interactive architecture of the story space and its complete navigational structure. Based on the walkthroughs and the wireframes, we focussed our analysis on how various navigational structures shape potential user interaction and particularly, how user activity within the story space is shaped by its interactive architecture.

For our analysis, we selected five interactive multimedia narratives created by Dutch news media between 2014 and 2019. The narratives are published on stand-alone websites hosted on web domains of major journalistic organisations. The five narratives were selected because they are exemplary for international trends of this genre and showcase a variety of narrative and navigational structures found in our previous content analysis of interactive narratives in Dutch online journalism (Van der Nat, Bakker, and Müller 2021). Together, the five productions display diverse architectures of interactivity (Table 1), allowing us to compare how different interactive architectures structure potential user interaction. To capture a full scope of interactive journalistic narratives, we have also included one with a traditional linear structure

Table 1. The five interactive narratives were selected to display variety in their arrangement of the narrative and navigational cues.

Name	Sequencing	Publisher	Year
Kan geboortebepanking het wereldwijde voedselprobleem oplossen? (<i>Can birth control solve the worldwide food crisis?</i>)	Linear	De Volkskrant	2019
Het Nader Gehoor (<i>The Detailed Hearing</i>)	Multi-linear	National newspaper Trouw	2016
Uit het Moeras (<i>From the Bogs</i>)	Multi-linear with options to explore non-linearly	National newspaper Dagblad van het Noorden	2019
Refugee Republic	From non-linear to multi-linear	Regional newspaper De Volkskrant & Submarine Channel	2014
De Industrie (<i>The Industry</i>)	Non-linear with option to explore linearly	National newspaper & documentary production house VPRO & Submarine Channel National public broadcaster & documentary production house	2016

that offers no alternative pathways through the story space and thus, only has minimal variation in the potential instantiation of a plot.

Analysis of Five Interactive Architectures

In the next section, we discuss the interactive architecture of each of the five cases in order of increasing complexity (see Table 1). In our analyses, we focus on the consequences of the complexity of the different interactive architectures for potential user activity and individual instantiations of the story space.

Kan geboortebepanking het wereldwijde voedselprobleem oplossen? (Can Birth Control Solve the World's Food Problem?)

The data-essay *Kan geboortebepanking het wereldwijde voedselprobleem oplossen?* resembles a conventional journalistic article that includes two moments of interaction (Figure 1). It orders the information linearly, with the addition of interactive and animated data visualisations to answer its central question of whether birth control can decrease overpopulation of the planet. The production presents a singular plot, establishing the reasoning of the creators. This plot emerges from a linear presentation of narrative and a few navigational cues (Figure 2) leading users from text to visualisation (Figure 2 – nr.1). The text directs users through the story space by posing questions, explaining the answers, and taking users along in the line of reasoning with a liberal use of the inclusive rhetorical devices “we” and “you.” An example is the following sentence that explains how a graph should be interpreted: “As you can see, both birth and death rates have decreased over the past 200 years.” Also, questions are often posed using inclusive pronouns, including users in the creators’ argument.

DE VOEDSEL ZAAK krant


Kan geboortebeperving het wereldwijde voedselprobleem oplossen?

Een condoomfabriek in Afrika, de sterilisatie van hele continenten en zelfs seks met dieren, al deze 'oplossingen' zijn op de sociale media voorbijgekomen als reactie op ons **Voedselzaak-project**. Hoe voeden we tien miljard mensen in 2050?, is de vraag. Een veelgehoord antwoord: kunnen we er niet beter voor zorgen dat er minder mensen bij komen? En dan vooral door geboortebeperving in Afrika.

De toon van een deel van de reacties is naar of ronduit racistisch. Kijk maar naar de echt geplaatste tweets en facebook posts hieronder:

 **Wim Brouwer** · 27 jan.
Als antwoord op @volkskrant

Geen paniek !! De natuur regelt zichzelf, er zullen mensen omkomen van de honger. God zorgt daar wel voor. Ander idee misschien: Bouw een gigantische condoom fabriek in Afrika. Of stel een grens aan het aantal kinderen wat je mag hebben.



Maar het is niet alleen een groep - regelmatig anonieme - reaguurders die in ver-gaande geboortebeperving een makkelijke oplossing voor allerlei problemen ziet. Ook de grootste regeringspartij, de VVD, bepleitte onlangs de inzet van ontwikkelings-geld voor anticonceptie in Afrika.

Natuurlijk klinkt die gedachtegang wel logisch: het is nou eenmaal makkelijker om voor iedereen te zorgen als er minder mensen zijn. Maar moeten we echt al die mensen in andere werelddelen beperkende maatregelen gaan opleggen om het geboorteoverschot terug te dringen? Of zijn er betere - bovenal ook humanere - manieren om de bevolkingsgroei af te remmen? En kunnen we op dit gebied misschien iets leren van de geschiedenis, inclusief de onze?

Die vragen beantwoorden we in dit stuk.

Laten we beginnen bij de huidige situatie. De wereldbevolking is de afgelopen twee-honderd jaar razendsnel verzevenvoudigd, tot 7.6 miljard mensen nu. Dus sinds jii in **1980** ↕ op de wereld werd gezet, is de bevolking met niet minder dan 3.2 miljard mensen gegroeid.



Year	Population (billions)
1810	1
1980	4.5
2018	7.6
2050	9.8

Figure 1. The landing screen of *Kan geboortebeperving het wereldwijde voedselprobleem oplossen?* ends with an interactive data visualisation where users can enter their own birth year.

