



ROEL LUTKENHAUS

ENTERTAIN
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CATION IN
THE NEW
MEDIA
LAND
SCAPE

Stimulating creative engagement
in online communities for social
and behavioral change

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Entertainment-Education in the New Media Landscape

Stimulating Creative Engagement in Online Communities for Social and Behavioral Change

Entertainment-Education in het nieuwe medialandschap

Het stimuleren van creatieve media-uitwisselingen in online communities voor gedragsverandering en sociale verandering

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"Every human being is an artist, a freedom being, called to participate in transforming and reshaping the conditions, thinking and structures that shape and inform our lives."

- Joseph Beuys

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Rotterdam, 1 July 2020

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CHAPTER 1 General Introduction

On screen, a couple is sitting in the doctor's office. Just a few hours earlier, their son was involved in a serious car accident and was admitted to the intensive care unit in critical condition.

From behind his desk, the doctor looks at them gravely: "I know this is hard for you, but we have good reasons to keep Bart on life support."

It takes a few moments before the couple comes to a realization: "You... You want to use our son as an organ donor!"

The doctor hesitates for a moment. "His heart... could save the life of another child."

The couple sitting opposite him look at each other. Their lives will never be the same, but will this tragedy now at least help another family?

Figure 1 Scene from *Medisch Centrum West* (1992)



In 1992, this scene from the tv series *Medisch Centrum West*—a popular Dutch medical drama serial—sparked lively conversations in Dutch living rooms (Bouman, 1999; Bouman et al., 1998). The episode was the result of an Entertainment-Education (EE) collaboration between the Netherlands Heart Foundation and TR0S, a national broadcasting organization. The scene provides a good example of how health organizations can use popular media to inspire audiences to think and talk about topics such as health and sustainability.

As the central focus of this dissertation, EE is a health communication strategy that has materialized from a tradition of street theatre, community radio, and dramatic telenovelas (Singhal et al., 2004). EE uses storytelling to enhance audiences' beliefs and behaviors. Likeable characters, relatable settings, and dramatic plot twists motivate audiences to talk about the issues and dilemmas raised in a story. EE interventions have inspired communities across the world to engage in behavioral changes designed to improve health, safety, and equality (Bouman, 1999; Chatterjee et al., 2017). For example, in the 90s, Indian radio EE serial *Tinka Tinka Sukh* ('Happiness Lies in Small Pleasures') received a significant amount of fan mail touching upon gender equality, women's rights, and family planning issues and reporting on a variety of community-led initiatives that the radio show inspired (Papa et al., 2000; Singhal et al., 1998). In the South-African EE serial *Soul City*, a group of villagers put an end to a tragic case of domestic violence in their neighborhood (Soul City Institute, 2012). Each time they heard their neighbors fighting, they started banging on their pots and pans, sending a simple but powerful message to the perpetrator: we notice your behavior and we disapprove. The story inspired local communities in South Africa to do the same (Usdin et al., 2004).

These examples show that EE is more than just a message; it is:

a point of engagement, a site of discourse. [...] It can be a powerful impetus for negotiation within families about family roles, responsibilities, and priorities. It can also provide a forum for interaction between audiences, media, and health institutions over social priorities and values. (Storey, 1998, p. 354)

Stories can inspire communities, and in EE, stories serve as a path to social and behavioral change. Many successful EE interventions in the past have been characterized by a classic mass media "one to many" approach (Livingstone, 2004). Yet since the advent of the Internet, the media landscape has drastically changed; audiences have spread across channels and especially young audiences have become notoriously difficult to reach via traditional mass media. The Internet has contributed to a democratization of the media landscape where the distinction between the sender and the audience

has become increasingly diffuse (Couldry, 2008). Moreover, audiences are now able to create media themselves and share it with a worldwide audience (Blank & Reisdorf, 2012; van Dijck, 2009).

These changes in the media landscape pose challenges to the EE strategy but also create new opportunities for storytelling and audience engagement (Pearson & Smith, 2015). During the last 2 decades, popular narratives have energized online communities to engage in creative media exchanges in fan communities, where narratives often provide a proxy to collectively make sense of public issues (Jenkins, 2006). Beyond tv and cinema, audiences have gathered in online communities around a wide variety of niche interests—including health and sustainability—where they engage in creative media exchanges to make sense of the world (Alleyne, 2015; Jenkins et al., 2013). The democratization of the media landscape offers the opportunity to reach out to online communities to extend engagement with EE serials to the Internet. This dissertation explores the potential of online media engagement with EE serials as a path to social and behavioral change. The aim of this dissertation is to unite the EE strategy with digital approaches, providing a basis for digital EE approaches in the future.

CHANGES IN THE MEDIA LANDSCAPE

The Internet has played an important role in the democratization of the media landscape. At the turn of the millennium, the increasing availability of personal computers and software allowed audiences to create media content themselves and share it with worldwide audiences over the Internet (Couldry, 2008; Lambert, 2012; van Dijck, 2009). The digital nature of media content gave way to new means of media production, allowing audiences to download and apply those media (e.g., images, audio and video clips, and computer code) to a variety of new content, including dairies, webcomics, music videos, and video games. Moreover, various legal and illegal services afforded access to professional software, providing millions of amateurs with innovative media tools. To learn how to use these tools, hobbyists started visiting Internet forums, where much of their work was shared as well. Internet forums

represent one of the earliest forms of participatory online communities, connecting creative audiences who seek to chat, share, and learn (OECD, 2017).

This culture of participation has also been observed in online fan communities around popular movies or TV series. Long before the advent of the Internet, fan communities met at convention centers where they would dress up, exchange merchandise and fan art, and reenact scenes of their favorite TV series or movies (Jenkins, 2006; Waysdorf, 2017). However, the Internet afforded the ability to extend these conventions, as these fan communities could experience a new form of collective and interactive engagement (Jenkins, 2006).

Community engagement also opened opportunities for film makers. In the late 90s, young creatives started experimenting with transmedia storytelling (Jenkins, 2007, 2010). One of the first examples was *The Blair Witch Project*, a low-budget horror movie that was purposely leaked to Internet forums (1999). The footage depicted a group of terrified young adults in a dark forest on the run for an invisible danger. The user posting the footage claimed he found it in an abandoned camera close to a forest that—according to a local legend—was bewitched. He recalled locals talking about a group of film students who ventured into the woods to make a documentary—could this be them? This sense of mystery fascinated Internet users who gathered on forums to discuss what could have happened, which likely boosted box office results once it was released (\$140 million in the U.S. against an estimated budget of \$60,000). *The Blair Witch Project* is one of the first examples demonstrating how a captivating story can energize online audiences—mainly by substituting traditional marketing efforts with real-life buzz. Later, popular-movie franchises such as *The Matrix* and *Harry Potter* created new opportunities for fan communities to discuss their favorite scenes. The most dedicated audiences even went on to expand the movies' universes through their own fan fiction and fan art (Fotopoulou & Couldry, 2015; Jenkins, 2006; Scolari, 2009).

Today, Internet forums have largely given way to social media platforms, with top forum contributors replaced by social influencers. Across the Internet, audiences have gathered around a wide variety of niche interests, including topics surrounding health (e.g., fitness, cooking, and personal

care) and sustainability (e.g., housekeeping, gardening, and ecological traveling). As loosely-knit communities across different websites and Internet platforms, audiences experience a shared engagement with themes and topics of their interest (Jenkins et al., 2013). Vlogs, podcasts, and live social media feeds are among the most engaged and cover a wide variety of topics (Abidin, 2017). For many young audiences, social media offers an interface to make collective sense of the world around them (Kligler-Vilenchik & Thorson, 2015; Van Eldik et al., 2019).

Online, popular media often form a focal point of engagement, including not only music videos and TV series but also social media posts from pop idols and actors. Furthermore, communities refer to popular culture when engaging with each other. For example, a *meme* is a user-generated content format often used for pop-culture inside jokes (Knobel & Lankshear, 2007). Memes often include an edited still image from a serial or movie, adding a large, white-lettered caption to express something other than the original scene expressed. This is how Ned Stark—the honorable leader of the house of Winterfell in the TV series *Game of Thrones*—ended up reminding social media users to stay safe on the road and change to winter tires: “Brace yourself, winter is coming!”

Online community engagement offers opportunities for EE professionals, especially those who use popular media on the Internet as an avenue to engage with audiences that have become difficult to reach with traditional mass media. During the last decade, several Dutch health organizations have experimented with online community engagement approaches for sexual education. *Beat the Macho!* was a health education program created by Rutgers—a Netherlands-based center for sexual and reproductive health and rights—to address regressive norms around masculinity among adolescent boys (Cense & Oostrik, 2015). The program had an online component where two rappers recorded a music video to share their views on what it takes to be ‘a real man’ (‘Listen to yourself!’; Sense.info, 2015↗). Online, audiences were also invited to share their perspectives by remixing the song, writing new lyrics, or recording dance videos.

In a prize-winning campaign in 2011, the Dutch AIDS/STD Foundation collaborated with online communities on Internet forums, enabling users to vote for the components of a new

↗ <https://youtu.be/gElabqH5zhU>

sexual education video commercial that was to be produced. A humorous slogan was chosen by the users and subsequently implemented by the AIDS/STD Foundation: *'Ik ga niet zonder hoesje in jouw poesje'* (a more explicit Dutch variation of 'No action without protection') (Team DylanHaegens & Soa Aids Nederland, 2011[↗]). The commercial was received with disbelief by more conservative forces in the Dutch Parliament, and even went so far as to question the prime minister (Nieuwsuur, 2011[↗]). Eventually, the Parliament decided to only broadcast the commercial after 8 p.m., making it even more appealing to young adults due its restrictiveness. The affair amplified attention for the campaign and may have contributed to it scoring far higher than the organization's benchmark for appreciation, behavioral change, as well as message transfer (Fisser, 2015).

Both cases show the potential of using popular media to stimulate online community engagement with health-related topics. Furthermore, the cases suggest that communities of audiences can play a more active role in health communication interventions. However, a more systematic approach to build on these successes has been lacking so far. This dissertation explores the potential of storytelling formats to go beyond the mass media approach, reaching out to online audiences and inviting them to join a creative media exchange around health-related norms, beliefs, and practices.

ENTERTAINMENT-EDUCATION

This dissertation focuses on the EE strategy; a health communication strategy that leverages popular media to stimulate social and behavioral change. Often, health communication interventions are part of larger health promotion programs and work in accordance with legislative measures providing health services and facilities. Moreover, the EE strategy comprises a framework of theories, approaches, and methods to engage and influence audiences using popular media (Bouman, 1999; Chatterjee et al., 2017; Singhal & Rogers, 2002; Sood et al., 2004).

The EE strategy revolves around storytelling in popular media. First, research has shown that certain types of stories (e.g., dramatic serials) can be used for persuasion. Stories

↗ https://youtu.be/U_hr4TLjjeo

↗ <https://youtu.be/AUwPyYowB3g>

are capable of *transporting* audiences into a *narrative world* (Green & Brock, 2000; Murphy et al., 2013). When transported, audiences suspend their disbelief (Weber & Wirth, 2014), making stories capable of changing audiences' perspectives on the issues raised in the story (Frank et al., 2015; Green & Brock, 2005; Slater & Rouner, 2002). Narrative persuasion theory offers a basis to design stories that educate and motivate viewers, allowing EE professionals to design characters audiences can identify and build imaginary relationships with (Horton & Wohl, 1956; Murphy et al., 2013; Papa et al., 2000) or design storylines that “model” healthy behaviors (Bandura, 1986, 2004).

Second, EE serials aim to motivate audiences to talk about the issues and dilemmas raised by the dramatic events on screen. As such, EE is not only another message but also a point of engagement that stimulates the renegotiation of roles, responsibilities, and priorities within families and communities (Storey, 1998). While the episode of *Medisch Centrum West* at the beginning of this chapter has inspired lively interpersonal conversations about organ donation, it is now possible to extend these conversations to the Internet, where audiences can discuss, reinforce, and further diffuse such health-related messages through online media engagement. This dissertation explores the ways in which this can be achieved.

RESEARCH SETUP

This dissertation is part of the *Media Lab* research program by the *Center for Media & Health* (CMH), which aims to explore and stimulate innovative collaborations between the creative media industry and health organizations in order to design new media strategies and approaches targeting healthy and sustainable lifestyles (Erasmus University Rotterdam, 2015[↗]). This program offered the unique opportunity to study new approaches in close collaboration with various health organizations, media professionals, and other stakeholders—each of which brought other interests and expertise to the table.

↗ <https://www.eur.nl/nieuws/nieuwe-leerstel-slaat-brug-tussen-media-gezondheid-en-wetenschap>

The central research questions of this dissertation are as follows:

- RQ1:** How can the EE strategy be extended to the Internet, with the aim of stimulating shared media engagement around topics such as healthy lifestyles and sustainability?
- RQ2:** How can the effects of these media formats be measured?
- RQ3:** What conditions are required for successful collaborations between new media professionals and societal and health organizations?

This dissertation addresses the above research questions in two ways: theoretically (Part I) and empirically (Part II). First, Part I (Chapters 2 and 3) draws from contemporary media theories to provide new methods and approaches that expand the EE strategy to the Internet. Next, Part II (Chapters 4 through and 6) explores how digital research methods can advance the several stages of design and production of EE interventions. These chapters describe three research projects that have tested and validated the methods and approaches proposed in Part I. Collaboration on real-world cases allowed for a reflection on the conditions for successful collaborations between health communication professionals and new media professionals.

PART I: Toward Spreadable EE

The first part of this dissertation explores how EE theories, methods, and approaches can be extended to the Internet in order to invite audiences to engage in a creative media exchange around topics such as health and sustainability.

CHAPTER 2: Toward Spreadable Entertainment-Education.

From a producer's perspective, spreadable media provides an alternative to the concept of viral media, implying that media content spreads through society, moving from one mind to the other. Moreover, Jenkins et al. (2013) argued that the notion of virality fails to acknowledging the agency of individual audience members. Ultimately, they have a free choice in sharing or responding to media content. Jenkins et al. (2013) proposed spreadable media as an alternative

concept, delineating the following set of interconnected conditions under which audiences are most likely to share or respond to media content:

1. When media content makes an appeal in ways that match the audiences' interests, beliefs, and social contexts;
2. When media content is well-attuned to the audiences' social networks, and the technical capabilities of the technologies they are using; and
3. When the creation or circulation of media content aligns with the interests of different stakeholders such as media platforms, creative professionals, and audience members.

Chapter 2 connects the concept of spreadable media to the EE strategy to introduce the concept of *spreadable EE*: multi-layered EE interventions that revolve around collaborations with influential content creators in online communities. It proposes to involve *social influencers* (Abidin, 2017; Langner et al., 2013) in the creation of engaging media content. Influencer collaborations can be implemented in the wake of a large-scale EE TV serial or as stand-alone interventions. Using interactive media formats, social influencers can invite audiences to engage with key health and social issues. In turn, this enhances the visibility of EE interventions and allows them to spread via the social networks of the audiences.

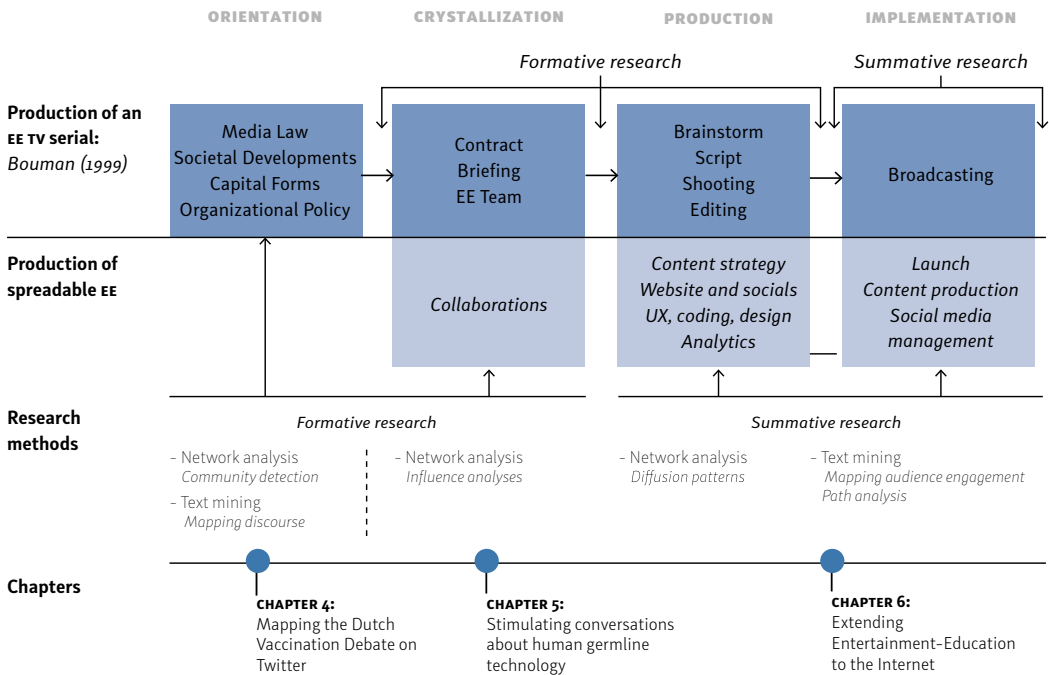
CHAPTER 3: Tailoring in the Digital Era. The third chapter explores how online social networks function as a place for health discourse. It shows how digital research methods can be used to identify online communities as stakeholders and identify social influencers as potential collaboration partners. The chapter expands on theories of social influence to propose different kind of collaboration strategies between EE professionals and social influencers. The digital research methods presented in the chapter help to tailor media strategies to the interests, preferences, and socio-technical context of the target audiences.

PART II: Mapping Spreadable EE interventions

In Part I, it became clear that designing spreadable EE requires radically different information about the interventions' intended audiences. Building off Part I, the three chapters

comprising Part II describe approaches to create spreadable media through a post-demographic lens. Instead of using socio-demographic data to organize groups of target audiences, a *post-demographic* approach helps analyze interests, social interactions, and behavioral patterns of online platform users to derive socio-behavioral profiles to organize audience segments (R. Rogers, 2009, p. 24). By advocating a post-demographic approach, this dissertation does not imply that demographic data is no longer important. Rather, supplementing these data with post-demographic data may allow health communication professionals to better adapt to audiences' online behaviors. For example, researchers may look for niche interests that the prospective audiences follow. Knowing which websites and social media users are most influential around those interests enables EE professionals to invite these social influencers as potential collaboration partners.

Figure 2 Media Mapping Model



Note. Adapted from Bouman (1999).

In Part II, the post-demographic research methods are embedded in an adapted version of Bouman's (1999) media mapping model (see Figure 2) that originally focused on the production of EE serials. First, during the orientation phase the initiators aim to obtain a clear image of the societal problem the EE intervention aims to address. Second, the *crystallization* phase results in a clear project plan, contracts with partners, and a project briefing for all stakeholders. Next, in the production phase the actual intervention is produced: scripts are written, TV serials are produced, and websites are created. Lastly, the *implementation* phase starts when the intervention is officially launched (e.g., when a TV serial starts broadcasting). Increasingly, the production and implementation phases overlap as social media teams continue producing content after an intervention is launched.

Research plays an important role in advancing this process. *Formative research* seeks to answer questions about the target audience before and during the production phase, while summative research aims to answer questions about the effectiveness of the intervention, both during and after the implementation phase (Bouman, 1999; Bouman et al., 2017).

The case studies in Part II illustrate and describe tools that can be used in each phase of the media mapping model. More specifically, the case studies illustrate how digital research methods can be used to:

1. Discover and understand online communities (Chapter 4);
2. Identify influential websites, YouTube channels, or micro celebrities as potential collaboration partners (Chapter 5); and
3. Measure and monitor how audiences respond to a transmedia EE TV serial (Chapter 6).

CHAPTER 4: Mapping the Dutch Vaccination Debate on Twitter. Chapter 4 presents the results of a study of how Dutch Twitter users talk about vaccination and unveils the underlying follower networks. The study was originally conducted in late 2017 for the Dutch National Institute of Public Health and the Environment (RIVM) to analyze the circulation of vaccination-related narratives in Twitter networks. The network of Twitter users comprises communities of audiences organized by interest, profession, and ideology, representing post-demographic characteristics that may aid in the design

health communication interventions. This chapter explores the different vaccination-related narratives that are circulated and compares their prevalence across communities. This vaccination case study provides an example of how formative digital research can contribute to a better understanding of a societal issue in the orientation phase.

CHAPTER 5: Stimulating Conversations about Human Germline Technology. Chapter 5 demonstrates how digital research methods can be used to find potential collaboration partners to stimulate conversations about a specific health issue. The case study focuses on conversations about CRISPR-Cas9 technology—a topic audiences may not yet be familiar with or talking about.