The two interactive visualisations support the creators' line of reasoning. The first asks users to enter their birth year and then displays how many people have been born since then. The second allows users to change the birth rate of each continent and see the resulting consequences on the growth of the world's population. Thus, both interactive features invite users to play with the presented data and to explore

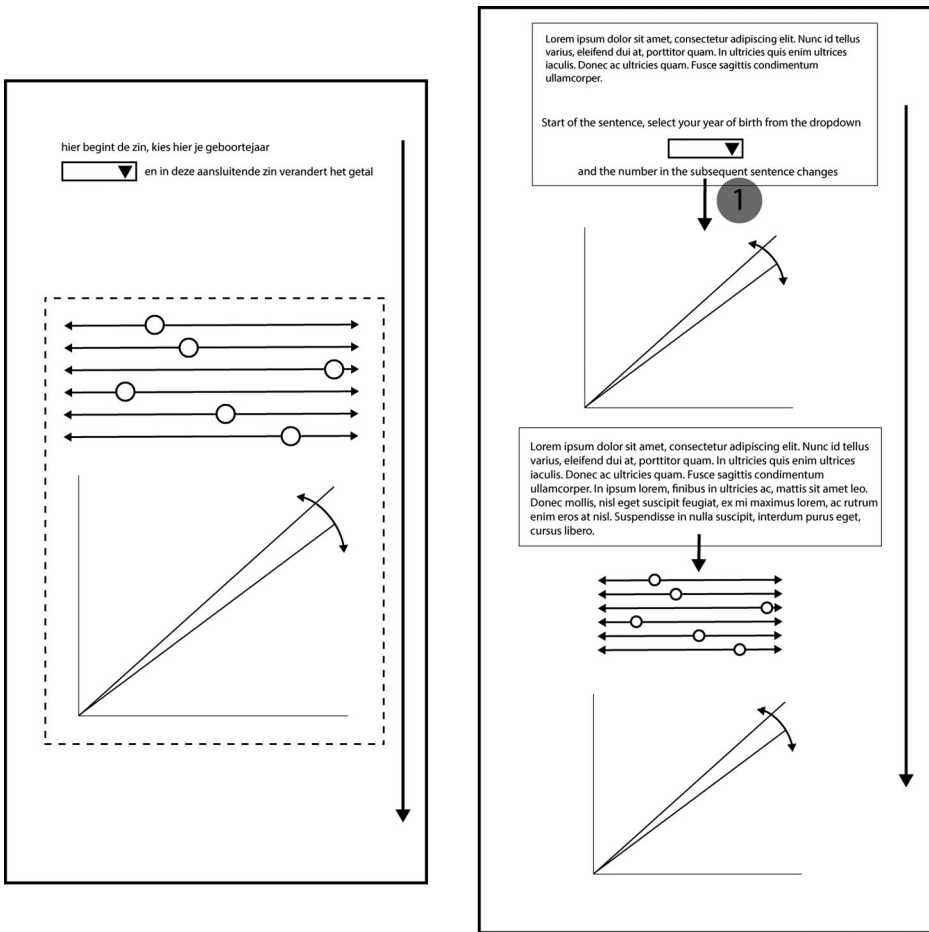


Figure 2. The architecture of *Kan geboortebeperving het wereldwijde voedselprobleem oplossen?*.

the statistical consequences as the visualisations change based on users' input. The visualisations are embedded in the argument by the text preceding and following the graphs. The preceding text includes navigational cues instructing users how to interact. Whilst the text following each interactive visualisation explains, independently from users' input, how the data should be interpreted.

Within the linear story space of *Kan geboortebeperving het wereldwijde voedselprobleem oplossen?*, the interactive architecture supports the creators' reasoning. This closed navigational structure allows for just a single trajectory through the story space. Potential for user activity is limited to the manipulation of data in the two interactive visualisations. However, as our analysis reveals, the interactive visualisations prompt users to reach the same conclusions as presented by the creators, based on their line of reasoning.

Het Nader Gehoor (the Detailed Hearing)

The interactive documentary *Het Nader Gehoor* requires more extensive navigation, whilst at the same time, the story space is structured in several closed sequences. The



Figure 3. The landing screen of *Het Nader Gehoor* sets the scene for users to take on the role of an immigration officer.

production presents the detailed hearings of asylum seekers about the reasons they fled their countries and their journeys to the Netherlands. Such a hearing is part of the asylum procedure in the Netherlands. The production mimics interviews of individual applicants by placing users in the position of an immigration officer. This situation is established during the opening sequence, where users are instructed to pay particular attention to applicants' willingness to share their migration stories truthfully and without contradictions. The landing screen (Figure 3) opens with the following text:

The immigration service determines which asylum seeker may stay. An in-depth interview about their flight story, the detailed hearing, is crucial in this decision. Who, according to you, is eligible for asylum? Watch, listen and decide.

After the introduction video, users are asked to choose one of the three interviewees (Figure 4 – nr. 1). The interviews are presented in an interactive video sequence

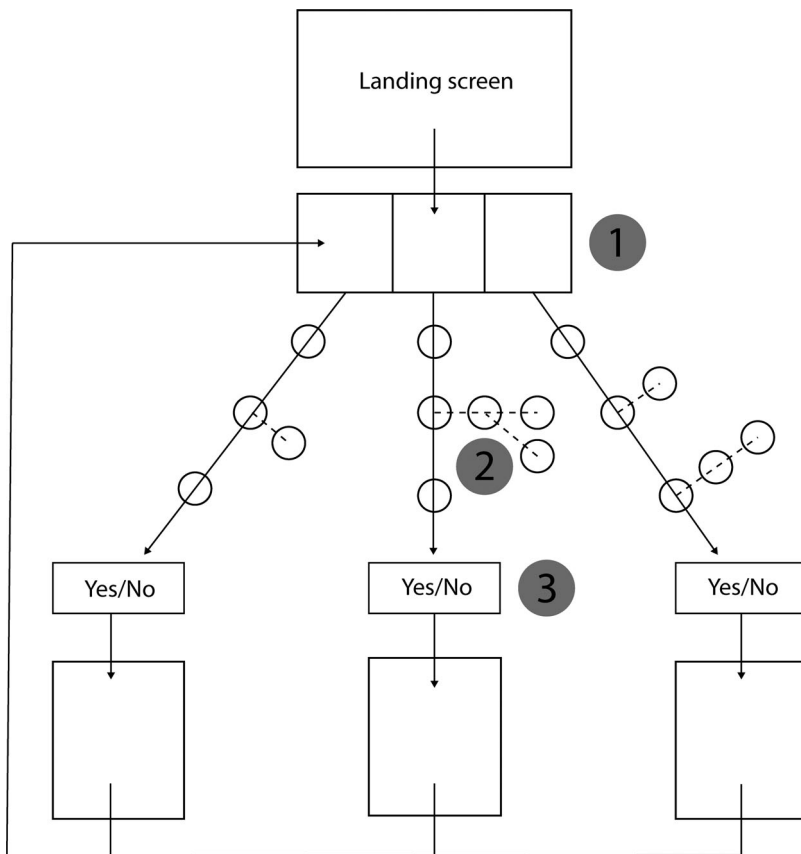


Figure 4. Users can choose one of three predetermined trajectories through the story space, as the architecture of *Het Nader Gehoor* shows.

simulating a conversation between the interviewee and user. The applicants' answers are subtitled and as they are telling their stories, certain words are highlighted as navigational cues. By clicking on a highlighted word, users can add sections of the interview to the video sequence and gain more information about an applicant's background; this is optional, as indicated by the dotted line connecting the circles in the wireframe (Figure 4 – nr. 2). Previous and skipped clips remain available, allowing users to review clips as well as watch skipped clips later on. At the end of the interview, users are asked to decide whether the applicant should be granted a permit (Figure 4 – nr. 3), and once they have made their decision, the original decision made by the Dutch Immigration Service is revealed and explained.

In *Het Nader Gehoor*, users are immersed in the story space but have limited agency to create an individual instantiation. According to the architecture, any individual choice leads to the same ending. Navigational cues are configured to lead users towards making a decision about their interviewees' fates. The user's decision may differ from the IND's decision that is revealed at the end of the trajectory, leaving users free to consider the differences and critically reflect on the role of the IND and the Dutch immigration policy.

Uit het moeras – Verhalen Uit de Veenkolonien (From the Bogs – Stories from the Peat Colonies)

Our third case, *Uit het Moeras*, invites users to explore a collection of family stories from the peat colonies, a historically poor area just south of the city Groningen in the north of the Netherlands, from the perspective of people living there. It allows users more agency in the construction of a plot by offering an extensive interactive architecture in a multi-linear story space.

The story space is divided into five different sections connected through a menu. Two sections, *Timeline* and *Family Stories*, are connected through a more open architecture of the story space when compared to *Het Nader Gehoor*. The *Timeline* (Figure 5 – nr. 1), spanning the years 2006 back to 1880, offers various navigational cues on the landing page, leading to the family stories and additional information about significant historical events for the region. Contextual information about the area is available via the menu option *Peat Colonies* (Figure 5 – nr. 2).

The interactive architecture suggests a preferred trajectory: the navigational cue presented on the landing screen (Figure 6) proposes users to start their individual exploration at the *Timeline*, which takes them through different family stories, highlighting how these are interwoven with the economic decline of the region. The reversed chronological order of the story space is emphasised on the landing page where the introductory text asks:

Where do you come from? Where are you going?

Uit het Moeras tells family stories from the Peat Colonies: a swamp area where pioneers delved for peat, waterways brought riches, and agriculture and industry flourished. Until modern times turned its back on the area.

The introduction ends with a navigational cue, an instruction telling users how to navigate through the story space:

On the timeline below, you can follow families. Back to the past: from granddaughter, to father, to grandmother. In between the families you read about the history of the area.

This text directs users to the *Timeline*, which appears on the screen when scrolling down. The *Timeline* then offers various navigational cues that lead to narrative information about the members of five typical families and the socio-political and economic events that have shaped their lives. The navigational cues to the section *Family Stories* are presented as albums with family photographs and the socio-economic events as notes on paper, occasionally including old photographs (Figure 7). As users decide which navigational cues to follow, they create their instantiation of the narrative and thus, an individual plot by combining the histories of various family members with contextual information. The *Timeline*, as the suggested beginning of a user's trajectory through the story space, does not enforce a chronological order since the navigational cues are arranged to interrupt this chronology. Using the perspective of family members on the history of the region, the story space connects multiple and diverse personal experiences, allowing users to construct their own pathway whilst exploring the different generations' and families' testimonies.

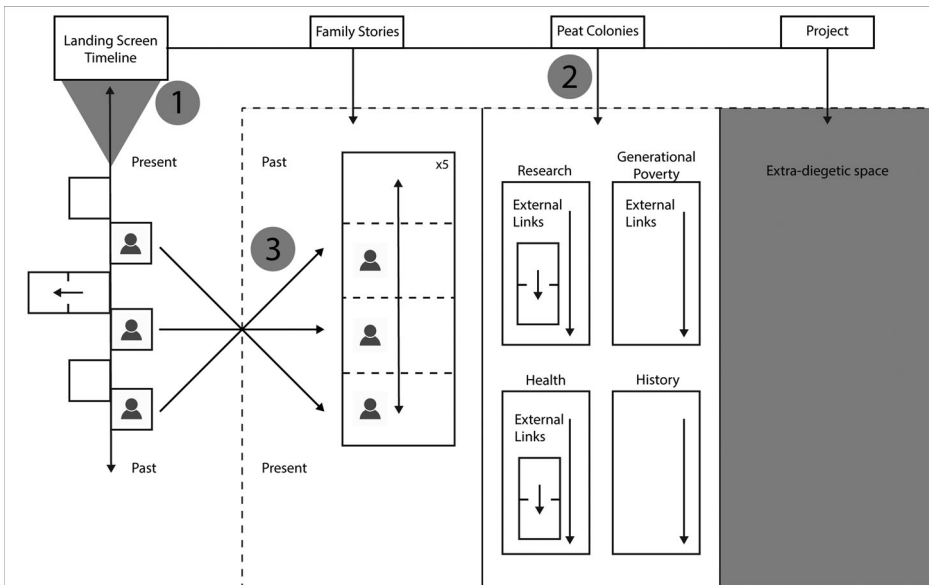


Figure 5. Architecture of *Uit het Moeras*.