CRISPR-Cas9 technology can be used to edit the germline genes of human embryos, making it possible to not only “edit out” heritable diseases and conditions but also improve cognitive and physical capacities. Since 2015, experts have called for wide and inclusive societal debates about human gene modification (HGM) to determine the extent to which societies permit this potentially disruptive technology to be applied in societies (Baylis, 2017; Olson, 2015). However, in early 2019, the topic of HGM was only discussed by a narrow range of experts and stakeholders and had not yet involved wider groups of citizens (Erfocentrum, 2018). The Dutch Ministry of Health, Welfare and Sport (vws) therefore supported the Dutch DNA Dialogue (2020[↗]), a project that aims to stimulate a societal debate about HGM among a broad range of societal groups and promote a wider exchange of knowledge and opinions.

For the DNA Dialogue, this chapter presents a study of the open web, Twitter, and YouTube to identify potential collaboration partners. From a content strategy perspective, this chapter reflects on the various opportunities for media formats and collaborations, showing how digital research methods can be used to advance the crystallization phase.

CHAPTER 6: Extending Entertainment-Education to the Internet. The sixth chapter reports on a unique EE project in India: *Main Kuch Bhi Kar Sakti Hoon* (MKBKSH[↗]), meaning “I, a woman, can achieve anything.” As a collaboration between the Population Foundation India (PFI) and well-known Indian writer-director-producer Feroz Abbas Khan, this EE serial

[↗] <https://dnadialogue.nl/>

[↗] <https://www.mkbksh.com>

focuses on topics such as gender equality, family planning, and hygienic sanitation. *MKBKSH* is a transmedia intervention revolving around a dramatic storyline that unfolds on tv and radio and is extended to other communication channels such as a website, chatbot, and social media. This chapter reports on a research project that monitored audience engagement on social media in the wake of the tv serial.

During the research project, the social media team received reports about how the audience engaged with the topics and issues raised by the EE serial. This provided insight into how audiences responded to the key messages and ideas of *MKBKSH* as well as different content formats and strategies.

The chapter shows how digital methods can be used to monitor audience engagement in the wake of a widely broadcasted EE serial, thereby contributing to the *production* and *implementation* phases. It also shows how monitoring audience engagement can help social media teams stimulate media engagement regarding key messages and ideas of EE serials.

CONCLUSION

Coming from a tradition of street theatre, community radio, and telenovelas, the EE strategy is based on the idea that stories can provide communities with a sense of direction. This dissertation expands on this tradition through the concept of spreadable EE. The case studies share how digital research methods have been used to study online engagement around health topics and how the results can advance the creation of spreadable media content.

On a more profound level, the case studies explore how individuals and organizations use social media to introduce new ideas; how audiences renegotiate these ideas through networked media engagement; and how media engagement may ultimately leave a mark on the beliefs and behaviors of communities. ☉



An abstract graphic on the left side of the page, consisting of numerous thin, light blue lines that form a complex, interconnected network. Some lines are thicker and more prominent, while others are very thin and delicate. Small blue dots are scattered throughout the network, representing nodes or data points. The overall effect is that of a digital or neural network.

PART I **Toward Spreadable
Entertainment-Education**

A decorative graphic in the bottom right corner, featuring a dense cluster of small, light blue and white dots. Some of these dots are larger and more prominent, creating a sense of depth and movement. The dots are arranged in a way that suggests a starburst or a cluster of particles, adding a dynamic and modern feel to the design.

CHAPTER 2 **Toward Spreadable Entertainment-Education: Leveraging social influence in online networks¹**

- ¹ This chapter has been published as Lutkenhaus, R. O., Jansz, J., & Bouman, M. P. A. (2019). Toward spreadable entertainment-education: leveraging social influence in online networks. *Health Promotion International*, 1–10. <https://doi.org/10.1093/heapro/daz104>

In his lush garden, on a cloudy summer day, we see Bill Gates behind a laptop watching a video of Mark Zuckerberg. Zuckerberg stands next to a bucket of ice-cold water and says some last words before unleashing it onto his head: “I’m going to challenge Bill Gates, my partner at Facebook Sheryl Sandberg, and Netflix’ founder and CEO Reed Hastings. You have 24 hours to do this, or you have to donate one hundred dollars”. —*Splash!*

Gates, arms folded, looks up from his laptop. “Well, I am glad to accept this challenge, but I want to do it better...”

A bit later, we see Gates on his pier, under a gantry, holding a rope connected to a big bucket of cold water. “I’m going to challenge three more people. Elon Musk, Ryan Seacrest, and Chris Anderson of TED, consider yourself challenged!” —*Splash!*

Figure 3 Bill Gates taking the ALS Ice Bucket Challenge (Gates, 2014)²



² <https://youtu.be/XS6ysDFTbLU>

In 2014, the *ALS Ice Bucket Challenge* (Figure 3) was among the first to leverage the power of social influence in online networks, raising \$115 million of donations and attention for the National ALS Association—a non-profit organization that seeks to discover treatments and a cure for Amyotrophic Lateral Sclerosis. When celebrities started taking the challenges and started nominating other celebrities, the *ALS Ice Bucket Challenge* reached unprecedented levels of exposure and engagement, peaking for about 3 months (van der Linden, 2017).

Over the last decade, health- and social change organizations have experimented with interventions similar to the *ALS Ice Bucket Challenge*, often with a view to *go viral*. But is it right to assume that the *ALS Ice Bucket Challenge* went viral? Not according to Jenkins, Ford and Green (2013), who argue that going viral is a myth. They argue that the virus metaphor implies that media content is capable of spreading itself, infecting one mind after the other as the inevitable result of an irresistible idea, thereby neglecting human agency. Instead, they propose the concept of *spreadable media*, postulating that only when appealing media content is meaningfully embedded in the technical infrastructures, economic structures and social networks that underlie the audiences' media realities, audiences may decide to engage with these ideas autonomously.

From this perspective, the *ALS Ice Bucket Challenge* did not simply go viral. Instead, it managed to 'spread' because it was well-attuned to the dynamics of the new media landscape. It activated social processes by inviting audiences to participate through a nomination mechanism, gained social momentum by involving a diverse range of celebrities, and translated momentum into real-world contributions through a playful moral imperative (van der Linden, 2017). As such, the *ALS Ice Bucket Challenge* was intrinsically spreadable.

In this chapter, we seek to combine lessons learned from a phenomenon like the *ALS Ice Bucket Challenge* with the *Entertainment-Education (EE)* strategy—a communication strategy that uses popular media to spread prosocial ideas. *EE* typically leverages the appeal of popular media to educate and motivate viewers to improve their health, safety, or equality—mostly using dramatic radio, television and internet serials that allow to engage with a story over a longer period

of time (Bouman, 1999, 2016; Chatterjee et al., 2017; Singhal & Rogers, 2004). EE serials apply storytelling to introduce new ideas, norms and practices; and to spark conversations about the issues raised in the serial (Bandura, 2004; Bouman, 1999, 2016; Singhal & Rogers, 2002). As such, EE is not just another message, it is

‘a point of engagement, a site of discourse’ (Storey, 1998, p. 354).

This is important, because—in traditional models of social influence—norms and ideas diffuse through interactions between peers (Katz & Lazarsfeld, 2006; E. M. Rogers, 2003). Increasingly, offline societies intertwine with online communities in global digital networks (Bennett & Segerberg, 2012; González-Bailón, 2017)—the same digital networks that enabled the ALS Ice Bucket Challenge to spread. Seeking to leverage the power of social influence in these digital networks, this chapter enhances EE’s theoretical, empirical, and practical underpinnings and proposes strategic approaches to create and evaluate spreadable EE.

THEORETICAL BACKGROUND

The EE strategy is characterized by an affective approach, using the appeal of popular media on radio or TV to reach target audiences and introduce new knowledge, norms and practices (Bouman, 1999, 2016; Chatterjee et al., 2017; Singhal & Rogers, 2004). It is for good reasons that we find an engaging story at the heart of every EE intervention: stories have always traveled from mouth-to-mouth, eventually settling in cultures and religions as master narratives, which are stories that societies use to make sense of their worlds (Green & Brock, 2005; Halverson, 2011). With their dramatic arcs, stories are capable of captivating audiences over a longer period of time (Branigan, 1992; Green & Brock, 2005).

Narrative theories provide a playground to create compelling and persuasive storylines for EE serials. Studies have shown that stories can be persuasive, capable of impacting individuals’ knowledge, beliefs and attitudes (Green & Brock, 2000). This occurs when audiences are absorbed into a story world where they can identify with the story’s characters—

also called *narrative processing* (Slater & Rouner, 2002). Audiences may not only identify with a story's characters, they may also build imaginary relationships with them: this phenomenon is called *parasocial interaction* (Horton & Wohl, 1956; Papa et al., 2000) and enhances stories' persuasive effects by negatively affecting the audiences' capability to critically evaluate messages (Slater & Rouner, 2002). In EE serials, persuasive storylines are often supported by the so-called *heuristic principles*, drawn from Petty and Cacioppo's *Elaboration Likelihood Model (ELM)* (Petty et al., 2005; Petty & Cacioppo, 1986). For example, the *likeability heuristic* implies that audiences tend to place more confidence in people they like—also when these sources are fictional and played by actors.

The EE strategy is also rooted in Albert Bandura's *Social Cognitive Theory (SCT)* (Bandura, 1986, 2004). Concepts such as modeling and social learning contribute to the design of storylines to effectively convey specific ideas, knowledge and practices. Storytelling is also capable of changing the social contexts that shape human behavior. For example, a dramatic storyline about an unplanned pregnancy in a popular TV series can stimulate interpersonal conversations about contraceptives, instilling the uptake of norms that facilitate and support the use of contraceptives (Storey, 1998).

The advantages of persuasive storytelling are apparent, however, not all stories are equally entertaining. Some stories simply stick, whereas other stories are unable to captivate audiences. High-quality storytelling—being in written form, on the radio, or on the screen—is more of an art than a formula (Green & Brock, 2005). The creation of high-quality EE interventions is therefore often a collaborative effort that involves an interdisciplinary team of researchers, health experts, and creative professionals such as scriptwriters, producers and media strategists. The exact nature of these collaborations often depends on the level of involvement of the different partners and shows through the specifics of their partnership agreements (Bouman, 1999; Reinermann et al., 2014).

Changing media landscape

The media landscape has changed radically since the early nineties, presenting challenges and opportunities for the EE strategy.

First, the media landscapes in Western societies have increasingly saturated through a multiplication of media outlets and options, offering audiences alternative ways to gratify their media-related needs (Sherry, 2002). Audiences often rely on a mix of media and content types to make sense of public issues (Hasebrink & Hepp, 2017; Hasebrink & Popp, 2006; Kim, 2016; Taneja et al., 2012). They have fragmented across platforms to engage with various online communities around specific niche interests, hobbies, or ideologies such as music, sports or politics (Blank & Reisdorf, 2012; Jenkins, 2006). Online communities are characterized by a culture of participation in which members' activities contribute to a collective kind of sense-making (Kligler-Vilenchik & Thorson, 2015).

Second, the introduction of the Internet signifies a shift from the age of the broadcasting schedule, where audiences adapt to broadcasting schedules to see their favorite shows, to the age of the stream, where audiences choose from a continuous stream of media content at any time they like (Locke, 2016). Conversations in online communities often function as the interface to navigate this stream, meaning that audiences follow up on what peers might 'like', share or say on social media sites. Furthermore, online communities often comprise and attract individuals with shared interests and views, increasing the likelihood of audiences confirming their pre-existing beliefs through mutual interactions. This phenomenon is referred to as the echo chamber and is often associated with increasing polarization on controversial topics (Barberá, Jost, et al., 2015; Colleoni et al., 2014), including health topics such as vaccination (Lutkenhaus et al., 2019c). Moreover, algorithmic recommender systems aggravate this effect: online platforms and social media sites algorithmically personalize their content suggestions to match the supposed media preferences of their users, leading to *filter bubbles* that selectively expose people with similar media patterns to similar content (Pariser, 2012).

Third, some individuals have made a name for themselves in their respective communities and acquired the status of social influencer (Langner et al., 2013). Social influencers create their own content and often point their followers to other interesting articles, photos and videos. The role of *social influencers* is comparable to that of *opinion leaders* in

the classic *two-step flow model* (Katz & Lazarsfeld, 2006) or *innovators* and *early adaptors* in the *Diffusion of Innovations Theory* (E. M. Rogers, 2003). In Katz and Lazarsfeld's pre-Internet model, mass media would introduce new ideas that flow to opinion leaders who, in turn, would further diffuse these ideas to their peers via interpersonal communication (Katz & Lazarsfeld, 2006). Today, many of these interpersonal conversations take place online where influencers introduce topics, raise questions and spark conversations on a wide variety of issues. As online communities have intertwined with our offline social networks, they play an increasingly important role in the diffusion of ideas, norms and practices in society (Alleyne, 2015; González-Bailón, 2017).

Some have questioned the extent to which online participation can contribute to real life action (Morozov, 2009), while notions such as the 90:9:1 rule (Nielsen, 2006) imply that the part of the audience that actually participates or creates media content is small: 1% *heavy contributors*, versus 9% *intermittent contributors* and 90% *passive lurkers*. However, it is not just a group of vocal frontrunners shaping the streams of media content. Surrounding the heavy and intermittent contributors, we find large groups of lurkers that play a crucial role in amplifying and inhibiting information flows. The media behaviors of this critical *periphery feed* the personalization algorithms with clicks and likes and, in turn, personalization algorithms use these data to determine which media content should be shown, and which not, to whom (Barberá, Wang, et al., 2015).

To summarize: changes in the media landscape offer challenges and opportunities to enhance the EE strategy. First, to reach target audiences in an increasingly fragmented and polarized media landscape, there is a need for multi-platforms strategies to align with audience interests to engage with multiple communities at the same time. Second, online communities have emerged as new avenues for audiences to have interpersonal conversations about popular media and EE serials, thereby providing new points of engagement to discuss ideas, knowledge and practices. Third, it has become possible to directly engage with the innovators and early adaptors of online communities via social media influencers. Their key positions in online networks can be leveraged to 'spread' new knowledge, ideas and practices, as well as to

stimulate, sustain and moderate conversations. In the next section, we will explore how this can be approached in practice, drawing from relevant scientific work and illustrated by practical examples.

TOWARD SPREADABLE EE

➔ <http://eastloshigh.com>

Multi-platform communication strategies can reach audiences that have scattered across the media landscape. In EE, the transmedia *storytelling strategy* has been used to creatively coordinate elements of a story across platforms, thereby providing multiple entry points across a wide range of channels (Jenkins, 2006; Jenkins et al., 2013; Scolari, 2009). *East Los High*➔ is an example of an EE intervention applying the transmedia storytelling strategy (Wang & Singhal, 2016). This high school teen drama comprises four seasons, running from 2013 until 2017, and is distributed in the US through the video-on-demand platform *Hulu*. During its first season, the serial focused on sexual and reproductive health among Latina/o Americans. Around the TV serial, online media content provided entry points and more depth to the stories. For example, some characters posted blogs or video dairies, like Ceci—one of the main characters who became pregnant unexpectedly and shared her experiences in a vlog—or Camila—exposing her struggles with her mental health. These stories were often complemented with links to public health services and other reliable information sources, creating pathways between the serial and other layers of relevant content.

The transmedia storytelling strategy can thus be used to reach fragmented audiences by spreading entry points across the platforms and avenues that are popular among their target audiences. Furthermore, the dynamics of social influence in these online communities can be leveraged to stimulate meaningful engagement, such as conversations about EE programs.

Leveraging Social Influence

Networks of connected audiences provide the social and technical infrastructure for the circulation of media content (Jenkins et al., 2013) as well as the diffusion of ideas, norms

and practices (González-Bailón, 2017; Katz & Lazarsfeld, 2006). Within these networks, communities of like-minded audiences provide avenues to talk about things and topics that interest them, including popular media that may very well include EE serials.

An intervention by the *STD/AIDS Foundation in the Netherlands (SAFN)* provides an example of how EE professionals can approach online communities as points of engagement. SAFN found that many young Dutch women intend to use condoms, but do not always carry condoms with them because they are afraid to be seen as a 'slut'. To challenge this norm, SAFN collaborated with social influencers to reach out to online beauty and fashion communities. In a series of YouTube videos (Soa Aids Nederland, 2014⁷), several beauty experts asked their followers for their opinions and, after lively conversations in the comments, summarized them and shared their own opinions. Thereby, SAFN and the social influencers provoked the online communities to challenge the norm from bottom-up, criticizing the idea and ultimately introducing an alternative norm: having condoms with you is smart, not slutty. Eventually, the intervention did not only include influencers sharing SAFN's message but also invited audiences to reinforce or reappropriate SAFN's message, ultimately rippling through the social networks around them. As such, SAFN leveraged the dynamics of social influence in these different communities to stimulate meaningful conversations about the topic.

This example fits well into the theoretical foundations of the EE strategy, where storytelling is a site of discourse that stimulates and sustain meaningful engagement around pro-social topics (Storey, 1998). We will further explore the nature and dynamics of audience engagement in online communities, especially in the context of popular media, and will explore how these dynamics can stimulate audience engagement.

Engaging with Popular Media and Narrative Exchange

Digital storytelling tools offer audiences rich opportunities to create and share media content of their own (Blank & Reisdorf, 2012; Couldry, 2008). As such, it is often argued that transmedia stories can be expanded by participatory audiences when they create media content relating to the overarching narrative (Jenkins, 2006; Jenkins et al., 2013;

⁷ <https://youtu.be/X2wgJPJguX8>

Scolari, 2009). When audiences expand a narrative world, they take part in some collective kind of storytelling around a master narrative (Alleyne, 2015; Scolari, 2009) and they add an entry point to the story increasing the EE intervention's visibility among their networks as a nifty bonus.

Digital storytelling tools can also be used to frame events in a manner that embodies a judgment on their nature (Branigan, 1992). For example, audiences may frame media content in different ways: they can share the same picture, but the captions that they add may imply different meanings and judgments. The process of creating and circulating content around a particular narrative can be understood as *narrative exchange* (Clark et al., 2015; Couldry et al., 2014). The SAFN case shows how audiences can be invited to challenge a norm by engaging in narrative exchange, and how it can contribute to social and behavioral change.

Audience engagement can have a second, more implicit effect, impacting how ideas diffuse and flow through communities. By simply clicking, liking or sharing media content that embody messages or frames that they support, audiences feed personalization algorithms and contribute implicitly to the prevalence of particular frames in the streams of their peers (van Dijck, 2009). As such, members of online communities often engage in a process called 'networked framing' (Meraz & Papacharissi, 2013), shaping the course of online conversations.

A common way to conceptualize what happens when ideas spread online is the meme—typically a simple image with a caption, often drawn from or making references to popular culture. A meme is thought to contain “contagious patterns of ‘cultural information’ that get passed from mind to mind and directly generate and shape the mindsets, behavior, and actions of a social group” (Knobel & Lankshear, 2007, p. 199). From a spreadability perspective, we dismiss the idea that memetic content is capable of directly generating and shaping mindsets. However, we do acknowledge that a meme, when making cultural references, can tap into the narrative experiences people have in common, which makes it an effective way of conveying complex messages or ideas using one simple image, especially in the context of storytelling. Plus, it is fairly easy for audiences to create a memetic content themselves: it is for good reason that they are used often comments sections.

Memetic content can play an important role in the conversations EE interventions aim to spur by stimulating the creation of memes with the story's locations, characters and events as a rewarding source of inspiration. This can be accelerated by referring to community-specific cultures: Kligler-Vilenchik and Thorson found that a meme that relates to specific (sub) cultures is more likely to be shared, be imitated, or inspire the creation of new content (Kligler-Vilenchik & Thorson, 2015).

Setting up Story Circles to Promote Narrative Exchange

Previous research established that audiences engage in online activities to fulfill needs such as entertainment, finding facts and knowledge, establishing and maintaining social contacts, self-expression, and competition (Jansz et al., 2015; Shao, 2009). Therefore, we cannot assume that target audiences will automatically participate or create content once an EE intervention raises certain issues. For an EE intervention to truly function as a point of engagement, audiences need meaningful incentives to engage in 'narrative exchange'.

One way to achieve this is by setting up story circles. Clark et al. conceptualize 'story circles' as "a set of agents, processes and infrastructural conditions that enable narratives to consistently emerge and be acknowledged through exchange and mutual interaction" (2015, p. 924). Clark et al. found that, to foster story circles, the technical infrastructure has to be in place and there has to be an incentive to start and sustain narrative exchange, often coming from one or more influential individuals in the network. Moreover, the strongest examples of story circles were the cases in which digital social networks were supplemented by 'offline' connections (Couldry et al., 2014). In online communities, the technical infrastructures for *story circles* are in place: the Internet provides platforms where communities of audiences engage with each other. Social influencers and community managers can fulfill the role of *story circle agents*, e.g. by initiating and moderating conversations like the beauty and fashion vloggers did in the earlier mentioned intervention to promote condom use by SAFN. Moreover, EE strategies can draw from narrative persuasion theories and SCT to create innovative media and storytelling formats around social influencers to introduce new ideas, knowledge and practices.

In practice, the key messages of an EE intervention can be layered into a communication strategy to stimulate narrative exchange in iterative cycles. For example, in the third season of the Indian EE-series *Main Kuch Bhi Kar Sakti Hoon* or *I, a woman, can achieve everything*, the social media team of *Population Foundation India (PFI)* set up story circles around key issues following a four-step cycle: *inspire*, *enable*, *activate*, and *aggregate*. Seeking to promote gender equality, the tv series depicted families celebrating their daughters rather than only their sons (inspire). Online, this practice was coined as celebrating *Laadlidin*—a witty combination of the words ‘best’, ‘girl’ and ‘day’—providing a label for a practice that can be easily adopted (enable). On the show’s Facebook page, audiences were asked to share pictures of their daughters and sisters to celebrate their Laadli’s (activate), that were combined into new Facebook posts by the community managers to amplify the support for this practice among the audience (aggregate). This led to a series of posts with audiences sharing their interpretations of Laadlidin and comments about the role of girls and women in the family challenging existing gender regressive norms.

Markers

The word *Laadlidin* provides audiences with a new and uniquely labeled behavior that can be easily adopted. In EE, such a specific word or practice is also known as a *marker*. Markers are unique identifiable elements of messages such as new words, phrases or novel behaviors that ideally model new realities to break oppressive power structures in society (Bouman et al., 2012; Singhal & Rogers, 2002; Wang & Singhal, 2018). The goal of markers is two-fold: through uptake, markers directly contribute to attaining EE interventions’ goals, while also enabling researchers to track conversations around the marker for monitoring or evaluation purposes. The latter solves an important research issue: any marker-related online activity can now be directly attributed to the EE intervention as a result of the marker’s uniqueness. For example, the *Center for Media & Health (CMH)* collaborated with the Dutch daily soap *Good Times, Bad Times* to introduce the markers *haperhoofd* (Dutch for ‘stuttering head’, referring to cognitive malfunction resulting from brain damage) and *cocakop* (Dutch for ‘cocaine head’, referring to somebody with

a cocaine addiction), tracked conversations around these words by scanning social media platforms, and analyzed the audience's responses (Bouman et al., 2012).

In the digital age, markers do not necessarily have to be words: we can also think of other forms and modalities that are easily replicable in text, photos or videos such as symbols, gestures or dance moves. Markers can even include digital stickers, animations or augmented reality via *Facebook Filters*, *Frames* or *Snapchat Effects*, appealing to the playfulness of the target audiences. By including stickers, GIFs and visual effects that only refer to particular scenes, characters and events (e.g. Laadlidin), a visual lexicon of markers may shape the course a conversation takes. Similarly, East Los High provided easily sharable content such as healthy recipes and dance routines drawn from the TV show, promoting conversations about healthy food and exercise.

To conclude, an important advantage of markers is that we can let audiences reaffirm markers from bottom up, meaning that they can use digital storytelling tools to reaffirm and recontextualize markers to reflect their own realities. As these recontextualized markers diffuse through digital networks, they are enriched with various stories and real-world experiences and empower audiences to have a meaningful conversation about the topics, themes, or issues that resonate with them most strongly—closing the loop from bottom-up.

Research and Evaluation

Research and evaluation play an important role in the field of EE, and it is critical to position spreadable EE within the field's rich research tradition. EE distinguishes between formative research, which is applied to inform the design of an intervention, and summative research to measure the intervention's effects (Bouman, 1999). Today, it is possible to leverage public data sources for formative research from platforms like Twitter, YouTube and Facebook to retrieve information on how communities of audiences are connected, how they talk about certain themes and issues, and which individuals are among the most influential (Lutkenhaus et al., 2019a). Such research methods are essential to identify target audiences and to strategically decide on which influencers to collaborate with.

Likewise, the analysis of online communities, conversations and social influence can be used for summative research and contribute to the evaluation of the intervention, e.g. by monitoring how conversations change over time or tracking the diffusion of markers. Digital methods provide tools to study the behaviors and dynamics of online communities and play a critical role in the evaluation of spreadable EE interventions. EE professionals need to collaborate with community managers and data scientists to bring this into practice.

Collaboration

The field of EE has a long-standing tradition of interdisciplinary collaboration. During the late nineties, Bouman (Bouman, 1999, 2002) studied strategies for EE collaboration in television formats between health communication professionals and media professionals. Bouman found that if different professional domains want to collaborate, they have to have a feel for the game and know the habitus of each other's fields. The same is true for spreadable EE, although the stakeholders are different. Depending on the scope and context, spreadable EE requires collaboration with a new kind of media professionals such as social influencers, content strategists and data analysts. These professionals have unique professional and educational backgrounds and EE professionals need to be acquainted with what these new stakeholders bring to the table in order to work toward a common frame of reference.

DISCUSSION

The significance of our contribution is that it reevaluates the EE strategy in the light of changes in the media landscape such as media saturation, audience fragmentation and algorithmic personalization. Seeking to leverage social influence in digital networks, it expands existing EE theories with insights and strategies from the new media landscape and proposes approaches to create spreadable EE in practice. As such, spreadable EE utilizes the dynamics of media engagement and social influence in digital networks to create sites of engagement where audiences can discuss new ideas, knowledge, and practices, while empowering audiences to highlight the aspects that matter to them the most.

A limitation is that we have described interventions that vary in scale and scope, while the specifics of EE strategies usually are a matter of goals, budgets and other contextual realities. The skills, expertise and collaboration partners needed to create spreadable EE vary largely as well. Nonetheless, we have discussed the main practical implications of spreadable EE, such as leveraging digital methods for formative and summative analysis and working toward interdisciplinary collaborations. Future studies could further explore methodological innovations and the dynamics of interdisciplinary collaborations in spreadable EE.

Furthermore, it is often assumed that health- and social change organization possess too little resources to compete with vested industries that are marketing unhealthy products such as tobacco, alcohol and fast food; promoting unsustainable products such as cars, single-use plastics and clothing; and creating entertainment media showing irresponsible and intolerant behaviors. Compared to health- and social change organizations, vested industries possess more resources to generate clicks, views and likes through paid advertising and other outreach strategies. The power of spreadable EE lies not in reach, but in the quality of engagement of specific target audiences with the EE intervention, as these actions will ripple through their social networks. In this context, EE professionals play the role of conductors, orchestrating a *transmedia symphony* (Gomez & TEDxTalks, 2010⁷) that sheds light on all relevant aspects of social issues, and empowers audiences to join in and share their perspectives.

When it comes to stimulating conversations about pro-social topics, maintaining in control over a spreadable EE intervention is a delicate matter. Narrative exchange may quickly take alleys that health communicators might want to avoid, like the *Kony 2012* case that faced this backlash when communities of audiences started to create memetic content accusing the campaigns' supporters of slacktivism (Kligler-Vilenchik & Thorson, 2015; von Engelhardt & Jansz, 2014). The Kony example shows that EE also risks being subverted, that its social momentum can be taken hostage by a different group that uses it to flip the message. This lack of control is a characteristic typical for the dynamics in the networks of connected audiences that underlie the media landscape today (Rainie & Wellman, 2012). Health- and social

⁷ <https://youtu.be/p9SlVedmnw4>

change organizations should embrace the dynamic nature of the internet by approaching spreadable EE like an ongoing conversation. For example, instead of repressing backlash, EE professionals could respond to concerns or use it as input for a public discussion amongst the audience.

CONCLUSION

In this chapter, we have shared our perspective on the premise of spreadable EE, illustrated by theoretical notions and practical examples. Spreadable EE is built upon transmedia storytelling strategies that foster audience participation and effectively reach audiences that have spread across the media landscape. Persuasive storytelling strategies keep audiences engaged over a sustained period of time, and audience engagement is stimulated by setting up story circles. There, social influencers introduce new ideas, knowledge and practices, and stimulate conversations around prosocial topics. Narrative elements and multi-modal markers provide means to shape the course of narrative engagement and yet empower audiences to reaffirm and recontextualize markers to reflect their own realities. Furthermore, the use of markers allows EE professionals to follow conversations around key concepts of particular EE interventions in order to track the diffusion of ideas, knowledge and practices. ©

CHAPTER 3 Tailoring in the Digital Era: Stimulating dialogues on health topics in collaboration with social media influencers^{2,3}

2 This chapter has been published as Lutkenhaus, R. O., Jansz, J., & Bouman, M. P. (2019). Tailoring in the digital era: Stimulating dialogues on health topics in collaboration with social media influencers. *Digital Health*, 5, 1–11. <https://doi.org/10.1177/2055207618821521>

3 The case study presented in this chapter was originally conducted for the Dutch National Institute for Public Health and the Environment (RIVM) by the Center for Media & Health. (Lutkenhaus, R. O., & Bouman, M. P. A. (2017). #Vaccinatie. *Conversatienetwerken op Twitter*.)

Tailoring is an effective method for increasing the relevance of health communication programs, in that it adapts messages to audiences' knowledge, beliefs, circumstances and prior experiences on specific health issues (Bartholomew Eldredge et al., 2016; Witte, 1995). In practice, tailoring usually involves the computer-aided personalization of letters, leaflets, websites or apps, and provides audiences with feedback and personal advice for a relatively low cost (Hasebrink & Popp, 2006; Lustria et al., 2009; Peels et al., 2013). However, the media behaviors of today's audiences have diversified (Hasebrink & Domeyer, 2012; Hasebrink & Popp, 2006; Kim, 2016; van Rees & van Eijck, 2003; Webster & Ksiazek, 2012), and audiences are increasingly drawn to online communities to consume and exchange information and stories on a diverse range of topics and niche interests (Bennett & Segerberg, 2012; Hasebrink & Hepp, 2017), including health (Vicari & Cappai, 2016). Against the background of these open communication networks, where there is less control over how content ultimately arrives at end-users' screens, how can we tailor health communication interventions to be more personally relevant? How can we leverage the dynamics of conversations and social influence in online networks to create and deliver tailored health interventions more effectively?

In many online communities, content-creating audience members have become particularly influential and act as opinion leaders, introducing new information and ideas to their social circles and setting the agenda for conversations. It is for good reason that these so-called *social media influencers* have sparked the interest of marketers (Langner et al., 2013). Collaboration with these influencers offers new opportunities to engage with audiences, for example in modeling health behaviors, breaking taboos and initiating conversations. There are also opportunities to amplify tailored health communications in the target audiences' media realities not merely by focusing on sending tailored mes-

➔ <https://youtu.be/gElabqH5zhU>

➔ <https://youtu.be/yKAGLkVm1I8>

sages, but also by stimulating (online) conversations and other forms of online audience engagement. The STD/AIDS Foundation in the Netherlands, for instance, has intuitively applied this in practice, building a legacy of collaborations with social influencers such as beauty vloggers, rappers and gamers in order to engage with online audiences (Fisser, 2015, 2016). An example is its collaboration with rappers in the intervention *Beat the Macho* (Cense & Oostrik, 2015; Sense. info, 2015[↗]). This targeted young audiences with an interest in urban culture with a view to challenging community specific perceptions on masculinity through raps and dance, encouraging them to think and talk about what it means to be a “real man.” In another of the Foundation’s collaborations, beauty vlogger Linda de Munck created an episode in which she visited the consultation hour of the municipal health services for personal advice on birth control methods (Sense. info, 2017[↗]). These cases show that working with influencers can tailor a message to the perceptions and cultures of online communities in an organic way, as influencers are already culturally fluent in engaging with members of these communities. As such, we have a slightly different take on tailoring by putting the creative and cultural competences of social influencers central.

Engaging with audiences in this way calls for a segmented approach that tailors interventions to the unique cultures and salient health-related beliefs across different online communities (Noar, 2006; Randolph & Viswanath, 2004). This chapter addresses this need by reflecting on how digital methods can be used to:

- (a) identify online communities;
- (b) understand community specific perceptions, beliefs and norms; and
- (c) identify social media influencers as potential collaboration partners.

Furthermore, we align these digital methods with a media mapping protocol to improve the design of segmented health communication strategies that aim to engage with different online communities. We illustrate our argument with a case study on conversations about vaccination among Dutch Twitter users, which was commissioned by the Dutch National Institute for Public Health and the Environment (*RIVM*) (External Advisory Committee on Vaccination Willingness, 2018; Lutkenhaus & Bouman, 2017).

TAILORING IN THE DIGITAL ERA

Studies have shown that tailoring is an effective method for increasing the relevance of health communication programs (Bartholomew Eldredge et al., 2016; Witte, 1995). Tailoring distinguishes between two types of goal: ‘enhancing cognitive preconditions for message processing or acceptance’; and ‘enhancing message impact by selectively modifying initial behavioral determinants of desired outcomes.’ (Hawkins et al., 2008, p. 454) In addition to tailoring a message’s contents, it is also important to ensure that it reaches its prospective audience. Tailoring therefore often overlaps with targeted communication in practice (Campo et al., 2012; Hawkins et al., 2008). If health interventions in online audience segments in the digital age are to be appropriately targeted and tailored, it is important to understand how specific target audiences are organized. This section therefore reflects on changes in the media landscape and explores how open data collection methods can be leveraged to:

- (a) identify online communities;
- (b) map their health-related perceptions, beliefs, and cultures; and
- (c) identify social influencers as potential collaboration partners to create interventions tailored to community specific beliefs and perceptions.

CASE: VACCINE HESITANCY IN THE NETHERLANDS

Following a global trend (World Health Organization, 2016), vaccination rates in the Netherlands have been declining. In 2015, 95.5% of eligible children received a measles-mumps-rubella shot; this figure was 94.8% in 2016 and 93.8% in 2017 (RIVM, 2017). Alarmed by these numbers, the RIVM invited a Vaccine Hesitancy Commission (VHC)—a group of social and communication scientists—to study the situation (External Advisory Committee on Vaccination Willingness, 2018). The VHC wanted to increase its understanding of the (mis)information that is circulated online and commissioned us at the Center for Media & Health to explore how vaccination is being discussed on Twitter (Lutkenhaus & Bouman, 2017).

4 Dutch for “to vaccinate,” “vaccination,” “vaccinations,” “to inoculate,” “inoculation,” “inoculations.”

Method

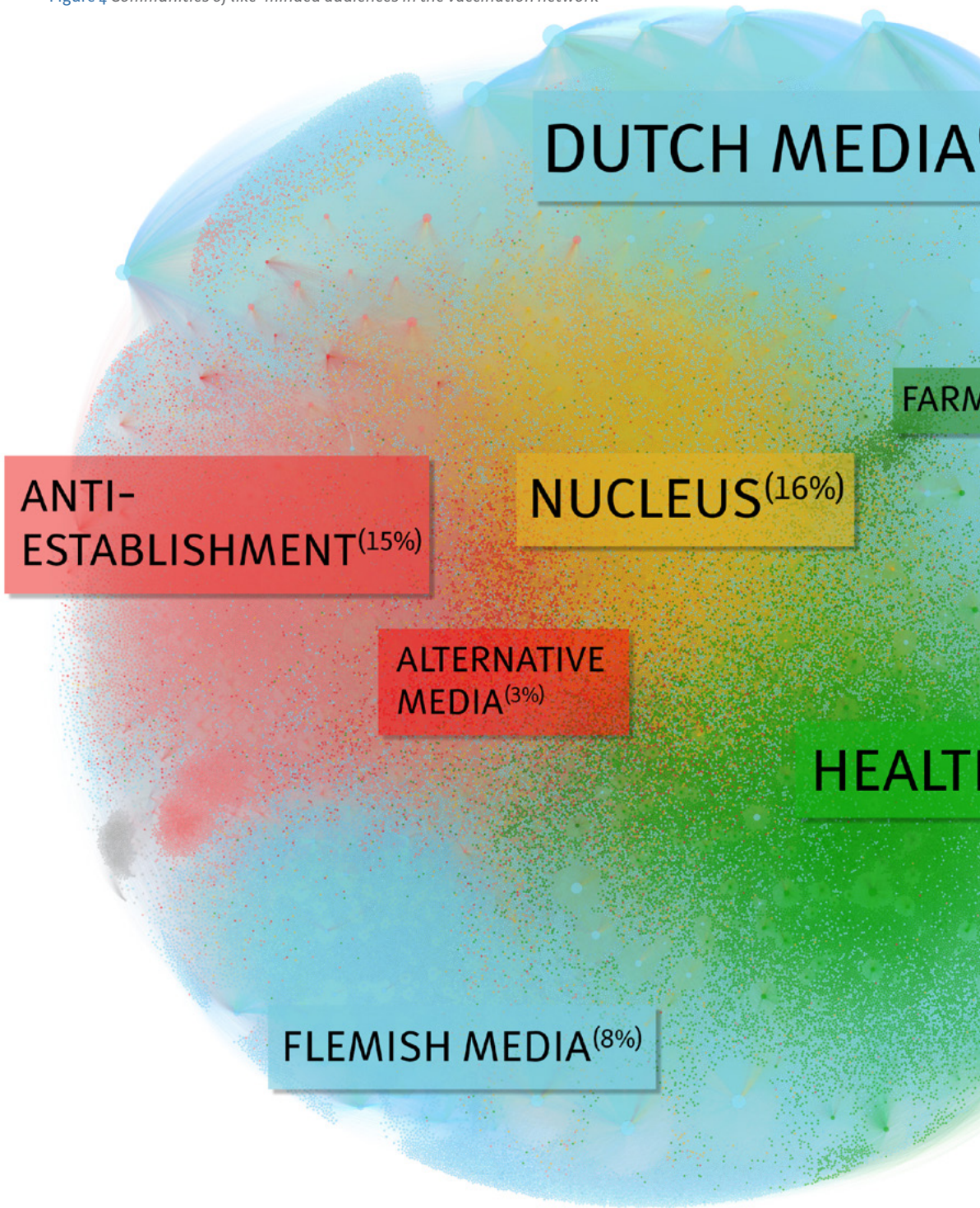
We used a set of custom scripts in Rstudio (R Core Team, 2017; RStudio, 2017) based on the *rtweet* package (Kearney, 2017) to retrieve all the tweets between 28 August and 9 October 2017 that included the Dutch words “vaccineren,” “vaccinatie,” “vaccinaties,” “inenten,” “inenting,” or “inentingeng.”⁴ This produced a data set with 10,710 tweets written by a total of 2,600 unique authors, including associated quotes, retweets and replies. The authors’ followers and accounts they were following were also retrieved. These data were combined and a network file was created that included 125,746 accounts and 3,822,000 connections. Iterating through a cycle of network analysis, text mining, and qualitative analysis, we identified online communities, distinguished them by common characteristics in their profile texts and tweets, and analyzed how they talked about vaccination.

Researchers interested in employing our methods can use our scripts to gather, process and analyze Twitter data that we have made publicly available via GitHub (Lutkenhaus, 2018).

Identifying communities. Figure 4 shows a plot of the network created in *Gephi* (Bastian et al., 2009), in which the communities—some of which will later serve as audience segments for targeted communication—are distinguished by color. We used the *Louvain algorithm* (Blondel et al., 2008) for community detection. The nodes (Twitter accounts) are sized according to the number of times they are followed by co-members of the network. Analysis of the profile description texts confirmed our expectation that the communities are inhabited by like-minded audiences.

The health community is inhabited by general practitioners, pharmacists, and public health and other health-related professionals. The anti-establishment community is inhabited by independent bloggers, homeopathy advocates, people advocating a strong Dutch nationality, and troll profiles, and is tightly entangled with a small alternative media community with independent journalists and news outlets that are mainly based in the United States. We also identified a Dutch media community and a community of Flemish media from Belgium, which are also in the Dutch language. Each community comprises the country’s broadcasting organizations, newspapers and public figures. We also identified a

Figure 4 Communities of like-minded audiences in the vaccination network



(38%)

MERS AND VETS (2%)

H (18%)

small farmers and veterinarians community, which approaches vaccination from their professional perspective. At the center, we identified a community that is mainly populated with politicians, media and communication professionals, and a mix of profiles that seem to be rooted in one of the surrounding communities. This nucleus community represents the space where a critical general audience engages in conversations about vaccination, and where Twitter users that are aligned with the surrounding communities try to influence the debate.