Figure 6. The introductory text on the landing screen of *Uit het Moeras* points users towards the *Timeline* and disembark on their exploration of the story space.

Like the *Timeline*, the pages with the *Family Stories* organise the narrative information chronologically. Each of the five *Family Stories* is a collection of scenes from the lives of several family members. The scenes are written in the style of narrative journalism. Each family member has their own sub-section on the page of their *Family Story*, which serves as the destination of the navigational cue on their own family album in the *Timeline* (Figure 5 – nr. 3). Thus, when users click on the button of Job



Figure 7. Timeline with photo albums of the individual family members and notes that fold out to reveal more information about socio-economical events.

Aardema's photo album in the timeline (Figure 7), they are transported to his account on the page of his family's story. Once on the page of the *Family Story*, users can navigate to other family members either by scrolling through the page or using a family timeline (Figure 8 – bottom-left), with buttons to each family member's section within the *Family Story*.

The narrative information of *Uit het Moeras* is ordered in multiple sequences interrupted by navigational cues. The architecture offers non-linear navigation through a multi-linear story space, thereby creating a more open navigational structure than the two previously discussed productions offer to their users. Furthermore, the architecture suggests the start of individual trajectories and opens up the navigation soon after, leaving users relatively free to construct their own plot. This open architecture, in combination with the multi-linear organisation of the story space, particularly the *Timeline* and the *Family Stories*, gives users agency over their own structuring as they explore and consider the lives of people living in the peat colonies.



Figure 8. Each *Family Story* has its own timeline of the birth years of each family member.

Refugee Republic

Like *Uit het Moeras*, the architecture of our fourth case *Refugee Republic* suggests user agency since it offers extensive navigational options for users to explore the story space. *Refugee Republic* invites users to imagine themselves being virtually present on the location as they explore this story space. The production is a collection of observations and stories from Domiz Camp, a UN refugee camp in Iraq that in 2014, when the *Refugee Republic* was published, housed over 38,000 Syrian refugees. Its interactive architecture allows for navigation through the story space based on an illustrated map of the camp that organises the presentation of the narrative information according to spatial logic. During the opening sequence, on the landing screen and in the introduction video, users are directed to the *Map* (Figure 9), and at the end of the introduction video, users are directly addressed and welcomed to *Refugee Republic*. This invites them to take on the role of a visitor of the camp and thus, to explore the story space in this role.

The legend of the *Map* (Figure 9, top-left) instructs users that the camp can be explored by zooming, clicking, and dragging on the map. Zooming in on the map reveals a collection of illustrations based on observations made in Domiz Camp that are commented on in text by an authorial voice (Figure 10). These comments offer contextual information characterising various locations in the camp, such as “The Entertainment Area” or “Singles,” where single men live. Users can inspect various locations on the *Map* on their own account, creating their own trajectory through this section of the story space (Figure 11 – nr. 1). Furthermore, users can choose to follow one of the four *Walking Tours* that offer narrative information about daily life in the camp and its inhabitants. The *Map* displays four walking tours as coloured lines meandering through the camp. These are accessed by clicking on the line, or by choosing one of the tours in the map’s legend. Like the *Family Stories* in *Uit het Moeras*, these *Walking Tours* are separate sections within the story space, accessible through the central navigational structure.

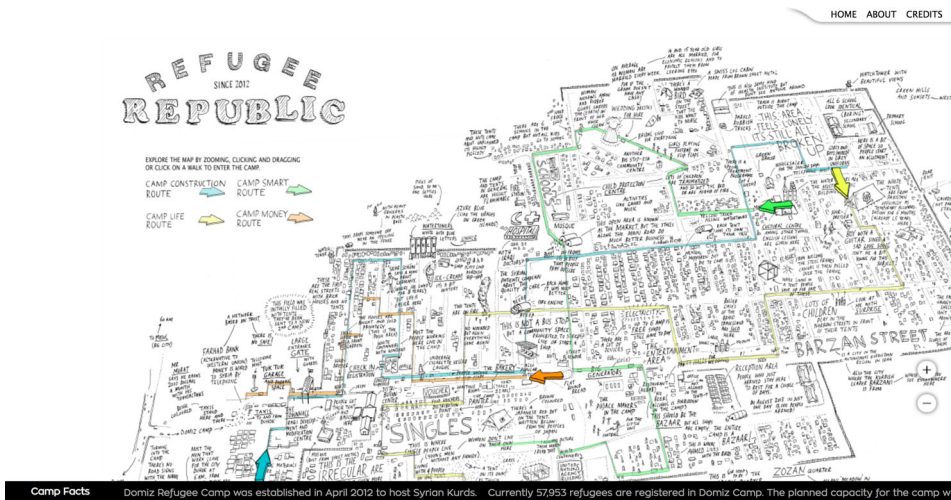


Figure 9. This illustrated map is the central navigational structure of *Refugee Republic*.

Progressing from the *Map* to the *Walking Tours*, the navigational structure changes from open to relatively closed. This section of the story space is multi-linear, with the narrative information appearing in four predetermined sequences (Figure 11 – nr. 2). On the *Walking Tours*, users—as virtual visitors of the camp—encounter inhabitants and observe scenes of daily life; for example, in people’s tents, at the mosque, or at the school. Each tour has a similar navigational structure: users scroll horizontally through the tour along a backdrop with similar illustrations, including comments, as on the *Map*. This is explained on the first screen of the tour. Following the navigational cues, users are directed towards a more intimate and detailed view of life in a refugee camp. As users scroll through this backdrop, photographs, videos, or other illustrations slide onto the screen, providing extra personal and detailed information about inhabitants, their living situation, and places in the camp. The additional information is presented in text or audio and appears if users stop scrolling on the image. Occasionally, a photograph will present a navigational cue that grants access to a more in-depth story about an inhabitant or place, which is then arranged in sequential order as well; but the scroll direction changes to vertical (Figure 11 – nr. 3). At the end of a tour, a button pops up, leading back to the map (Figure 11 – nr. 4).