Mapping perceptions. To determine audience segments and appropriately target and tailor a health communication intervention to their perceptions, it is important to understand how the communities engage with each other on vaccination issues. What are their vaccination-related beliefs? What are their cultures?

We identified patterns in the tweets using text mining techniques from the *tidytext* package (De Queiroz et al., 2017). Using a constant comparative procedure (Boeije, 2002), these patterns were followed in a subsequent step of the qualitative content analysis in order to identify recurring themes, frames and narratives. We also traced back chains of retweets, quotes and replies to determine how the communities engage with each other.

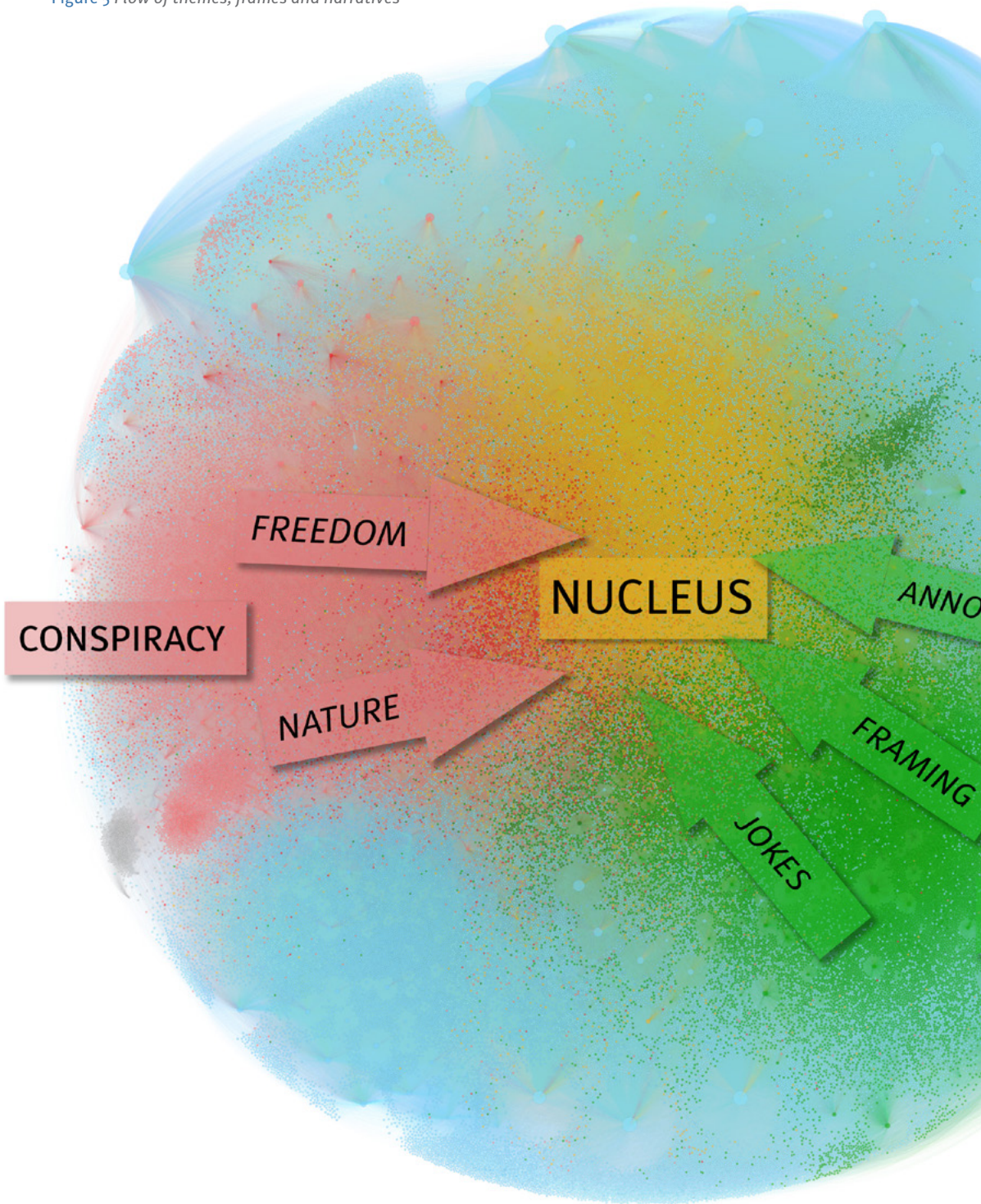
Figure 5 shows the different themes, frames and narratives and how they flow through the network.

Most of the themes, frames and narratives originate in the health-care and anti-establishment communities and are discussed in the nucleus community. The health-care community tweeted in favor of vaccination, sharing reports on scientific studies and peer-reviewed articles (research), announcing informative events about vaccination (announcements), and criticizing media that showed images of crying children to portray vaccination as something scary and painful (framing).

The anti-establishment community was largely tweeting against vaccination, sharing articles exposing its supposedly

Note. This plot is a zoomed-out view that includes all the analyzed Twitter accounts and the connections between them. The accounts and connections are colored along the detected communities to which they belong. The communities have been named after the analysis of the patterns in the accounts' profile descriptions.

Figure 5 *Flow of themes, frames and narratives*



harmful effects and framing it as a conspiracy by large pharmaceutical companies (conspiracy) and an infringement of the right to self-determination (freedom); not vaccinating, meanwhile, was proclaimed as a natural way to build a resilient immune system (nature). The sentiment about vaccination in this community has similarities with a wider sense of distrust toward doctors, science, politicians and other traditional institutions observed in other studies (Kata, 2010, 2012).

The Dutch and Flemish media communities rarely engaged in discussions on vaccination, although the health and anti-establishment communities both used media coverage to back up their arguments. In Figure 4, the so-called hubs—which are the nodes in our network that are followed widely, but rarely follow other nodes back—are positioned toward the edges. Notably, the anti-establishment community is not well-connected to the media cluster. Instead, it is linked to a small cluster of alternative media. These alternative media sources do not engage actively with the other communities, but are retweeted and quoted often by members of the anti-establishment community.

In the nucleus community, representing the space where the health communities and anti-establishment community engage with a general audience, a mix of frames in favor of and against vaccination was observed. From the frames against vaccination, the conspiracy frame hardly reoccurred at the nucleus, possibly because it is too much at odds with more moderate world views. From the frames in favor of vaccination, the research frame rarely reoccurred in the nucleus community. The reason why the research narrative did not spread may be because the high information density and medical jargon posed a cognitive barrier (Bouman, 1999; Moyer-Gusé, 2008). Similarly, the members of the health communities antagonize and joke about anti-vaccination activists (jokes) who, in turn, see their prejudice about the arrogance of the traditional elite confirmed. For some audiences, the fact that a doctor, researcher or someone from what is perceived as “the establishment” is sharing this information may be enough reason to dismiss the message (Kata, 2010, 2012).

Mapping the discourse on vaccination in and between communities produced results that can be used to define and tailor health communications to the perceptions of the different online communities. It also provided input when



ANNOUNCEMENTS

RESEARCH

deciding which frames to support and which misconceptions to address.

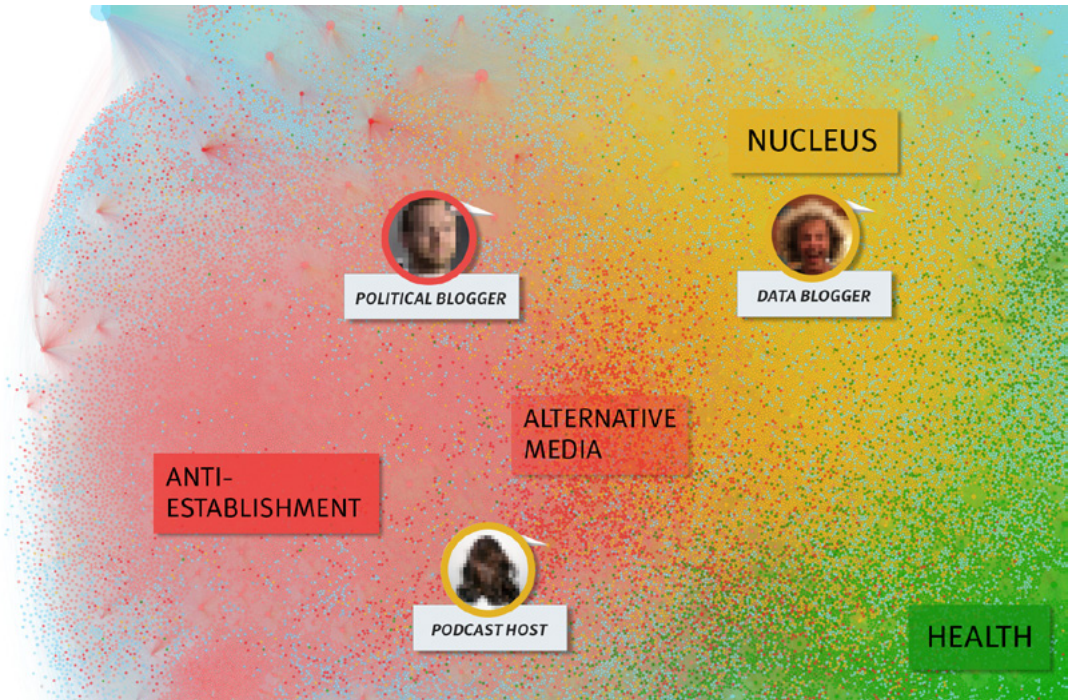
Identifying social influencers. The analysis shows that most of the misconceptions around vaccination are rooted in the anti-establishment community, whereas the health community tries to debunk these misconceptions by sharing facts and ridiculing anti-vaccination activists. However, this seems to alienate the anti-establishment community and to fuel its prejudices about what it perceives to be “the elite.” This makes the anti-establishment community elusive and difficult to reach via traditional means. Moreover, some of this sentiment also resonates in the nucleus communities.

In targeting and tailoring health interventions to this situation, health communicators could collaborate with opinion leaders to develop formats that address and stimulate conversations about misconceptions on vaccination in the anti-establishment and nucleus communities. They could also collaborate with gatekeepers to enhance the flow of ideas between communities. To identify gatekeepers and opinion leaders, we used the *igraph* package (Csardi & Nepusz, 2006) to compute *PageRank* (Xing & Ghorbani, 2004) and *betweenness* centrality (Kolaczyk & Csárdi, 2014). Sorting the individual Twitter accounts in each community by their respective PageRank and betweenness centrality scores yielded a list of the most influential opinion leaders and gatekeepers.

Finding suitable influencers to collaborate with is not about identifying the most influential nodes in general, but finding the most influential nodes for every community. To illustrate this, some of the most influential nodes in our vaccination network reside in the health-care community, but the anti-establishment community largely lies beyond its reach. We were specifically interested in influencers that are native to the target communities, as it is in these communities where they are most influential. Ideally, the RIVM would collaborate with social influencers who can create their own media content, or already do so (semi-)professionally. Social influencers should also be willing to collaborate on a pro-vaccination campaign, so they should not be specifically against vaccination. A curious, critical attitude, however, would add to the authenticity of the prospective media content. After inspecting the profiles of the most influential nodes, many potential collaboration partners surfaced. Figure 6 highlights

three social influencers in the network, and Table 1 describes the potential collaborations in more detail.

Figure 6 Potential collaboration partners in the vaccination network.



Note. The profile pictures of the potential collaboration partners are anonymized. Table 1 describes the potential collaborations in more detail.

Identifying Online Communities

Locke (2016) has aptly characterized changes in the media landscape by stating that we have shifted from the age of broadcasting schedules, where audiences would have to adapt to scheduled broadcasting times to see their favorite television shows, to the age of the stream, where audiences are subjected to a constant stream of information that adapts to them, using tools such as social media sites, search engines and messaging services. Locke argues that (mediated) interpersonal conversations are the main interface for navigating the stream, for example, by consuming and talking about media messages that are recommended by peers or media suggested by personalization algorithms in search

Table 1 Potential collaboration partners and content formats

COLLABORATION PARTNER	COLLABORATION AND CONTENT FORMAT
<p>Data Blogger</p> <p>ROLE Opinion leader</p> <p>GOAL Share fact-based information</p>	<p>A data enthusiast that visualizes data professionally, but also shares interesting visualizations on a diverse range of topics on Twitter.</p> <p>A collaboration with this data blogger could result in a series of appealing visualizations about vaccination and immunization that would resonate strongly in the nucleus community.</p>
<p>Podcast Host</p> <p>ROLE Opinion leader</p> <p>GOAL Spark conversation</p>	<p>The podcast host resides in the nucleus community and is well-connected with the anti-establishment community. A collaboration with the podcast host could result in an interesting podcast episode where a diverse range of guests talk in depth about vaccination from different perspectives.</p>
<p>Political Blogger</p> <p>ROLE Gatekeeper</p> <p>GOAL Share different perspectives</p>	<p>This blogger and aspiring politician is a prominent member of a Dutch political party that is known for advocating the right to online privacy. The blogger bridges the gap between the anti-establishment, nucleus and Dutch media communities. A collaboration with the blogger could result in an offline or online public discussion event that can attract a diverse audience, including vaccination sceptics from the anti-establishment and nucleus communities.</p>

Note. The potential collaboration partners are highlighted in Figure 6

engines or social networks. To reach audiences, it is therefore important to study media networks in order to identify online communities. This is not only with the goal of determining audience segments, but also to tailor health interventions to community-specific beliefs and perceptions, and to leverage social influence in networked conversations that collectively direct the audiences' media gazes (González-Bailón, 2017).

A variety of interests can be distinguished when we look at an individual's media usage. A community is the sum of individual media behaviors related to a specific topic. To conceptualize this, it is helpful to distinguish between (individual) media repertoires and (collective) media ensembles (Hasebrink & Hepp, 2017). Today's audiences actively make use

of a mix of traditional and online media. Such cross-media usage is often referred to as a media repertoire (Hasebrink & Domeyer, 2012; Hasebrink & Popp, 2006; Kim, 2016; Taneja et al., 2012; van Rees & van Eijck, 2003; Webster & Ksiazek, 2012). Media repertoires transcend passive media use and comprise media-related communicative practices that individuals use to relate to online communities focusing on niche interests. In defining online communities, we follow what Hasebrink and Hepp call “social domains”—figurations of organizations and individuals engaging with each other on a common topic or issue (2017). Individuals engaging with these social domains collectively make sense of various issues by creating, sharing and engaging with media content (Blank & Reisdorf, 2012; Couldry, 2008). The sum of these communicative practices around a social domain is called a media ensemble (Hasebrink & Hepp, 2017) and can be seen as the collective voice of a community, or the voices of different communities that engage with the same topic from different perspectives.

For health communication purposes, open data collection methods can be leveraged to retrieve these media ensembles from the web, social media or content platforms to create media networks in which we can distinguish between different online communities, as these are the audience segments for targeted communication strategies. For example, we can examine relationships between websites, Twitter users or YouTube videos to detect media clusters that represent the platform-specific aspects of media ensembles around a specific issue.

Understanding Community Perceptions

It is important to understand how communities engage with each other on health issues if we are to appropriately target and tailor health communication interventions to online audience segments. What are their health-related beliefs? And how do these relate to their community-specific media preferences and cultures? Analyzing conversations on specific health topics among different online communities contributes to understanding the communities’ knowledge, attitudes and social norms, which are important determinants for behavioral change (Ajzen, 1991; Chung et al., 2016; Hawkins et al., 2008) that can be taken into account when creating tailored health interventions.

Zooming into specific media ensembles, we can use text mining techniques and qualitative content analysis approaches to disentangle the voices of the stakeholders engaging with the issue. For example, content analyses of what information is circulated, what sources are referred to and how this information is presented unveil issue-related media exposure for the different communities. This enables us to tailor health communications in order to address the most prominent misconceptions about health-related issues across different online communities.

Health communicators can also study salient social norms around health issues in online communities. Social norms are not static; instead, in online networks they are constantly being negotiated through interpersonal discussions, direct observations, and vicarious interactions through the media (Alleyne, 2015). So, as a type of discourse, which is “language reflecting social order but also language shaping social order and shaping individuals’ interaction with society,” (Jaworski & Coupland, 2006, p. 3) analyzing the conversation in different online communities helps researchers to identify salient health-related social norms and take these into account when creating tailored health interventions.

As such, health communication is also related to the concept of cultural competence (Bartholomew Eldredge et al., 2011), meaning that a health intervention should fit the culture of the target communities to foster empowerment (Pasick et al., 1996). In order to design an intervention that fits the culture of a certain community, Hixon (2003) has argued that health communication professionals need to work with and within communities and must try to understand their culture by being flexible, open and self-reflective. Analyses of the conversations in an online community may therefore contribute to our understanding of its culture.

Identifying Influencers

In today’s media landscape, platforms such as Google, Facebook or Twitter tailor the content they offer—either search results, timelines or friend suggestions—to match individual preferences (Pariser, 2012; Tufekci, 2015). Platforms derive preferences from their users’ platform-related behaviors and the behaviors of their peers. In doing this, these platforms aim to be as relevant as possible, maximizing the time

audiences spend online and thereby increasing the amount of potential advertising space (Gillespie, 2010; Helmond, 2015). A consequence of algorithmic personalization is that similar audiences are presented with similar information (Rieder et al., 2018). This means that online community members are exposed to ideas similar to their own—a phenomenon often referred to as the filter bubble (Pariser, 2012). Moreover, as individuals engaging within a specific community are more closely connected with each other, they also engage with each other more intensely. As they are like-minded, this often reinforces their existing opinions. This phenomenon is commonly referred to as an echo chamber (Colleoni et al., 2014). Algorithmic personalization leads to echo chambers and filter bubbles that are difficult to burst, especially when a message is at odds with a community's perceptions and culture. The field of influencer marketing offers health communicators interesting opportunities to bypass the boundaries of filter bubbles and introduce new ideas into online communities. In collaborating with social influencers, health communicators can engage with various audience segments while applying targeting and tailoring techniques to enhance the preconditions for careful processing and behavioral impact.

Social influencers can be ordinary citizens as well as established celebrities who share parts of their personal life, promote political views or advertise services or products through their Twitter, Facebook, Instagram or YouTube accounts (Agrawal, 2016). The role of social influencers in online communities resembles that of opinion leaders in the classic two-step flow model of Katz and Lazarsfeld (2006). This model states that ideas flow from mass media to opinion leaders who, in turn, further develop and disseminate them to their peers. In mass media models, opinion leaders rely on interpersonal communication to publicize their thoughts. In the digital age, however, (mediated) interpersonal communication functions as the interface to navigate an abundance of content, implicitly directing audiences' media gazes. Moreover, opinion leaders use the internet to share their thoughts with the world, radically speeding and scaling up the dissemination process. Following the spreadability paradigm of Jenkins, Ford and Green (2013), we believe that human agency in the networks of participatory audiences is central to reaching and engaging with them. Simply put, media

content will not spread itself, no matter how appealing it is. Nevertheless, when messages are strategically embedded in the technical and social infrastructures of the internet, audiences are likely to engage with them and spread them widely. As the most influential and visible members of their communities, social influencers play a key role in shaping the flow of information to them.

Social influencers can make an important contribution to setting and shifting the public agenda of online communities. For example, in interacting with their peers, they invite their followers to leave their thoughts in the comments section, vote in a poll or react by creating memes (Johnston, 2016; Knobel & Lankshear, 2007). As such, they foster digital story circles (Clark et al., 2015; Couldry et al., 2015) and set the agenda for conversations in online communities. As noted earlier, conversations are capable of pushing the boundaries of social norms (Chung et al., 2016). Furthermore, conversations about health topics also contribute to greater levels of awareness about an issue within a community. Higher levels of engagement around a topic mean that personalization algorithms favor content with a similar theme (Tufekci, 2015). Accordingly, conversations can implicitly and explicitly raise awareness, increase exposure and make audiences more receptive to information about a specific health issue (Weinstein et al., 2008; Weinstein & Sandman, 2002).

In targeting and tailoring health interventions, two kinds of influencer would make suitable collaboration partners:

- (a) social influencers who are influential in one specific community (opinion leaders); and
- (b) social influencers who are influential among more than one community, thereby facilitating the flow of information from one community to another (gatekeepers) (Katz & Lazarsfeld, 2006), and who act as bridge builders.

The field of network analysis offers different methods to determine the influence of individuals in a network, such as degree centrality, betweenness centrality or eigenvector centrality (Barabási, 2016; Kolaczyk & Csárdi, 2014). Betweenness centrality, for example, quantifies the extent to which an individual act as a bridge to other individuals, meaning that it can be used to identify gatekeepers. PageRank, meanwhile,

expresses the extent to which an individual is influential by quantifying its connectedness with other influential individuals, so that it can be used to identify opinion leaders.