The architecture of *Refugee Republic* combines two distinct navigational structures strictly separated in two sections of the story space: open navigation on the *Map*, and relatively closed navigation on the *Walking Tours*. The interactive architecture of *Refugee Republic* allows for different instantiations since users can explore the story space on their own or choose a predetermined walking tour. However, the architecture also ensures that each individual trajectory always goes through and returns to the *Map*. The story space of *Refugee Republic* offers an open non-linear mode of navigation on the *Map* and a more linear and author-controlled mode in the *Walking Tours*. Users can choose between these modes, and beyond that, decide on numerous moments whether they want to explore a person, place, or event more in depth. In other words, *Refugee Republic’s* interactive architecture offers a partially open story

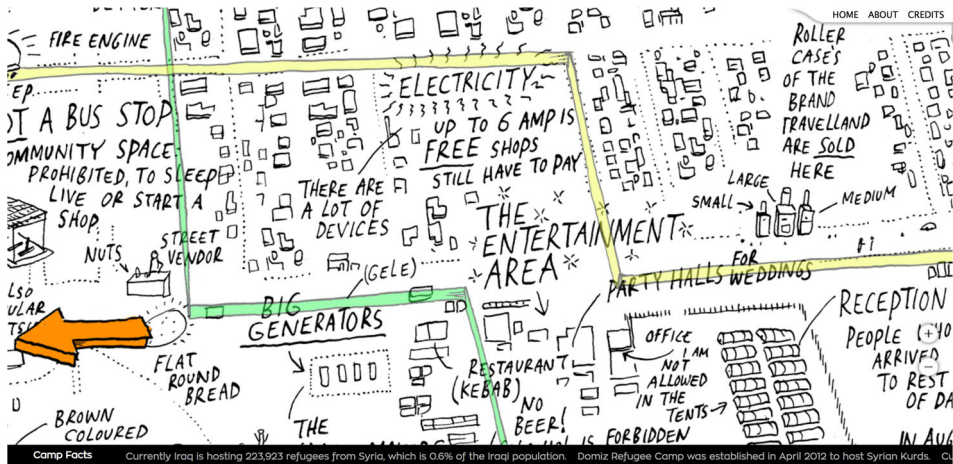


Figure 10. Zooming in on the map reveals commentary on the various locations found in Domiz Camp.

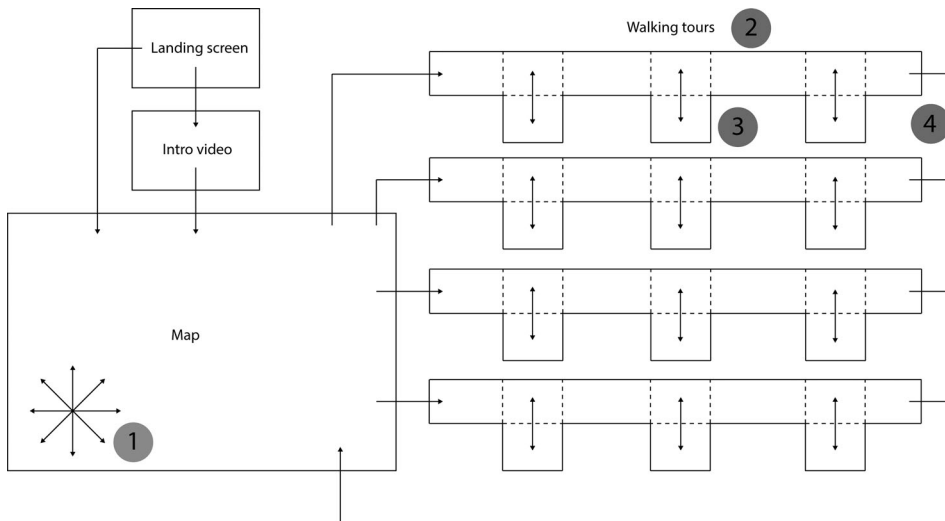


Figure 11. Architecture of *Refugee Republic*.

space for users' explorations, potentially creating numerous and rather diverse instantiations of the daily lives of refugees in Domiz Camp.

De Industrie

Our final case, *De Industrie*, is a collection of information and stories about the Dutch drugs industry, one of the most important players in the worldwide drugs trade. It is based on extensive research and interviews with people (formerly) working in that industry, who share their experiences in the enormous drugs networks that pervade the country. Like *Refugee Republic* and *Uit het Moeras*, the interactive architecture of this production guides users through different sections of the story space to be explored and requires users to construct their own plot. The structuring of narrative

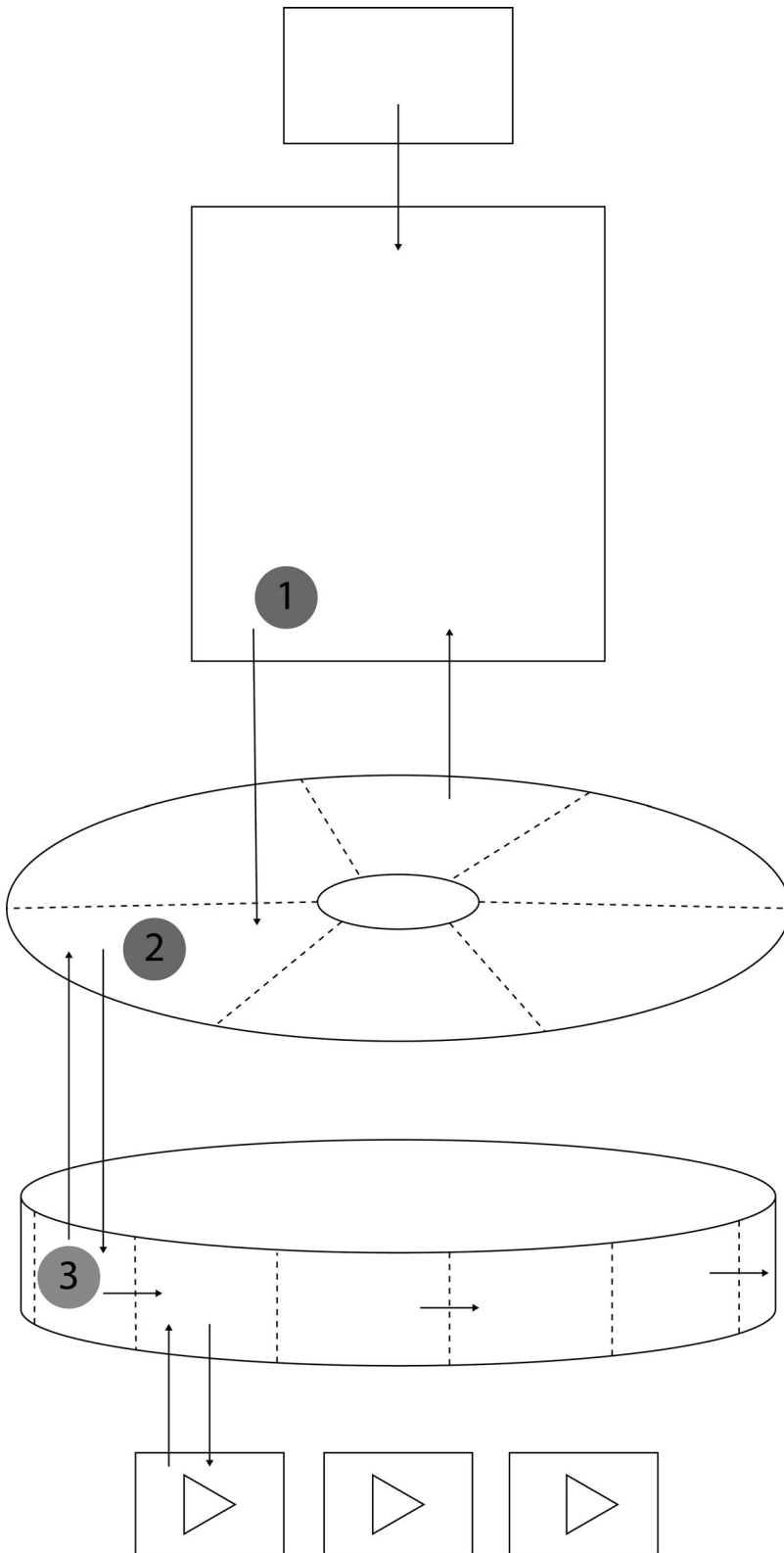


Figure 12. Architecture of *De Industrie*.

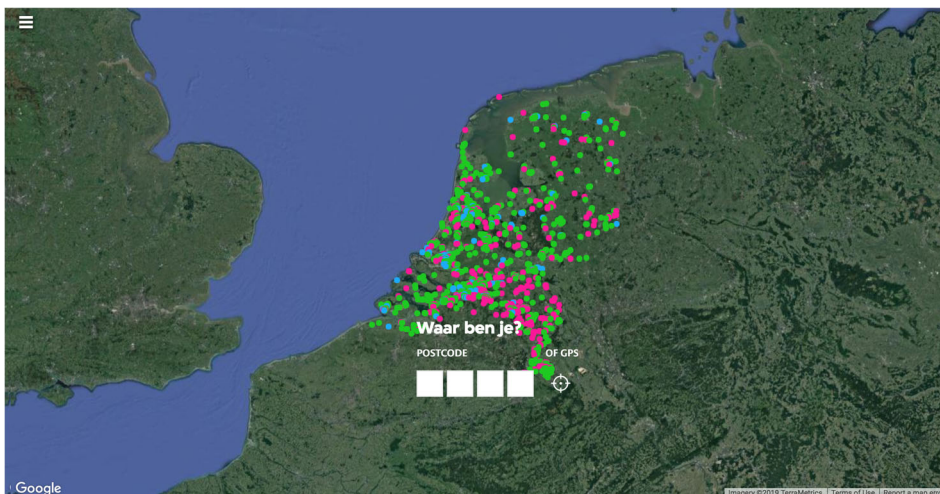


Figure 13. The first section is the *Map*. Here, users can enter their postcode and access news stories about the drug industry in their own neighbourhoods.

information is non-linear. However, navigational cues are sometimes visually emphasised to suggest a particular trajectory to users. It offers three different sections, each with a distinct navigational logic: *Map*, *Network*, and *3D environments with audio stories* (Figure 12). Users are addressed directly at the end of the introduction video and invited to start navigating on the *Map* in their own neighbourhoods, emphasising that the drug industry has permeated the whole country. When the introduction video ends, a satellite image appears with the Netherlands at its centre (Figure 13). The area of the Netherlands fills with brightly coloured dots, each a navigational cue that can be clicked on. Furthermore, users can fill out their postcode in a frame just below the text “Where are you?” Both options lead to a zoomed-in screen of the *Map*, including the dots plotted on there. The introduction video, in combination with the text “where are you?” indicates that the suggested trajectory for users is to start their exploration at their place of residence. On the zoomed-in screen of the *Map*, the coloured dots represent news items covering drugs linked to that location. Certain dots are enlarged and show the headline of that news item, inviting users to continue their exploration by clicking on one of these emphasised navigational cues. Other dots and thus, news stories, remain visible and accessible for users who wish to deviate from the suggested trajectory.