Next, we will turn to a case study that illustrates how digital methods can be used for tailoring by realizing three goals:

- (a) detecting online communities;
- (b) mapping health-related norms and perceptions; and
- (c) identifying social influencers as potential collaboration partners.

DISCUSSION

Our case study shows that digital methods provide an opportunity for targeting in the digital era by identifying online communities with specific health perceptions. Before discussing the methodological limitations of our research, we will now demonstrate more precisely how this kind of analysis can contribute to tailoring.

Targeting and Tailoring in the Digital Age

One could argue that influencer marketing is an opportunity to use the communication channels of social influencers to send tailored messages to passive audiences, which is a sender-driven approach. However, it is unlikely that a message in which the contents or the sender are at odds with the reigning perceptions and norms around an issue will make any impact, as audiences will not be receptive to it. Instead, we have a slightly different take on tailoring by putting the creative and cultural competences of social influencers central. This differs greatly from computer-aided tailoring, where messages are typically the result of leveraging personal data using a pre-determined content formula. However, both approaches may lead to communication that is more relevant on a personal level, which is why tailoring is applied in the first place. The STD AIDS Foundation's *Beat the Macho* and contraception cases described in the Introduction show that working with influencers tailors a message to the perceptions and cultures of online communities in an organic way, as influencers are naturally culturally competent when it comes to engaging with these communities' members.

Targeted health interventions require collaboration strategies in which health communicators and social influencers work closely together. In such collaborations, there is a need for a common frame of reference that guides the collaboration process (Bouman, 1999), balancing tasks and responsibilities between health communication professionals and social influencers. In the STD AIDS Foundation's examples, social influencers were responsible for the social and creative aspects of the interventions, whereas the health communicators remained in control of aspects that concerned behavioral impact and contributed to the intervention's objectives. In our case study on vaccine hesitancy, this might translate into: letting the hosts of existing podcasts lead discussions about vaccination; making vaccine-related data sources available to data bloggers, artists and other enthusiasts; and (co-) producing live discussion events about vaccination.

To strengthen this common frame of reference, we suggest following a media mapping procedure (Bouman, 2015) that effectively integrates the efforts of the different stakeholders. The media mapping procedure distinguishes different phases that can be used to guide the creation of health interventions in which the digital research methods from our case study play an important supporting role. During the orientation phase, in which researchers and health communicators work toward a deeper understanding of the health issue, health communicators can use digital methods to identify online communities, understand their health-related perceptions and define audience segments. During the crystallization phase, when potential collaboration partners are identified, approached and briefed, health communicators can use digital methods to further increase their understanding of health-related perceptions and find potential collaboration partners across online communities. During the dissemination phase, which monitors and measures whether beliefs, perceptions and norms around the health-related issue have changed, digital methods can be used to detect changes in online conversations about the issue across the different target communities.

Methodological Limitations

In terms of the methodological limitations of our case study, it should first be noted that previous research shows that the

cross-media use of audiences has diversified (Hasebrink & Domeyer, 2012; Hasebrink & Popp, 2006; Kim, 2016; Taneja et al., 2012; van Rees & van Eijck, 2003; Webster & Ksiazek, 2012). Nevertheless, our research on vaccine hesitancy is limited to Twitter. Facebook, YouTube, Instagram and many other platforms are also likely to be used to discuss vaccination. Accordingly, to incorporate the expanding media landscape and diversified media repertoires in future studies, we propose the extraction of links to other platforms from Twitter messages. These links can be used to understand: what media content audiences are linking to as “evidence”; which websites or sources are further referred to; or which websites, channels or Instagram accounts are most popular. These links can also serve as inputs for a digital equivalent of snowball sampling, unfolding networks of websites, YouTube videos and/or channels (Rieder, 2017) or networks of Instagram hashtags (Highfield & Leaver, 2016).

Secondly, we used the Louvain algorithm in our case study (Blondel et al., 2008) to detect communities. This algorithm is known for providing quick and adequate results for large networks. However, it does not take directionality into account, meaning that it does not distinguish between a node following a node and a node being followed by a node. Nonetheless, the Louvain algorithm served the purpose of detecting like-minded audiences in our case study exceptionally well. Another limitation of the Louvain algorithm is that nodes can only be members of one community, whereas in reality it is possible for individuals to engage with multiple communities. Algorithms that are capable of taking directionality or multiple-community membership into account require more computing power. In future studies, researchers could experiment with more powerful computing clusters or applying different community detection algorithms.

In addition to community detection, quantifying node influence is complex; there are several methods available and which of these is best depends on a study’s goals. In our research, we used PageRank and betweenness centrality to identify social influencers, as these are well-equipped to identify influential nodes, as well as nodes that serve as bridges (Kolaczyk & Csárdi, 2014). In future studies, researchers could experiment with the application of other indicators such as degree centrality, closeness centrality or eigenvector centrality.

Thirdly, we have mainly focused on analyzing textual content, whereas much of today's content is visual. In future studies, researchers could analyze visual content by making use of machine-learning resources such as Google's Vision API (Google, 2017). Such cloud-based machine-learning services make it possible to convert visual data into textual data to render them analyzable. So, when sending images to Google's Vision API, the system's interpretation of these images is returned to the user. Such systems are also able to recognize people, locations or even memes, providing richer levels of context. Analyses of such data could further enhance the mixed-methods approach we used in our case study, as the output of these systems may point to objects, places or people that occur more often than others in a set of images.

CONCLUSION

Recent changes in the media landscape include the formation of online communities and algorithmic personalization. These developments have made reaching and engaging with target audiences more challenging. We propose that health communication professionals and social influencers can collaborate effectively to create health interventions that are tailored to the preferences, perceptions and cultures of these online communities. To enable the creation of such interventions, we have presented a combination of network and content analysis to:

- (a) identify online communities;
- (b) increase our understanding of their health-related perceptions and cultures; and
- (c) identify appropriate social influencers as potential collaboration partners.

The case study has demonstrated how digital methods can be used successfully to target and tailor health interventions in the digital era.

Finally, we adopted an alternative approach to tailoring by putting the creative and cultural competences of social influencers central, resulting in health communication that is more personally relevant. We propose a media mapping

procedure that integrates digital research methods into a collaborative process to define audience segments, identify collaboration partners and design messages that are tailored to the target communities' perceptions, guiding interdisciplinary collaborations between health communicators, social influencers, researchers, data scientists and influencer agencies. This contribution is especially useful for those who: seek to raise awareness; promote conversations and/or educate online audiences on specific health issues; and are open to experimenting with collaborative partnerships. ☉



PART II **Researching Spreadable
Entertainment-Education**



CHAPTER 4 Mapping the Dutch Vaccination Debate on Twitter:

Identifying communities, narratives, and interactions^{5,6,7}

5 This chapter has been published as Lutkenhaus, R. O., Jansz, J., & Bouman, M. P. A. (2019). Mapping the Dutch vaccination debate on Twitter: Identifying communities, narratives, and interactions. *Vaccine: X*, 1, 100019. <https://doi.org/10.1016/j.jvacx.2019.100019>

6 This chapter analyzes an extended version of the data set that was originally retrieved for a research project commissioned by the Dutch National Institute for Public Health and the Environment (RIVM) by the Center for Media & Health. The reports have been published as ▶

In recent years, vaccination rates in the Netherlands have slightly but steadily declined (RIVM, 2017). Although the vaccination rates remain above critical levels, the Dutch National Institute for Public Health and the Environment (RIVM) commissioned an External Advisory Committee on Vaccination Willingness (vwc) to study the societal context of the decline, and to advise the RIVM on strategies to address it (External Advisory Committee on Vaccination Willingness, 2018).

One of the societal contexts that the vwc set out to explore is the role of the Internet. Online platforms are leading audiences to sources of health-related content of varying quality (Betsch et al., 2012) and social media have given rise to communities of vaccine advocates and anti-vaccine activists who use Web 2.0 services to circulate their message (Betsch et al., 2012; Kata, 2012; Venkatraman et al., 2015). Several studies have associated *anti-vaxx* communities with the emergence of a postmodern paradigm in health care in which people favor their own interpretations over evidence-based facts and question the legitimacy of traditional institutions (Kata, 2010, 2012; Smith & Graham, 2017). The vwc was especially interested in the role that these communities play in the vaccination debate in the Netherlands. Which communities are engaged in the vaccination debate and what role do they play in the Dutch media landscape? How do they interact with others, with the government, and with knowledge institutes such as RIVM?

Commissioned by the vwc, we investigated how Dutch Twitter users discuss vaccination (Lutkenhaus & Bouman, 2017). The main research objectives were to:

- (1) identify the different communities and understand their backgrounds;
- (2) identify the most important vaccine-related narratives; and
- (3) examine how the communities interact by exposing the ways in which narratives flow through the network.

▶ Lutkenhaus, R. O., & Bouman, M. P. A. (2017). #Vaccinatie. *Conversatienetwerken op Twitter*. Center for Media & Health and External Advisory Committee on Vaccination Willingness. (2018). *In gesprek over vaccineren*. Rijksoverheid. <https://www.rijksoverheid.nl/documenten/rapporten/2018/02/01/in-gesprek-over-vaccineren>

7 The data set in this chapter is publicly available as Lutkenhaus (2019). Data for: Mapping the Dutch Vaccination Debate on Twitter: Identifying Communities, Narratives, and Interactions, *Mendeley Data*, v1. <http://dx.doi.org/10.17632/fjvk93bc5m.1>

THEORETICAL BACKGROUND

Web 2.0 has enabled audiences to create and gather in public spaces beyond the realm of mainstream media (Couldry, 2008). There, media consumers use Web 2.0 services to relate to so-called social domains, which are figurations of organizations and individuals engaging with each other on a common topic or issue (Hasebrink & Domeyer, 2012; Hasebrink & Hepp, 2017) like vaccination. Sometimes, online communities use their voice for a specific reason, such as raising awareness about the alleged side-effects of vaccination. Multiple communities engaging on the same topic can have contrasting interests, and in those cases they can become allies or rivals and, in publicly negotiating their interests, their voices will reinforce or oppose each other (Kligler-Vilenchik & Thorson, 2015).

It is important to study vaccine-related conversations across these communities, because discussions can instill norms and affect perceptions that may ultimately impact the vaccine-related decisions made by individuals (Witteman & Zikmund-Fisher, 2012). Perceptions about vaccination may vary strongly across communities and two mechanisms have been associated with exaggerating those differences. First, online platforms tailor their content feeds to individual preferences, resulting in a *filter bubble* for individual end-users where they are selectively exposed to media content aligned with their interests and beliefs (Gillespie, 2010; Helmond, 2015; Pariser, 2012). Members of anti-vaxx communities, for example, are automatically exposed to more negative representations of vaccination. Second, so-called *echo chambers*, or the process of one's preexisting opinions constantly being reinforced by likeminded peers, ultimately contributes to polarization between communities of concurring audiences (Barberá, Jost, et al., 2015; Colleoni et al., 2014).

The extent to which an individual is exposed to vaccine-related information, or is subjected to vaccine-related norms, depends on where he or she is situated in the network. As an online equivalent of a stakeholder analysis, it is therefore important to identify online communities and understand how they perceive vaccination and why.

METHOD

We have employed a mixed-method approach to identify different online communities in the Dutch vaccination debate, disentangle their voices, and inspect how information travels within and across communities. In this section, we will outline how we have retrieved, processed, and analyzed our data. The scripts to gather and process the data draw extensively from both Kearney’s *rtweet* package (2017) and the *igraph* package (Csardi & Nepusz, 2006) and have been made available publicly via GitHub (Lutkenhaus, 2018).

Retrieving Tweets

We retrieved all Dutch Twitter messages (statuses or tweets) written between 28-07-17 and 12-02-17 that included the words: “vaccinatie”, “vaccineer”, “vaccineert”, “vaccineren”, “vaccineerde”, “vaccineerden”, “gevaccineerd”, “gevaccineerden”, “vaccin”, “vaccins”, “inenting”, or “inenten”⁸. This produced a collection of 2,869 tweets by 1,684 unique users.

8 Dutch (synonyms) for ‘vaccine’, ‘vaccination’, and different tenses of ‘to vaccinate’ and ‘to be vaccinated’.

Many of these tweets resulted from (multiple) interactions between users. For example, 823 of our 2,869 original tweets (28.7%) were replies, 414 (14.4%) were retweets, and 249 (8.7%) were quotes. Many of these statuses would not have been written without an original tweet to retweet, quote, or reply to. As we wanted our data to reflect this context, we retrieved the (chains of) tweets that triggered the retweets, quotes, and replies in our initial set, resulting in 2,437 extra tweets by 1,197 unique users, of whom 324 unique users were present in our initial data set. This led to a sample set of 5,306 unique messages written by 2,557 unique users.

Retrieving the Network

Just a small section of all registered Twitter users actively tweet; many users merely lurk or are inactive (Liu et al., 2014; Nielsen, 2006). However, connections between non-tweeting and tweeting users make up a large part of the digital infrastructure that facilitates the circulation of vaccine-related content and can be used to reveal the underlying social context. Therefore, for each of the unique Twitter accounts in our earlier-retrieved set of tweets (the *authors*), we retrieved all their *followers* (accounts following the authors: 34,135,154) and *followees* (accounts followed by the authors: 1,288,618).

We were interested in identifying online communities based on *shared interests* (who the authors are following) and *shared audiences* (who the authors are followed by). We therefore excluded followers and followees who were not connected to at least 15 authors. We determined this cut-off point by examining the distribution of the number of connections with authors and arrived at our ultimate network size to stay within the limits of what our hardware and software were capable of handling in terms of visualization. Ultimately, our network included 121,623 Twitter accounts and 3,706,124 connections.

Analysis

To analyze our data, we iterated through a cycle of four steps, combining the merits of quantitative and qualitative analyses.

Step 1: Community Detection. We used the *Louvain algorithm* to detect communities in the network of authors and their wider social context. The Louvain algorithm is known as a fast, but relatively accurate, method to detect communities in large-scale networks (Blondel et al., 2008). We visualized the network using *Gephi* (Bastian et al., 2009). We only retained the communities that included at least 1% of all the network's users.

Step 2: Text-mining. We verified whether each community comprised groups of likeminded audiences by analyzing the profile texts of all users. We analyzed the profile texts of authors as well as the profile texts of the followers and followees they have in common. Consequentially, the analyzed profile texts do not reflect alignment in the vaccination debate, but alignment in the wider media ecology.

Next, we examined the vaccination-related tweets in the different communities to distinguish different vaccination-related narratives. The results reflect how the authors in each community engage on vaccination. The results also show to which narratives the members of each community were most likely exposed.

To analyze the tweets, we first filtered stop words and stemmed the text using the *MBSF text-analysis system* (Computational Linguistics & Psycholinguistics Research Center, 2018), which can process the Dutch language. Then,

using the *tidytext* package (De Queiroz et al., 2017), we applied text-mining techniques such as word occurrence and *TF-IDF* (Ramos, 2003) to determine the words' importance to each of the communities. To guide the quantitative step, we created word clouds for each community, where the word size reflected occurrence and color intensity word importance.

Step 3: Narrative Analysis. We analyzed the contents of the tweets using a coding scheme based on narrative analysis (Alleyne, 2015). A narrative is a way of framing events in a manner that embodies a judgement on their nature (Branigan, 1992). Users on Twitter tend to frame media content in different ways. Two different users can tweet the same link, but their tweets may embody different judgements depending on the text accompanying the link. Similarly, the meaning of a tweet may change when other users respond to it. Furthermore, when users collectively engage in the creation and circulation of content around a specific narrative, they contribute to the materialization of a public narrative (Alleyne, 2015) – a process also known as narrative exchange (Couldry et al., 2014).

The narrative analysis in this study employed the constant comparative procedure (Boeije, 2002), in which the word clouds from step 2 were used to analyze the profile texts and tweets. So, if the words 'autism' and 'MMR' were found to be important in a specific community, we analyzed the tweets including these words written by members of this specific community. We also studied the conversational context (i.e. *reply-chains*) to understand how users use narratives to engage with each other. We identified the main narratives by coding the tweets relative to the 25 most occurring words in each community and grouped those codes into coherent groups.

Step 4: Network Analysis. As a final step, we examined communication flows between communities, counting the number of times that retweets, quotes, or replies occurred in each of them. We aggregated our data into a new network that we visualized to show flows of tweets, retweets, quotes, and replies between different communities. We zoomed in on these flows to identify which narratives flowed from one community to another, or which narratives clashed when two communities were interacting.

Figure 7 *The network of Twitter users.*



RESULTS

When we started retrieving our data, Dutch news media reported on vaccination becoming mandatory in Italy (Teerink & Klomp, 2017), followed by opinion pieces and readers' letters on whether this should be the case in the Netherlands too. A month later, the Dutch Health Council released a report in which they argued that vaccinating all children against the Rota-virus would lead to the highest health gain (Nu.nl, 2017). This further sparked the public debate on vaccination, where newspapers published more opinion pieces and readers' letters about the topic. A substantial part of the Twitter debate (still) seemed to revolve around a public appearance of a columnist in 2016, expressing her doubts about vaccination and referring to the negative information she found online (RTL Late Night, 2016).

Communities

The communities that were identified during the first step yielded a modularity statistic of 0.4, confirming that our network does indeed comprise multiple communities of densely connected users (Barabási, 2016). Figure 7 contains a plot of the network in which the communities are distinguished by color. Note that Figure 7 comprises authors as well as accounts that the authors generally follow or are being followed by.

Figure 8 only shows the authors in the network and how they interact with each other.

Table 2 includes properties of the different communities, comparing the number of authors with other users and distinguishing initiators (users that specifically mentioned vaccination) from sources & responders (authors of messag-

Note. Includes authors (users actively engaged with the vaccination debate) as well as their social context (users that the authors are generally following or are being followed by). The nodes (dots) represent Twitter accounts and are sized according to the number of incoming connections. They are positioned using Gephi's ForceAtlas2 algorithm, which iteratively places nodes with many common connections close to each other. Connections between nodes are visualized using thin, transparent lines that collectively show larger paths between sections of the network. The community labels were added manually and were determined by analyzing the users' profile texts during the text-mining step.

FLEMISH MEDIA

Figure 8 *Interactions in the Twitter network.*



Note. The network only including authors (users actively engaging with the vaccination debate). Edges represent interactions (retweets, quotes, mentions, and replies), node sizes represent the number of tweets about vaccination, and the colors corresponds with the communities.

es retrieved in the context of the debate). The engagement column shows the proportion of authors in each community.

Table 2 includes properties of the different communities, comparing the number of authors with other users and distinguishing initiators (users that specifically mentioned vaccination) from sources & responders (authors of messages retrieved in the context of the debate). The engagement column shows the proportion of authors in each community.

Table 3 shows the proportion of tweets, retweets & quotes, and replies about vaccination that the authors in each community produced.

To understand the nature of the communities, we analyzed the profile texts of all the users in each community. The descriptions below, reflect to the wider social contexts of the authors in each community.

Dutch Media (the Netherlands). We identified a *Dutch media community*, comprising the country's main news platforms, broadcasting organizations, and public personae such as columnists, presenters, politicians, and musicians. Within this community, these accounts are followed by entrepreneurs, freelancers, consultants, and public administration officials who are (professionally) interested in communication, politics, and media.

Although the Dutch media community is large – it spans 37.4% ($n = 45,177$) of the network – it is rather passive when it comes to tweeting about vaccination: 6.2% ($n = 154$) of all the authors reside in the Dutch media community, ultimately producing 4.5% of all the tweets ($n = 233$), 1.6% of all the retweets and quotes ($n = 16$), and 1% of all the replies ($n = 22$). Just 0.3% of the Dutch media community was engaged in the vaccination debate, writing an average of 1.5 messages per users, which are the lowest figures for all communities.

Health. The *health community* was the second-largest community identified and is inhabited by general practitioners, nurses, consultants, and other health-care professionals working for hospitals, municipal health services, education, and mental health services. It also includes the official Twitter accounts of hospitals and public-health services.

The health community spans 18.2% (21,974) of the network and has an active core of 437 users, representing 17.5% of all



Table 2 Characteristics of the Twitter communities.

	Total		Authors		Initiators		Sources & Responders		Engagement
	N	%	N	%	N	%	N	%	
Dutch Media	45,177	37.4%	154	6.2%	115	6.9%	39	4.7%	0.3%
Health	21,974	18.2%	437	17.5%	384	22%	53	6.4%	2.0%
Writers & Journalists	18,952	15.7%	689	27.5%	553	33.1%	136	16.4%	3.6%
Anti-Establishment	18,055	15%	512	20.5%	264	15.8%	248	30%	2.8%
Flemish Media	10,498	8.7%	230	9.2%	183	10.9%	47	5.7%	2.2%
Farmers & vets	3,026	2.5%	115	4.6%	97	5.8%	18	2.2%	3.8%
Global Pro-Vaxx	2,971	2.5%	363	14.5%	76	4.5%	287	34.6%	12.2%
TOTAL	120,653		2,500		1,672		828		2.1%

Note. This table includes the proportion of authors, initiators (i.e.: users writing a tweet including one of the words from our search query), and sources & responders (i.e.: tweets that were retrieved in the context of the debate, such as the original messages retweeted by others and tweets that were replied to). The engagement column expresses the proportion of users from each community actively engaged in the vaccination debate. The percentages in the 'totals' row, express the proportions in the larger network.

the authors. The community wrote a relatively high proportion of tweets ($n = 1184$; 22.8%) and retweets and quotes ($n = 256$; 26.3%), but replied relatively little, ($n = 400$; 18.2%). 2% of the health community members engaged in the vaccination debate, which is the second lowest of the communities, writing an average number of 2.7 tweets, which is the second highest.

Writers and Journalists. The third largest community we identified is the *writers and journalists community*, which has a strong resemblance to its Dutch media counterpart. The community revolves around a group of (independent) journalists working for quality Dutch newspapers such as 'de Volkskrant' and 'NRC'. The accounts of the newspapers themselves, however, inhabit the Dutch media community. Generally, the journalists in this community do not actively tweet about vaccination, but are followed by individuals

Table 3 Characteristics of the tweets.

	Tweets		Retweets & Quotes			Replies		Messages	
	<i>N</i>	%	<i>N</i>	%	% community	<i>N</i>	%	per user (<i>M</i>)	
Dutch Media	233	4.5	16	1.6	6.9	22	1	9.4	1.5
Health	1,184	22.8	256	26.3	21.6	400	18.2	33.8	2.7
Writers & Journalists	1,252	24.1	198	20.3	15.8	661	30.1	52.8	1.8
Anti-Establishment	1,412	27.2	307	31.6	21.7	680	30.9	48.6	2.8
Flemish Media	438	8.4	64	6.6	14.6	209	9.5	47.7	1.9
Farmers & vets	177	3.4	31	3.2	17.5	50	2.3	28.3	1.5
Global Pro-Vaxx	500	9.6	101	10.4	20.2	175	8	35	1.4
TOTAL	5,196		973		18.7 %	2,197		42.3 %	

Note. The characteristics of the tweets in our sample by community. The percentages in the 'totals' row, express the proportions in the larger network.

who do. These followers are a crowd of (professional) writers, communication professionals, entrepreneurs, education professionals, and public administration professionals who are interested in media and politics and sometimes engage in discussions on vaccination.

The writers & journalists community spans 15.7% ($n = 18,952$) of the network and has a large active core spanning 27.5% of all its authors ($n = 689$), producing a slightly smaller proportion ($n = 1252$; 24.1%) of all the Twitter statuses. The community retweets relatively little, producing 20.3% ($n = 198$) of the retweets and quotes, but produced a relatively large number of the replies ($n = 661$; 30.1%). With an average number of 1.8 tweets per author, the authors in the Writers & Journalists community produce a comparatively small number of tweets and of which a substantial part is replies, possibly indicating a conversational Twitter style

and an incidental kind of involvement. 3.6% of the Writers & Journalists community engaged on the topic, which is the second highest figure of the communities.

Anti-Establishment. The fourth largest community we identified is the *anti-establishment* community, comprising homeopathy advocates, independent bloggers, alternative media, and users following these accounts. The followers generally do not disclose much about their real-world identity. The community's members seem to come from the Netherlands, the United Kingdom, and the United States. In their profile descriptions, the community's members: describe themselves as right-wing, patriotic, and conservative; promote a strong Dutch national identity; agitate against Islam; advocate for the Netherlands leaving the European Union ('Nexit'); claim to have solidarity with Israel; praise Donald Trump; and state that they are looking for 'the truth' beyond the mainstream media. The users engaging on vaccination within this community seem to include conspiracy thinkers and homeopathy advocates, of whom the latter especially seems to form an odd minority in this community. Strikingly, the community also includes accounts with profile descriptions in Arabic or the Cyrillic script.

The anti-establishment community spans 15% (n = 18,055) of the network. The anti-establishment community is very involved: the active core spans 20.5% (n = 512) of all the authors, collectively producing the largest proportion of tweets (27.2%; 1412). The community produces comparatively large proportions of retweets and quotes (31.6%; n = 307) and replies (30.9%; n = 680). With 2.8% of the community engaging on vaccination, the anti-establishment community is the third-most engaged community. The anti-establishment community is the most vocal, writing an average number of 2.8 tweets per author.

Flemish Media (Belgium). The fifth largest community we identified is similar to the Dutch media community, but concerns media accounts from Flanders in Belgium that are also in Dutch. The *Flemish media community* includes the accounts of broadcasting organizations, news platforms, NGOs, political parties, and universities, as well as the accounts of public personae such as politicians, artists, scientists, and athletes.

The Flemish media community is rather small, spanning 8.7% (n = 10,498) of the network and including 9.2% (n = 230) of all the authors, writing 8.4% (n = 438) of all the tweets. With 2.2% of the community members engaging on vaccination, writing an average number of 1.9 messages, the Flemish media community is the second-least engaged, but third-most vocal community.

Farmers and veterinarians. The sixth largest community concerns a small cluster of farmers, veterinarians, and agricultural and horticultural organizations. The community spans 2.5% (n = 3,026) of the network, with an active core encompassing 4.6% (n = 115) of all the authors. This community produced 3.4% (n = 177) of all the tweets, 3.2% (n = 31) of the retweets and quotes, and 2.3% (n = 50) of the replies. 3.8% of the community actively engaged with the vaccination debate, writing an average number of 1.5 tweets. Although the community is the most engaged, they interact relatively little with others – probably because the *farmers & vets community* is talking about vaccination from a livestock perspective.

Global media and vaccine advocates. Lastly, we identified a *global media and vaccine advocate community* containing: news platforms such as The Guardian, MSNBC, and Le Monde; health and development institutions such as the WHO, UNICEF, and the British Medical Journal; and public personae such as researchers, correspondents, artists, and athletes mainly based outside the Netherlands. In addition to these health organizations, the active core of the community includes independent bloggers, physicians, and pediatricians who can be regarded as pro-vaccination advocates, as they signify this with '#vaccineswork' in their profile descriptions. Within this community, they are in turn followed by a minority of non-Dutch anti-vaxxers and conspiracy thinkers, whose messages were retweeted in the anti-establishment community. The global media and vaccine advocate community includes accounts tweeting about vaccination in English, Spanish, French, and Dutch.

The global media and vaccine advocate community spans a mere 2.5% (n = 2971) of the network, but includes 14.5% (n = 363) of all the authors. The community is very active, producing 9.6% (n = 500) of all the tweets, but merely 10.4%

($n = 101$) of all the retweets and quotes, and 8% ($n = 175$) of all the replies. The fact that 36.67% ($n = 287$) of the authors in the global media and vaccine advocate community were responsible for tweets retrieved in the context of the debate, possibly indicates that the global media and vaccine advocate community was mostly used as a source community for retweets and replies. With 12.2% of the community actively engaging on vaccination, the global media and vaccine advocate community shows the highest involvement with the topic of vaccination.

Narratives

After analyzing the different profile texts of all members of the online communities, we moved to the analysis of the vaccine-related tweets to determine the different narratives being circulated within and across communities.

Scientific Evidence. The *scientific evidence narrative* entails the circulation of news articles and peer-reviewed research papers that aim to show that vaccination works. The narrative is common in the health community, where members share peer-reviewed articles or refer to them in their replies to other users. The scientific evidence narrative is also common in the Dutch media, Flemish media, and global media and vaccine advocate communities, where news outlets and individual users share news about scientific studies or reply to statuses of (non-Dutch) anti-vaxxers. In turn, these tweets are often retweeted in the health community.

Extremism. The *extremism narrative implies* that anti-vaxxers are extremists who have decided to ignore scientific information about vaccination. This narrative mostly concerns tweets, replies, and quotes, and often involves jokes, ridicule, and insults. One Twitter user, for example, compared individuals who do not vaccinate their children on religious grounds to religious fundamentalists, while another user compared being anti-vaxx to believing in well-known conspiracy theories such as the Illuminati, chemtrails, and reptilian humanoids (Wikipedia, 2019). The extremism narrative is especially dominant in the writers and journalists community, but also occurs in the health and anti-establishment communities. This shows that the latter community is

not necessarily against vaccination – many users among the anti-establishment openly disagree with anti-vaxx messages.

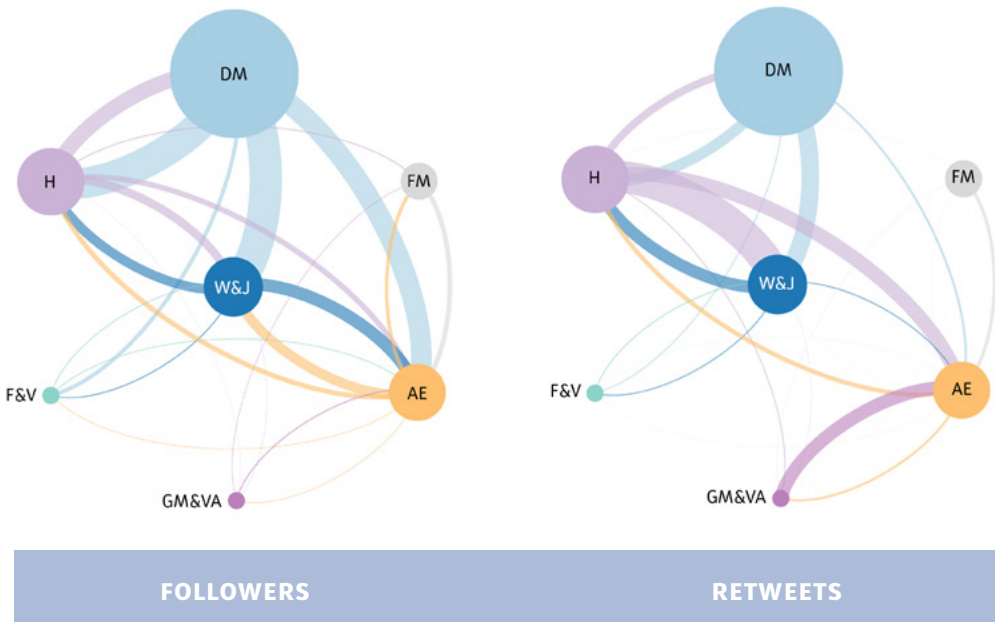
Information. The *information narrative* includes practical information about vaccination programs or announcements of informative events about the topic. Announcements are often posted directly by the Twitter accounts of health organizations in the health community, but also appear as news articles or press releases in the Dutch media and Flemish media communities. The statuses are often retweeted by members of the health community.

Framing. The *framing narrative* is a form of critiquing the media, where Twitter users suggest that Dutch media should use different imagery to illustrate news items about vaccination. In response to a news article with a picture of a crying child, for example, one Twitter user replied: “That picture is really a pity; it creates resentment of vaccination. It spreads a dangerous sentiment!” The framing narrative is most common in the writers and journalists community, where it is retweeted frequently, but it also occurs in the health community.

Natural Medicine. The *natural medicine narrative* implies that vaccination is unnatural and is therefore harmful, unlike natural medicine or homeopathy. The narrative includes hyperlinks to external and often seemingly trustworthy websites about natural medicine or homeopathy, but also includes tweets that are characterized by twisted logic. One Twitter user, for example, asked rhetorically: “Have you ever wondered why it is not allowed to use mercury in thermometers, but why it is allowed to inject it into babies?” The narrative is dominant in the anti-establishment community and is often replied to fiercely by members of the writers and journalists community, who employ the extremism narrative.

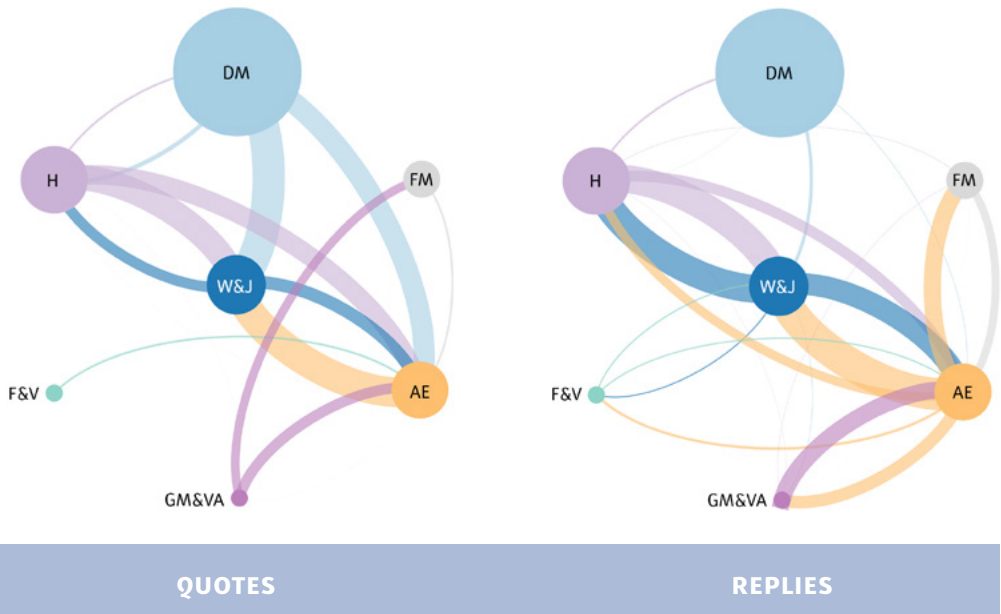
Survival of the Fittest. The *survival of the fittest narrative* implies that vaccination weakens the human race, because it compromises the human gene pool with the offspring of people who are not naturally resistant to the diseases that people are vaccinated against. The narrative has a radical undertone of evolutionary extremism and exclusively occurs in the anti-establishment community.

Figure 9 Connections and interactions between communities.



Freedom. The *freedom narrative* implies that compulsory vaccination is an infringement of personal integrity. Most of the narrative's statuses surfaced in response to news about certain vaccinations becoming obligatory in Italy. Twitter users in the anti-establishment community reacted particularly angrily and called it an infringement of personal integrity, backing up their claims with links to national and European laws. In other cases, Twitter users compare compulsory vaccination to rape.

Anti-Religion. Traditionally, a strictly religious reformed minority in the Netherlands does not vaccinate their children for religious reasons. The *anti-religion narrative* implies that this is an excess of religious extremism. The narrative is common among the writers and journalists community as well as the anti-establishment community, meaning that the anti-establishment community is not necessarily anti-vaxx. Notably, however, it mostly surfaced as replies to debates about religion, meaning that vaccination was mentioned in response to tweets about religion, not as a conversation's main topic.



Note. The connections between nodes represent interactions that enable content to flow from one community to another. Information flows clockwise, and connections are colored along to the community from which the content flows. For example, a light-blue line connecting the Dutch media (DM) community with the anti-establishment (AE) community means that: (1) the AE community is exposed to tweets from the DM community (followers); (2) the AE community is retweeting tweets from the DM community (retweets); (3) the AE community is quoting tweets from the DM community (quotes); and (4) the DM community is replying to the AE community (replies).

Conspiracy. The *conspiracy narrative* implies that vaccination is a conspiracy by the global elite to enable large pharmaceutical companies to maximize their profits. It includes quotes and links, often accompanied by short, rhetorical questions, such as: “Isn’t it weird that the side effects of vaccines are only researched after the vaccines have been introduced already?” An important role is played by dissenting voices such as parents, journalists, and scientists who speak out against vaccination. A good example is the online documentary *VAXXED*⁷, to which members of the anti-estab-

⁷ <https://www.vaxxedthemovie.com>

lishment community often refer. The documentary contains interviews with (alleged) parents, journalists, and researchers and purports to show how governments and the pharmaceutical industry are trying to cover up overwhelming evidence against vaccination. The conspiracy narrative evokes replies from the writers and journalists and health communities, but counter-arguments from the evidence or extremism narratives are often dismissed as being the result of systematic brainwashing or an attempt to cover up the truth.

Interactions

Our analyses have thus far focused on separate communities, but we also wanted to determine how these communities interact with each other. We therefore aggregated the interactions between the communities to inspect these dynamics, as well as the circulation of community specific narratives through the network (See Figure 9).

Followers. The extent to which members of one community follow members of another determines the degree to which this community is exposed to the other. We have quantified how often community members follow members of other communities as a way to visualize information flows and examine patterns of exposure.

The top-left panel of Figure 9 shows that the Dutch media community is widely followed by all the other communities, except the Flemish media and global media and vaccine advocate communities. The Dutch media community, however, rarely follows members of other communities back, except for members of the health community, where they follow a few public institutions. This characterizes the role of the Dutch media community in the vaccination debate as being an important information disseminator, mainly drawing information from traditional health institutions.

The anti-establishment and health communities follow each other, but are not as well-connected as with the writers and journalists community, which seems to play a central role in the vaccination debate.

Strikingly, the anti-establishment community is the only community that follows both the global media and vaccine advocate and Flemish media communities. This is a cosmopolitan trait that seems to be at odds with the profile of the

anti-establishment community, but that mainly signify an interest in non-Dutch news organizations and interactions with the few anti-vaccine activists among the global media and vaccine advocates community.

Quotes. Quotes are similar to retweets, but include the option to reframe the original message using a short piece of text. This makes it especially useful for retweeting statuses that users do not want to endorse. A community quoting another community may signify disagreement.

The anti-establishment community quoted the Dutch media, health, and writers and journalists communities, while only the writers and journalists and global media and vaccine advocate networks quoted them back. This means that the health and Dutch media communities did not respond when the anti-establishment community quoted (and criticized) their messages, while the writers and journalists and global media communities did. The writers and journalists community was actively engaged in conversation with the health and anti-establishment communities.

Replies. Replies are similar to tweets, with the difference being that they would not have come into existence without the tweet they are responding to. So, replies signify interactions between people, but do not necessarily signify (dis) agreement.

Strikingly, the Dutch media community does not seem to be involved in the vaccination debate. The writers and journalists community communicated with the health and anti-establishment communities. The anti-establishment community also responded to the writers and journalists, global media and vaccine advocate, and Flemish media communities, and – to a lesser extent – the health community. The interactions between the anti-establishment community and the other communities are likely to signify fierce debate.

DISCUSSION

In our study, we found 9 narratives of which 4 were negative about vaccination. By analyzing the wider social context of the authors of these tweets, we found seven distinct communities

with unique profiles. In the debate on vaccination, authors in each community play a different role in circulating the narratives that we found: the Dutch media community focuses on news, but only happens to tweet about vaccination occasionally; the health community shares vaccination-related news, research, and other information; and the writers and journalists community criticizes the Dutch media community for representing vaccination in a negative way, and ridicules the anti-establishment community for conspiracy thinking. The anti-establishment community has mixed-feelings about vaccination: a minority of homeopathy advocates favors natural medicine over vaccination, while other members object to vaccination for reasons that are often related to a distrust of traditional institutions and 'the elite', and others do not object at all and actually join the writers & journalists community in ridiculing their peers. Tweets from the global media and vaccine advocate community are mostly in favor of vaccination, but also include a few tweets from international anti-vaxxers. Both kinds of messages are retweeted, quoted or replied to in the anti-establishment community. The Flemish media and farmers and vets communities do not play a role of topical significance.

Examination of the interactions between the communities give the impression that the health and Dutch media communities employ a classic mass-media sender-approach, sharing news and evidence from a top-down perspective and hardly engaging in any one-to-one interaction. By contrast, the global media and vaccine advocates community is highly visible among the anti-establishment by actively responding to myths and misconceptions, and providing (retweetable) evidence to debunk these myths. The writers and journalists and anti-establishment actively interact with each other. The relationship between the writers and journalists and anti-establishment communities is troublesome, as the quotes and replies flowing between them are characterized by a great deal of ridicule and insults.

Our study shows that negative messages about vaccination are most prevalent in the anti-establishment community, but these messages are also often contested. The authors in the anti-establishment community include homeopathy advocates and conspiracy thinkers. They are often criticized or antagonized by their peers and by members of other communities using the extremism narrative, that seems to persist

anti-vaxxers and conspiracy thinkers in their beliefs about the ‘arrogance of the elite’. This provides further empirical evidence for Kata’s argument that anti-vaxx communities are rooted in a post-modern worldview that distrusts traditional institutions (2010) and favors personal narratives over scientific evidence (2012). Meanwhile, the fact-driven research narrative is mostly shared within the health community and does not reach the audience that apparently needs it the most.