By clicking on a news item, users enter the *Network* section of the story space (Figure 12 – nr. 1). The *Network* appears partially on the left side of the screen and invites users to explore a segment of that network visualisation related to the topic of the news item (Figure 14). For example, if users click on a news item about a dismantled weed farm, they are taken to a segment of the network visualisation with more information about weed farms. At the centre of the screen, a navigational cue is displayed that, upon clicking, takes users to 3D-rendered visualisations of central locations of the drugs network and their actors (Figure 12 – nr. 2). They are represented as white human shapes set in a 3D-rendered environment representing their work-space (Figure 15). The audio segment with an interview starts playing automatically,

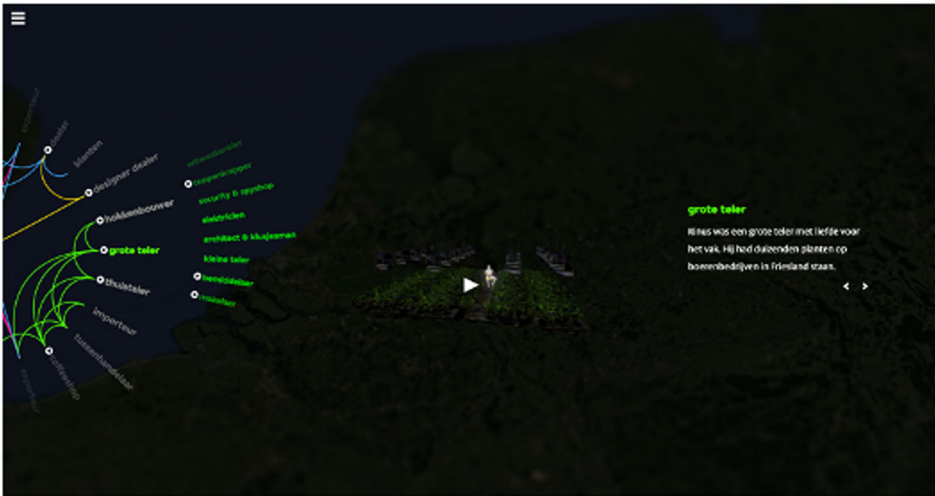


Figure 14. Clicking on a news item on the map leads to a segment of the *Network* that covers the topic on the news item.

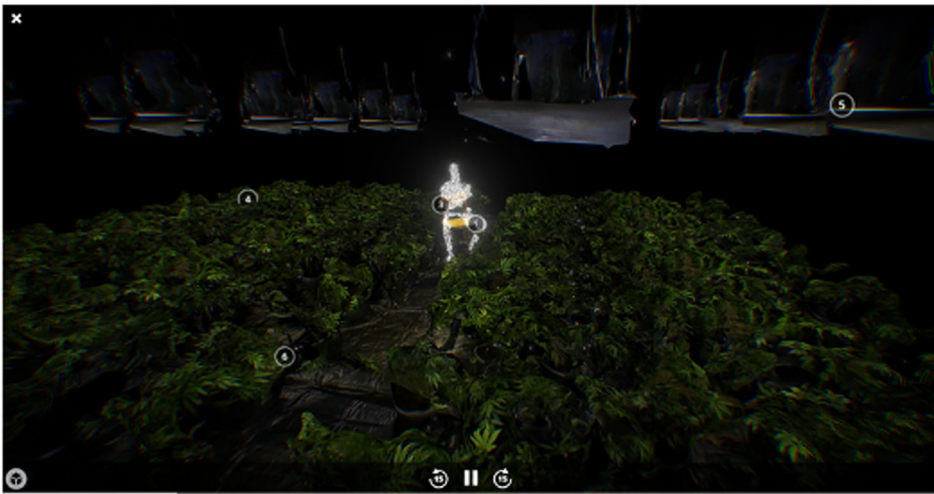


Figure 15. From the *Network*, users enter the 3D environments in which anonymous actors in the drug industry talk about their lives.

and whilst, in this case, a large-scale cannabis farmer shares his experience with the drugs industry, users can explore the 3D space by clicking on the numbers or look around by manipulating the camera's perspective.

Once an eyewitness account ends, users have to decide how to proceed their trajectory through the story space; they can return to either the *Map*, the *Network*, or go to another 3D-animated environment (Figure 12 – nr. 3). In this last case, users can choose between two 3D environments in order to proceed. Again, we can discern a preferred trajectory through the story space, as the navigational cues that lead to more 3D environments are visually emphasised.

Whilst none of the sections of the story space has a predetermined sequence, suggested trajectories guide users subsequently through the three sections of this non-linear story space, starting with the introduction video which leads to the *Map*, and through the *Network* to the 3D environments. This layered structure of the story space retains non-linear ordering of the information in each section. The construction of the story space and its interactive architecture offers an open navigation, allowing for numerous different trajectories of individual users whilst at the same time, emphasising cues that suggest trajectories to users that take them to the core material of the presented narrative material: the interviews. The interactive architecture of *De Industrie* facilitates a linear navigation through a non-linear story space. It offers several trajectories guiding users in their explorations, resulting in diverse instantiations of the narrative. However, users can explore the story space based on their choices, since next to the suggested navigational cues, there are numerous alternative ones that, when clicked on, open more areas to be explored within this layered story space. Of the five cases discussed here, the architecture of *De Industrie* suggests the most extensive user agency since it offers a navigational structure for numerous individual instantiations of the narrative, each constructing a different plot.

Trajectories through Story Spaces and User Agency

Our analyses of the five cases reveal a diversity of interactive architectures that can be described on a continuum of rather closed to more open, complex story spaces and navigational structures. We described two different types of trajectories that the architectures construct for users: predetermined trajectories that offer limited additional options for user activity, and suggested trajectories that provide diverse pathways with a variety of options for further choices, enabling users to construct rather individual instantiations of the narrative. Having identified these differences not only between the five cases, but also between different sections of the same productions, this allows us now to consider the consequences of different interactive architectures for user agency.

In more closed architectures like *Kan geboortebeperving het wereldwijde voedselprobleem oplossen?* en *Het Nader Gehoor*, the trajectories are predetermined by placing the navigational cues in an order supporting the authors' arguments and the respective plots. In *Kan geboortebeperving het wereldwijde voedselprobleem oplossen?*, the navigational cues are part of the argument, and user input functions strengthen the author's line of reasoning. In *Het Nader Gehoor*, the interactivity is more extensive, as users can choose between three different predetermined trajectories and can decide whether they explore more than one. However, once a particular trajectory is chosen, users are offered limited agency in manipulating the instantiation of the story space.