Notably, in the anti-establishment and global media and vaccine advocate communities, we also found trails that might indicate troll activity (i.e. high-frequency tweeters, Cyrillic and Arabic scripts). Researchers have previously identified ‘content farms’ and ‘troll armies’ that purposely try to sow unrest in relation to themes that are controversial in the West. Apparently, vaccination has been targeted as one of these playing fields (Broniatowski et al., 2018). In future studies, therefore, researchers could use troll farm detection algorithms to distinguish communities of actual people from bots and trolls.

CONCLUSION

Our study provides insight into the main stakeholders in the Dutch vaccination debate on Twitter. We disentangled the different voices in the debate on vaccination by looking at shared elements in the wider media ecologies of users tweeting about vaccination.

Due to selective exposure, members of the anti-establishment community are more likely to be exposed to messages that are negative about vaccination than others. To effectively reach the group, Dutch health organizations could try to engage in an open dialogue to address questions, doubts, and worries; and by making information to debunk those myths more easily accessible and shareable. As such, our results provide helpful insight to developing public advocacy strategies in support of vaccination services (Lutkenhaus et al., 2019a).

The method we present in this study, and the scripts that we have made available publicly via GitHub (Lutkenhaus, 2018), can help health organizations to attune their strategies to the different communities and narratives in debates around health topics. ©

CHAPTER 5 **Stimulating Conversations about Human Germline Technology**

A digital approach to societal debates^{9,10}

⁹ This chapter describes a research project by the Center for Media & Health, commissioned by the organization committee of the Dutch DNA Dialogue (Ministry of Health Welfare and Sports (VWS) et al., 2020). The report has been published as Lutkenhaus, R. O., & Bouman, M. P. A. (2019). *De medi-anetwerken rond kiembaanmodificatie*.

¹⁰ A slightly adapted version of this chapter has been submitted as Lutkenhaus, R.O., Jansz, J., & Bouman, M.P.A.: Stimulating Conversations about Human Germline Technology.

In November 2018, Chinese biophysicist He Jiankui shocked the world by announcing the birth of the world's first-known genetically edited human babies: Lulu and Nana (Marchione, 2018; Regalado, 2018). He claimed to have used the CRISPR-Cas9 technique to edit the germline genes of two embryos in order to lower their susceptibility to the HIV virus. Jiankui's work met significant critique, as he had not resolved the relevant safety and efficacy issues involved in editing the genes of two human embryos nor was there wide public support for his experiment (Krimsky, 2019; Normile, 2018). Thereby, he violated most of the conditions for responsible application of the CRISPR-Cas9 technique stipulated by the scientific community at the First International Summit on Human Gene Editing in 2015 in Washington. D.C. (Olson, 2015).

The case of Lulu and Nana illustrates the growing tension between what is technically possible and what applications are deemed ethical and acceptable as a society—an issue that governments and legislators are struggling with worldwide. In their summit statement, the organizing committee of the Summit on Human Gene Editing therefore urged societal debate in order to exchange expertise and perspectives between different societal groups, including “biomedical scientists, social scientists, ethicists, health care providers, patients and their families, people with disabilities, policymakers, regulators, research funders, faith leaders, public interest advocates, industry representatives, and members of the general public” (Olson, 2015, pp. 7–8). The committee suggested that societal debates contribute to societal consensus but did not elaborate on what this consensus would amount to or how it could be achieved.

Francoise Baylis, one of the members of the organizing committee, later suggested that societal consensus can be “figured out” by building upon decision-making through consensus strategies that have been developed by particular communities over the years (2017). For example, she refers to John Beatty's “no-objection” or “let-it-stand” decision-making

(2018), implying a process that reaches unanimity or a situation in which the opposition feels it is no longer worthwhile to express their views. Baylis also referred to a process described by the Women's Encampment for a Future of Peace and Justice (1983) in which each perspective is given proper hearing and nobody feels misunderstood. Baylis argued such processes will invariably involve struggle, but this struggle is an inevitable part of the path leading to societal consensus.

The Dutch DNA Dialogue

Currently, in the Netherlands, the topic of human germline modification (HGM) is discussed by a narrow range of experts and stakeholders, and has not yet involved wider groups of citizens (Erfocentrum, 2018). The Dutch Ministry of Health, Welfare and Sport (vws) has therefore financially supported a consortium of research institutions, health organizations, knowledge centers, and public advocacy groups to organize a societal debate on HGM in the Netherlands: the DNA Dialogue (Dutch Ministry of Health Welfare and Sports et al., 2020). The project's goal is to organize societal debate about HGM that reaches and involves a broad range of societal groups, propelling a wider exchange of topical expertise as well as diverse, real-world perspectives. The DNA Dialogue aims to facilitate and stimulate processes in which the perspectives of all societal stakeholders are heard, thereby improving the conditions for consensus decisions that can be implemented by lawmakers. Therefore, the DNA Dialogue Consortium (DDC) will ultimately map the most salient opinion and values that surface during the DNA Dialogue and offer these to Dutch politicians and scientists.

The DDC seeks to draw lessons from earlier societal debates in the Netherlands on topics such as nuclear energy, genetically modified foods, and nanotechnology. Previous debates have included public discussion events as well as the production of TV shows, educational materials, and opinion articles (Krabbenborg, 2012, 2016). An evaluation of a societal debate on nanotechnology showed that it did not fully succeed in involving ordinary citizens—co-organizing stakeholders and experts remained stuck to institutional frames of reference traditionally concerned with informing and educating rather than fully realizing an open debate featuring the exchange of day-to-day perspectives and experiences (Krabbenborg & Mulder, 2015).

The present-day media landscape also offers opportunities to extend societal debates to virtual places such as websites, fora, and social media, utilizing interactive media formats to stimulate conversations (Lutkenhaus et al., 2019b, 2019a). Expanding the debate to such avenues can contribute to the inclusiveness of societal debates, as it allows for actively reaching out to communities of audiences beyond the scope of traditional mass media and offline public discussion events. Furthermore, social media platforms and formats allow audiences to directly engage with the debate, thereby enabling substantial societal debate to take place online.

We have been commissioned by the DDC to provide formative insights and strategic suggestions that contribute to the design and implementation of the Dutch DNA Dialogue's online media strategy (Lutkenhaus & Bouman, 2019). This chapter

- (a) describes how we identified online communities around HGM, genetic technologies, and related topics;
- (b) provides insight into these communities' views, values, and interests; and
- (c) identifies potential collaboration partners in these communities.

Furthermore, we argue the ways in which exposure, influence, and expertise of influential websites, social media pages, and micro-celebrities can be activated to contribute to a wider exchange of expertise and diverse, real-world perspectives.

THEORETICAL BACKGROUND

In recent years, media behaviors have diversified, leading audiences to websites, platforms, and online communities around various niche interests (Castells, 2008; Couldry, 2008; Toepfl & Piwoni, 2015). There, likeminded audiences engage with each other on topics and issues of interest (e.g., food, music, fashion)—they consume and interact with media content or create their own content (Jenkins et al., 2013; Mukerjee et al., 2018). Such media engagement is often associated with a collective type of sense-making (Kligler-Vilenchik & Thorson, 2015), playing an important role in the circulation of media content (Jenkins et al., 2013), contributing to setting the public agenda (Barberá, Wang, et al., 2015; Boynton & Richardson, 2016), and

renegotiating each community's culture (Alleyne, 2015). These processes occur against the backdrop of networks of websites, fora, and social media profiles that provide the infrastructure for content consumption, engagement, and re-circulation (Jenkins et al., 2013)—or simply, the infrastructure for online discourse. In these networks, some websites, pages, or social media users have grown more influential than others and play a role similar to that of opinion leaders in the classical Two-Step Flow theory by Katz and Lazarsfeld (2006; Lutkenhaus et al., 2019a). Similarly, some social media users have built a large following by sharing and creating user-generated content and acquired *micro-celebrity* status in their respective communities (Senft, 2009; Usher, 2018). Their influence makes them attractive for private and public organizations seeking to advertise their products, services, (Hearn & Schoenhoff, 2016) or health messages (Lutkenhaus et al., 2019a), and has kick-started career trajectories as *social influencers* (Abidin, 2017). Micro-celebrities are capable of addressing issues in unique and attractive ways and directly engage with their audiences in the comment sections, allowing for sophisticated parasocial interaction and building strong relationships with their fans (Burgess & Green, 2018; Frobenius, 2014).

Mapping Communities and Finding Social Influencers

The DDC's aim is to reach and involve online communities in the Dutch DNA Dialogue by collaborating with influential websites and micro-celebrities. The DDC can initiate such collaborations to diffuse expertise and stimulate meaningful conversations around the topic of HGM in the websites' and micro-celebrities' respective communities. In order to identify the online communities that could serve as avenues for public discussion, we mapped online communities around HGM, genetic technology, and adjacent issues on the open web, Twitter, and YouTube. Next, we identified the most influential accounts in each community to find potential collaboration partners. The following sections

- (a) distinguish the different types of networks that we retrieved and analyzed and
- (b) briefly explore the roles they play in today's media landscape.

Types of Networks. First, *issue networks* comprise web pages connected by hyperlinks around specific themes and issues (Marres, 2017). These networks can be retrieved by following links on a given set of web pages. Communities in these networks often signify a cluster of pages that approach an issue in a similar manner. Influential pages in these networks are frequently linked to other pages, often signifying authority or popularity of a page on the networks' themes and issues.

Second, *ego networks* include connected social media users (Arnaboldi et al., 2013; Myers & Leskovec, 2014) and comprise the infrastructure allowing users to send and receive messages and media content (Myers & Leskovec, 2014). Ego networks can be retrieved from platforms such as Twitter; communities in these networks—which are smaller clusters of closely connected members—often signify like-mindedness among their members. Influential users in these networks are followed frequently and are well-connected, often signifying the social influence of these users in the network or in a specific community.

Third, *recommender networks* comprise connected pieces of media content (e.g., related YouTube videos), offering pathways between related or similar pieces of media content. Recommender networks can be retrieved from platforms such as YouTube (Rieder, 2015). Communities signify a certain degree of relatedness that is algorithmically derived from the media behaviors of each platform's users, tailored toward keeping audiences engaged with the platform as long as possible (Helmond, 2015; Rieder et al., 2018). Influential pieces of media content in these networks are linked with many other pieces of media content and signify authority.

In reality, issue-, ego-, and recommender networks are interconnected—a user can seamlessly browse from a web page and Twitter profile to a YouTube video. However, these networks differ in their nature and can only be retrieved and analyzed separately. In our case study, we retrieved issue networks of websites using Google Search, ego networks from Twitter, and recommender networks from YouTube—all of which are services with a large user base in the Netherlands (CBS, 2016; de Best, 2019). Although these networks are treated separately, it is likely they overlap. For example, micro-celebrities may publish articles on their websites, link to videos on YouTube, and engage with fans and foes on Twitter. To interpret the networks and find potential collaboration partners, it was therefore important to look beyond the platforms from where the data

were originally retrieved and consider the partners' other digital extensions (e.g., Facebook, Instagram, and Snapchat).

Collaboration and Media Formats

Online communities uphold narrative frameworks that comprise systems of symbols, habits, and worldviews (Alleyne, 2015) and may approach HGM and genetic technology in unique ways. Although influential websites, Twitter users, or YouTube channels can leverage these frameworks to create media content and foster engagement on topics with which they are familiar (Frobenius, 2014; Senft, 2009; Usher, 2018; Van Eldik et al., 2019), they might not be as familiar with raising highly technical and ethical topics, such as that of HGM. To effectively collaborate with micro-celebrities on the DNA Dialogue, partnership arrangements drive the creation of media content, striking a balance between the interests of the collaboration partners and the objectives of the societal debate.

METHOD

Within the DDC, we have been commissioned to study online networks in order to identify

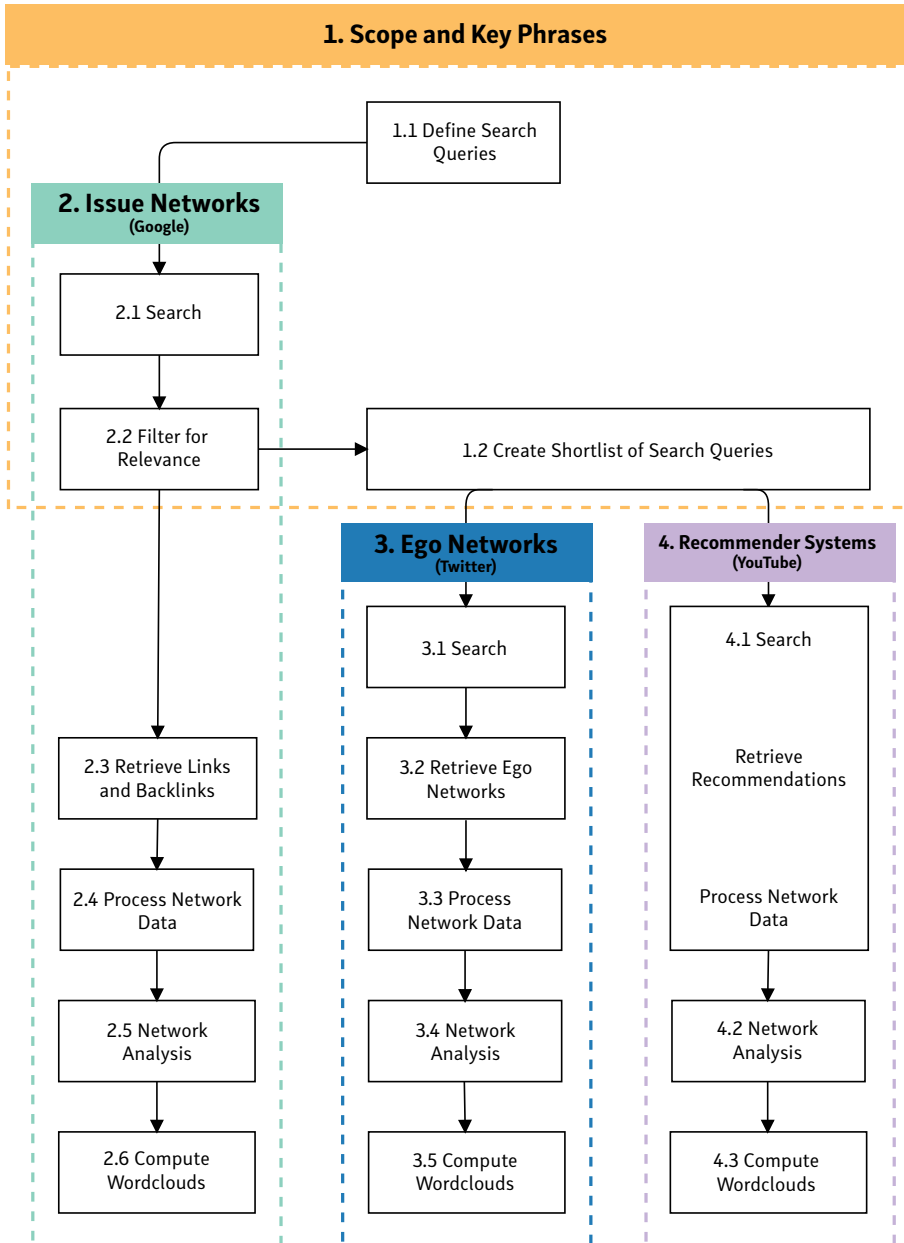
- (a) online communities as digital avenues for the DNA Dialogue and
- (b) websites and micro-celebrities for possible collaborate.

Our methods help map and analyze online communities around HGM in order to provide shortlists of potential collaboration partners, strongly relying on a data retrieval and processing pipeline consisting of four parts (see Figure 10).

During the first step, we defined the scope of our project by creating list of keywords and phrases that approach the topic of HGM from different angles (e.g., 'CRISPR-Cas9', 'designer baby', and 'transhumanism'). During the second, third, and fourth steps, these key phrases were used to identify relevant media content via Google Search, Twitter, and YouTube. For each service, we

- (a) retrieved connections between websites (Google Search), people (Twitter), and videos (YouTube);
- (b) visualized and analyzed the networks in order to identify online communities and potential collaboration partners; and
- (c) studied the content circulated in these networks.

Figure 10 Data Processing Pipeline.



Note. The data retrieval and processing pipeline uses a core set of key phrases to retrieve and analyze issue-, ego-, and recommender networks from the open web, Twitter, and YouTube.

We then shared our scripts—including a more thorough description of the underlying steps—on RPub’s (Lutkenhaus, 2019).

Scope and Key Phrases

First, we created a mental model comprising lists of keywords and phrases to find relevant media content via Google Search, Twitter, and YouTube. In order to identify a broad range of communities, the model distinguished three levels of topical involvement:

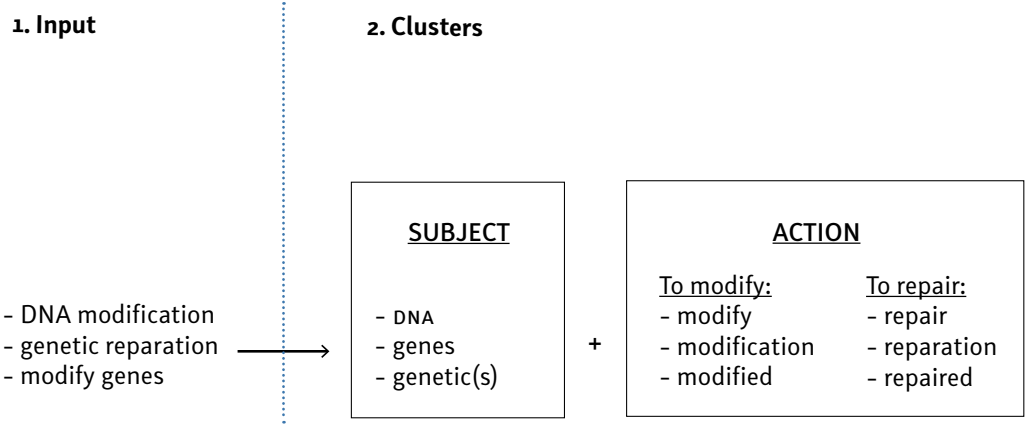
1. Core level: Communities with a direct interest in HGM. This includes key phrases such as ‘CRISPR-Cas9’, ‘human germline modification’, and ‘Lulu and Nana’.
2. Category level: Communities with an interest in genetic technology. This includes keywords and phrases such as ‘genetic modification’, ‘GMO’, ‘genome sequencing’, ‘perfect baby’, and ‘repair DNA’.
3. Adjacent level: Communities around topics that signify an indirect or potential interest in HGM or genetic technology, including future applications, related philosophical questions, or genetic technology in popular culture. This includes key phrases such as ‘fertility treatment’, ‘transhumanism’, ‘biotech startups’, and ‘gattaca’ (the title of a movie).

We used this model to structure the inputs of our consortium partners, each of whom we asked to provide possible key phrases, topics, and themes fitting these different levels of interest. We received suggestions from

- (a) researchers and ethicists working for the Rathenau Institute, a Dutch organization focused on research and dialogues related to the social aspects of science;
- (b) the Erasmus Medical Center and the Amsterdam Medical Center, both of which are Dutch university hospitals; and
- (c) the Center for Media & Health, a Netherlands-based nonprofit focused on popular media and social change.

Based on their input, we noticed frequently recurring synonyms (e.g., ‘gentech’ vs. ‘genetic technology’); related concepts (e.g., ‘embryo’, ‘baby’, ‘child’, ‘human’, and ‘offspring’); and different tenses (i.e., ‘genome modification’ vs. ‘modify genomes’). We translated the inputs to an exhaustive list of key phrases potentially capable of identifying all relevant media

Figure 11 Generating the List of Key Phrases



content around the key themes and topics of our project. We achieved this by splitting up key phrases into groups of synonyms and combining these groups to compose thematic building blocks that ultimately generated the list of 14,938 unique key phrases (see Figure 11).

Next, we categorized specific combinations of building blocks (and the associated key phrases) into thematic clusters: *description* (e.g., ‘crispr-cas9’ or ‘human germline modification’); *metaphors and imaginative future* (e.g., ‘designer baby crispr’ or ‘perfect human gentech’); *application* (e.g., ‘repair genetic defects’); *startups* (e.g., ‘human germline modification company’); *fertility and reproduction* (e.g., ‘ivf alternatives’ or ‘embryo selection’); *ethics and philosophy* (e.g., ‘transhumanism’ or ‘procreative beneficence’); *current affairs* (e.g., ‘He Jiankui’ or ‘Lulu and Nana’); and *popular culture* (e.g., ‘Gattaca’ or ‘Brave New World’). Key phrases in these groups corresponded to different levels of interest. For example, the startups theme comprises key phrases based on each of the three levels: ‘CRISPR-Cas9 startup’ (core), ‘genome sequencing startup’ (category), and ‘biotech startup’ (adjacent).