In more open architectures, the trajectories are less distinct, and to a greater or lesser extent, users retain the option to stray from suggested trajectories that we identified in all our cases. Certain navigational cues are emphasised and start or continue trajectories through layered story spaces, as the analysis of *Uit het Moeras*, *Refugee Republic*, and *De Industrie* reveal. In *Uit het Moeras*, the emphasis is on the *Timeline*, and users are urged in that direction on the landing page. *Refugee Republic* and *De*

Industrie resolve the emphasis visually; the first by using bright colours to draw attention to the *Walking tours* and the latter by guiding users through the sections by prominently placing navigational cues that lead to the 3D environments.

Suggested trajectories offer a guide for the exploration of complex and layered story spaces. The architectures of *Uit het Moeras*, *Refugee Republic*, and *De Industrie* show that each of these open story spaces is divided into sections. By varying the order of narrative and navigational cues within each section, these architectures play with the tension between open and closed navigation. In *Refugee Republic*, this is demonstrated by the switch between the *Map* and the *Walking tours*, thereby shifting from an open navigation to a more closed one with a predetermined trajectory. Whereas *Uit het Moeras* opens up a multi-linear story space with an architecture that offers an open navigation within and between various sequences. *De Industrie* is the reverse of *Uit het Moeras* and allows a closed navigation through a non-linear story space by emphasising certain navigational cues, whilst alternative options remain available to users.

The different interactive architectures of our five productions reflect different extents to which creators grant users the agency of constructing individual and thus, less preformatted instantiations of an interactive narrative. It seems that the more a production invites users to explore a topic, situation, or space, the more extensive the scope for user agency is. And vice versa: a narrow scope for user agency seems to be accompanied by an argument about or a view on the issue.

Conclusion

In debates on new forms of journalism, interactivity is often hailed as an emancipating feature that grants users agency, giving them the freedom to participate in journalistic productions (Dowling 2019; Picone 2016; Usher 2016). Certainly, interactivity has the potential to open up narratives for users to participate. However, our analyses show that including interactive features in journalistic narratives provides users with diverse degrees of agency, depending on the type and complexity of the interactive architecture of a narrative. Though user agency is essential for the procedural nature of these narratives, it is shaped within the bounds of the interactive architecture, that is to say within the bounds of the story space designed by the creators, which can be more or - as in some of the cases discussed above - less open in terms of agency granted to the user.

Interactivity is crucial within these story spaces because it affects the users' experience of the narrative and therefore the construction of meaning in journalistic stories, as Anderson and Borges-Rey (2019) and Nash (2012) have demonstrated. Interactivity draws our attention to a question that simmers underneath the innovation of narrative formats in journalism and addresses the changing dynamics between journalists and their audience. We can, along with journalists and news organisations, ask how the new interactive options could improve the supposedly ever more precarious relationship between journalists and their audience (Nelson 2021). At the same time, the question is why journalism - again - turns to technology to fix this relationship.

Here, our interest was to understand in particular how the architecture of interaction structures the relationship between authorial input and user agency, a

relationship that shapes the actual reception process of interactive multimedia narratives. Analysing interactive architectures uncovers a field of rather diverse, more closed and more open, multi-linear or non-linear navigational structures. Scrutinising the ordering of navigational cues has helped us to understand such differences, sometimes even between different sections within the same production. Our analyses of the more complex and more layered story spaces that require users to contribute to the construction of the plot through their choices—each resulting in a specific instantiation of the story space—revealed a fundamental tension between authorial control and users' agency within interactive journalistic narratives.

Whilst interactive narratives enhance journalists' devices in storytelling (Jacobson, Marino, and Gutsche 2016), the fundamental tension between authorial control and user agency of interactive story spaces, requires creators, as Drucker et al. (2018) argue for data visualisation practices, to think carefully about the design of the interactive architecture of their stories and how, when, and to what level they want to transfer agency to users. By utilising the potential of interactive storytelling, journalists can create new ways of engaging users in exploring stories blending playful and entertaining forms of interaction with a deeper exploration of layered background information on the covered topics. This does not only appeal users' intellectual engagement, but it also involves them emotionally in an open and more collaborative construction of meaning making.

However, this potential of interactive narratives in digital journalism seems at the same time to challenge the traditional perception of journalistic authorship. Recent content analyses of digital longform show a trend towards more linear and closed story spaces (Dowling 2017; Hiippala 2017), suggesting that journalists seem to prefer retaining control over their narratives by limiting the extent to which users are granted agency in the construction of the plot. This seems to reflect a traditional understanding of the journalist's professional role and related routines. In analogue media and traditional forms of journalism, journalists have always been in control of their narratives, and it was not until the rise of digital and networked technologies that the relationship between journalists and their audience started changing, amongst others by exploring interactive options of storytelling. The question remains whether users appreciate their new role and responsibility in the construction of the narrative. Results of reception and audience studies so far are ambiguous in this regard. Therefore, further reception studies are needed to examine how interactive architectures and different interactive cues shape and affect audience engagement and the user experience.

Our study suggests that studies of interactive journalistic longforms should particularly address the architectures of interactivity in detail to understand the shifting relationship between authorial authority and user agency. Though the scope of our study is limited, as it discusses only five cases, all of Dutch origin, and therefore might not fully grasp the increasing sophistication in interactive storytelling (Dowling 2017), we think that our concept of the architecture of interactivity could be a cornerstone for a more thorough understanding of interactive journalistic narratives - not only for textual analyses of broader representative samples, but also for production and reception studies. Understanding how interactive architectures include trajectories for users'

textual explorations sheds light on journalists' conceptualisation of user agency and thus on how journalists imagine their relationship with their 'audiences', now to be imagined as active 'users'. Particularly interesting for further research is the question how these imaginations influence choices made during the production process. In the broader context of discussions about the future of journalism, the question remains how the role of journalism and the role of the public develop in light of ongoing and future innovation in journalistic narrative formats. Whilst there is certainly potential to change the traditional relationship between journalists and their audiences, the emergence of new devices and technologies, such as smart speakers and conversational interfaces, will keep transforming this relationship as well.

Note

1. The descriptions, drawings, and mindmaps this data collection generated are available upon request.

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