3. Keywords

- modify DNA
- DNA modification
- modified DNA
- repair DNA
- DNA reparation
- repaired DNA
- modify genes
- genes modification
- modified genes
- repair genes
- genes reparation
- repaired genes
- modify genetics
- genetic modification
- modified genetics
- genetic reparation
- repair genetics
- repaired genetics

Note: We split the phrases provided by our consortium partners into words; clustered words into groups of synonyms and/or tenses (e.g., ‘To modify’ or ‘To repair’), used words or groups of synonyms to define building blocks (e.g., ‘Subject’ or ‘Action’), and combined the building blocks to generate an exhaustive list of keywords.

Data Retrieval and Preprocessing

We used Google—the most widely used search engine in the Netherlands (de Best, 2019)—to search for the keywords and phrases, leading us to relevant media content. Google allows users to combine multiple key phrases into single search queries (i.e., “‘key phrase 1’ OR ‘key phrase 2’ OR ‘key phrase 3’”) as long as the query does not exceed 32 words in total. We combined our key phrases into 1,886 unique search queries before submitting the queries to Google, where we disabled personalization and safe search, and searched from an IP address with no search history. Due to rate limitations, we chose not to use all 1,886 search queries on Twitter and YouTube. Instead, after filtering our queries for relevance, we selected the key phrases that returned the most relevant results for each theme and on each level. We determined this by filtering out keywords and phrases in queries

- (a) that did not return any results or
- (b) for which the first three results provided an insufficient match with the content we were expecting (‘designer baby’ returning web stores with designer clothes for babies).

After searching for relevant media content, we retrieved the surrounding issue-, ego- and recommender networks using

- (a) *Ahrefs.com*, a service that offers high-quality link reports;
- (b) *rtweet*, an open-source software to programmatically retrieve information about tweets and Twitter users (Kearney, 2017); and
- (c) YouTube Tools, an open-source tool to retrieve networks of related videos (Rieder, 2015).

Prior to analysis, connections between the web pages in the issue network were aggregated to only include links between top-level domains (TLDs; e.g., ‘www.address.com’) with the number of underlying subpages (URLs; e.g., ‘www.address.com/article.html’) as their properties. A more precise description of these steps can be found on RPubs (Lutkenhaus, 2019).

Network Analysis

We used *igraph* and Gephi (Bastian et al., 2009; Csardi & Nepusz, 2006) to further process, analyze, and visualize these networks. In particular, the Louvain algorithm (Blondel et al., 2008) was used for community detection; Gephi’s ForceAtlas2 algorithm was used to map out the network; and the centrality measures eigenvector centrality, betweenness, centrality and PageRank were used to determine the connectedness and social influence of the individual *nodes*—the connected entities such as websites, Twitter accounts, or YouTube videos—in the networks (Barabási, 2016).

To understand the nature of the different communities, we analyzed the URLs, profile texts, and video titles in each community by computing word occurrence and TF-IDF (Ramos, 2003). Next, we created word clouds, including the 25 most common words, where word size expresses frequency and the shade of blue expresses the uniqueness of this word compared to other communities.

RESULTS

Table 4 shows the characteristics of the retrieved and filtered data, while Table 5 reports the characteristics of the networks and their underlying community structures.

Table 4 Characteristics of the Retrieved and Preprocessed Data

	Web issue network		Twitter ego network			YouTube recommender network	
Data set before, and after filtering:■			Tweets◆ before, and after filtering:				
	Total	Relevant	Total	Relevant		Total	
Queries	1,886	250 (13.3%)	Tweets	17,505	1,302	Videos	867
URLs	4,145	2,564 (61.8%)	Context□		1,545	Unique channels	651
TLDs	2,112	1,317 (62.4%)					
(Back)links of the URLs:•			Users included in the network:◎				
	URLs	TLDs		N			
Backlinks	1,804	1,709	Authors of tweets	736 (26.8%)			
Links	15,003	1,140	Authors of context□	382 (13.9%)			
			Common audiences and interests	1,627 (59.3%)			

- The results were filtered by query relevance. 1,234 queries did not return any results, and 402 queries did not return any relevant results.
- (Back)links of all the relevant URLs were retrieved using a paid subscription to Ahrefs.com, a platform offering detailed (back)link reports.
- ◆ We retrieved tweets published between January 1, 2019 and June 1, 2019 using the shortlist of keywords. Relevant tweets are published by Dutch users and/or written in the Dutch language.
- ◎ As we are interested in users that the authors of our tweets are commonly following (interests) or followed by (audiences), we have only included users in the networks that are connected to at least 10% of our authors.
- The conversational context of the tweets (i.e., associated (re)tweets, replies, and quotes).

Table 5 Characteristics of the Networks and Their Community Structures

	Web issue network		Twitter ego network		YouTube recommender network		
	Total	Relevant■	Active◆	Passive	Total	Total	Relevant
Nodes (websites, Twitter users, and YouTube videos)	4,100	3,102 (75.7%)	1,118 (43.4%)	1,627 (63.1%)	2,577	867	
Edges (connections between nodes)	5,485	5,277 (96.2%)			232,716	5,847	
Communities	818	7•			5◎	136	8□
Modularity score	0.802		0.32		0.579		

- Part of the largest cluster of connected nodes in the network.
- Communities spanning >5% of the network.
- ◎ The Twitter network comprised one large component with 5 communities and did not need to be filtered.
- Communities spanning > 1.5% of the network.
- ◆ Authors of the tweets, and authors of tweets in the conversational context (i.e., associated (re)tweets, replies, and quotes). Passive users include the users that the authors are commonly following (interests) or followed by (audiences).

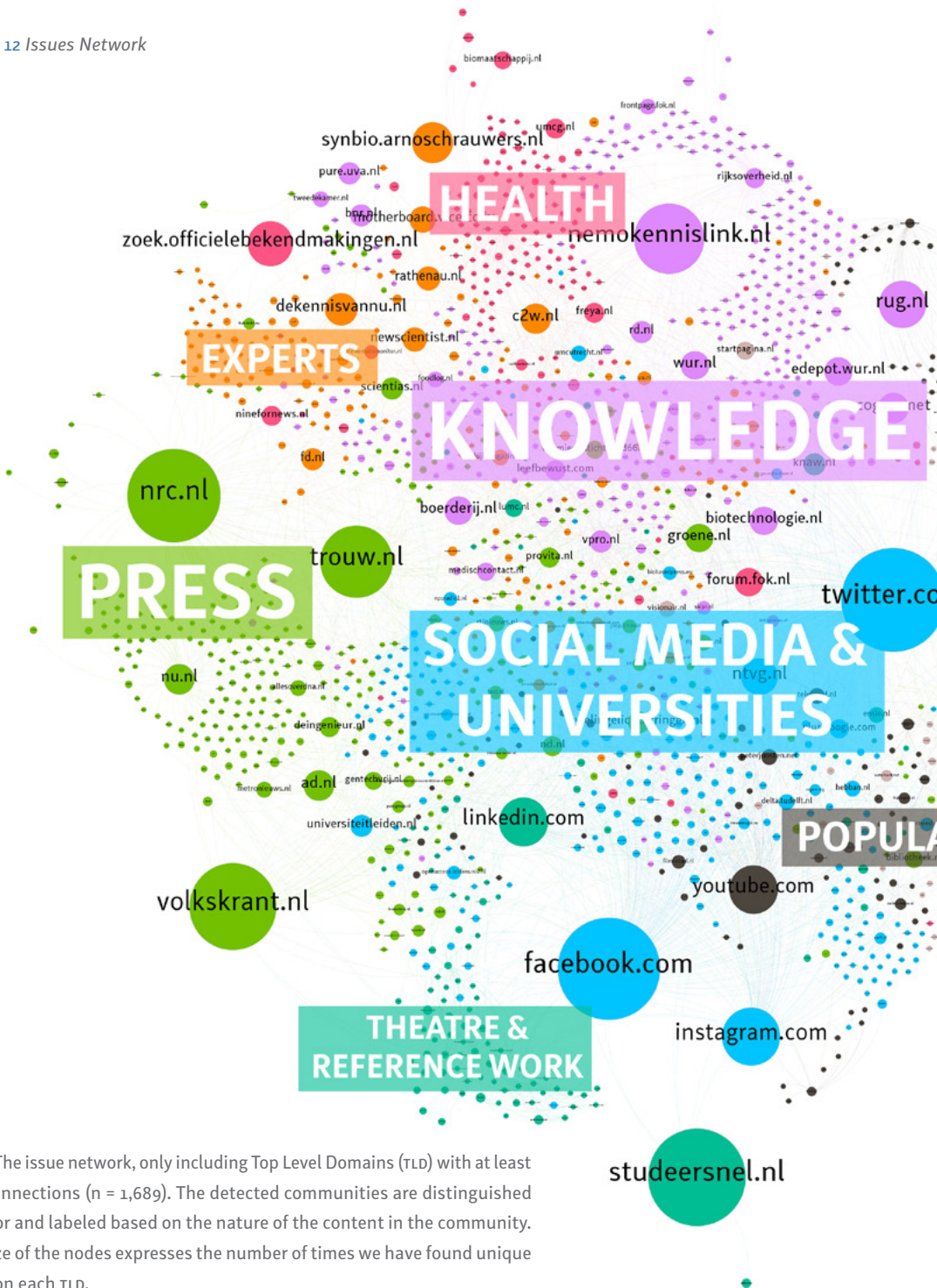
Table 6 Main Characteristics of the Communities in the Issue Network (Web)

	Nodes		Engaged		Top Words
	TLDs		Returned by Google Search		high frequency and/or salience
Knowledge	548	13%	73	14%	thesis, genetic, DNA, know, biotechnology, crispr
Press	507	12%	74	14%	news, DNA, science, background, genetic
Social Media and Universities	404	10%	102	20%	calendar, gene dna, genetic, brave (new world), diabetes
Popular Media	278	7%	42	8%	film, boys (from brazil), dna, baby, black mirror, homo deus
Experts	272	7%	46	9%	news, dna, crispr, lives, engineerable
Health	221	5%	35	7%	kst (parliamentary documents), umcg (medical centers), check-up, genetics
Theatre and Reference Work	218	5%	44	9%	university, lecture, brave (new world), genetic, theatre
Study Material	162	4%	26	5%	report, term, book report, science, question
Other■	1,490	36%	72	14%	

■ Nodes from communities spanning less than 5% of the network.

This mostly concerns small clusters that are not connected to a giant component.

Figure 12 Issues Network



Note. The issue network, only including Top Level Domains (TLD) with at least two connections ($n = 1,689$). The detected communities are distinguished by color and labeled based on the nature of the content in the community. The size of the nodes expresses the number of times we have found unique URLs on each TLD.

Issue Network (Web)

Table 6 shows the main characteristics of the communities in the issue network, and the visualizations in Figure 12 and Figure 13 show a subset of the issue networks.

Communities

Knowledge. The *Knowledge* community includes a mix of websites from universities, knowledge centers, interest groups, and the government, as well as independent platforms focused on knowledge and science. Potential collaboration partners include (but are not limited to) nemokennislink.nl (a popular science communication platform that is part of the DDC); cogem.net (an advisory committee focusing on the potential risks of genetic modification); biotechnologie.nl (a platform about biotechnology, created by NEMO Kennislink, which is the organization behind nemokennislink.nl); and waag.org (a networking organization focusing on science, technology, and the arts).

Press. The *Press* community comprises a mix of websites of Dutch newspapers, news magazines, online news magazines, professional press, and other news media. Potential collaboration partners include newspapers and broadcasting organizations; independent newsmagazines such as welingelichtekringen.nl and joop.vara.nl; the collaborating public libraries of the Netherlands (nobb.nl); and npofocus.nl (a portal featuring documentaries by the Dutch public broadcasting organizations).

Social Media and Universities. The *Social Media and Universities* community includes a mix of websites and social media pages of Dutch universities, faculties, and research labs, as well as three important social media platforms: Facebook, Instagram, and Twitter. Based on our search results, universities and social media appear to have been clustered together into one community because of the high level of integration with social media of Dutch university websites. In addition to the universities, potential collaboration partners include thijmgenootschap.nl (an association focused on science and philosophy); montesquieu-instituut.nl (an institute focused on the role of science in society); and brightlands.com (a networking organization focused on bridging research and business).

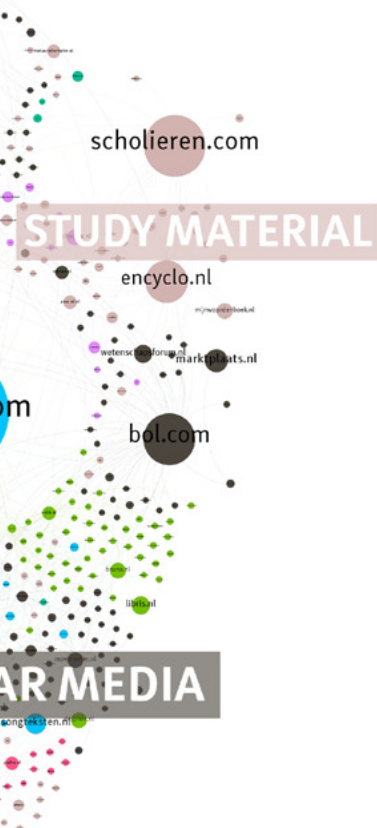
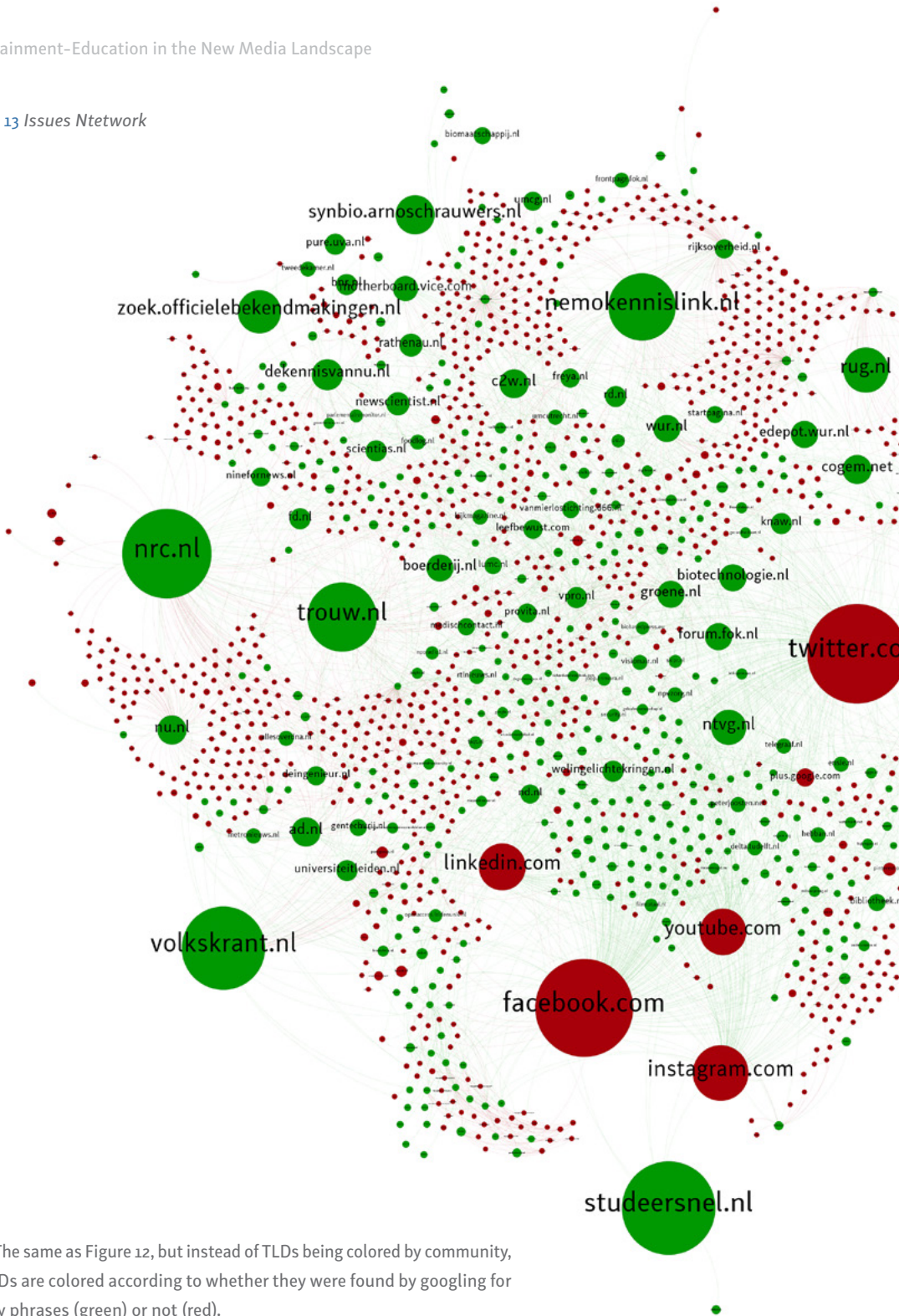
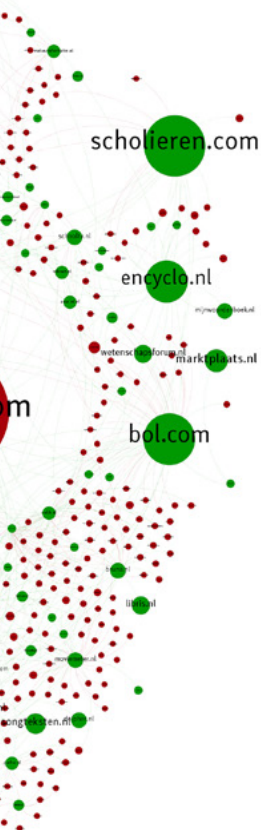


Figure 13 Issues Ntetwork



Note. The same as Figure 12, but instead of TLDs being colored by community, the TLDs are colored according to whether they were found by googling for our key phrases (green) or not (red).



Popular Media. The *Popular Media* community comprises a mix of websites about science fiction, technology, cinema, and literature—including web stores where movies and books can be purchased or streamed for free. Potential collaboration partners include (but are not limited to) *moviemeter.nl* (a Dutch website for film lovers); *bol.com* (a popular web store for books, music, and movies); and *peterjoosten.net* (a micro-celebrity and public speaker calling himself a “biohacker and DIY futurist”).

Experts. The *Experts* community includes a mix of professional media about germline modification, genetic modification, as well as science and technology in a broader sense, scientific journals, and media focused on ethical dilemmas and technology. Potential collaboration partners include *synbio*, *arnoschrauwers.nl* (a blog about biotechnology by a science journalist); *motherboard.vice.com* (an online magazine about technology, especially popular among younger audiences); and *czw.nl* (a magazine for professionals in chemistry and life sciences).

Health. The *Health* community comprises a mix of websites from hospitals; health organizations focusing on fertility, gynecology, cancer, and clinical genetics; platforms to access documents such as announcements or laws from the Dutch government; as well as alternative news websites and satire. In addition to hospitals and health organizations, potential collaboration partners include *biomaatschappij.nl* (a website about biotechnology and society) and *speld.nl* (the Dutch equivalent of *theonion.com*).

Theatre and Reference Work. The *Theatre and Reference Work* community includes a mix of websites of theaters, concert venues and night clubs, health organizations, and online reference works for students. The theatres, concert venues, and night clubs were mostly found through key words and phrases relating to popular media and current affairs: for example, many theatres host performances of *Brave New World*, or public lectures by experts on genetic technology. In addition to the theatres, concert venues, and night clubs, potential collaboration partners include *ensie.nl* and *studeer-snel.nl* (both of which are reference works for students where

information about genetic modification could be linked with the DNA Dialogue).

Study Material. The *Study Material* community comprises a mix of platforms for students as well as websites and blogs about science and society. Potential collaboration partners include (but are not limited to) nl.wikipedia.org and scholieren.com (both of which are reference works for students where information about genetic modification can be updated or linked with the DNA Dialogue).

Ego Network (Twitter)

Table 7 shows the main characteristics of the communities in the issue network; Figure 14 shows a visualization of the ego network, where nodes are colored along the community they belong to. Figure 15 only shows the authors, distinguishing between authors of tweets returned by our first search (red) and authors of tweets in the conversational context (orange). The lines between the nodes signify interactions such as replies, retweets, and quotes.

Communities

Politics and Media. Although the *Politics and Media* community is the largest and most central, it is also one of the least engaged communities with HGM or other genetic technologies. In addition to public broadcasting organizations, newspapers, and online news magazines, potential collaboration partners include (but are not limited to) the chief technology officer (cto) of the city of Amsterdam, several ex-MPs from the Dutch Green party, as well as the Dutch Christian Democrats.

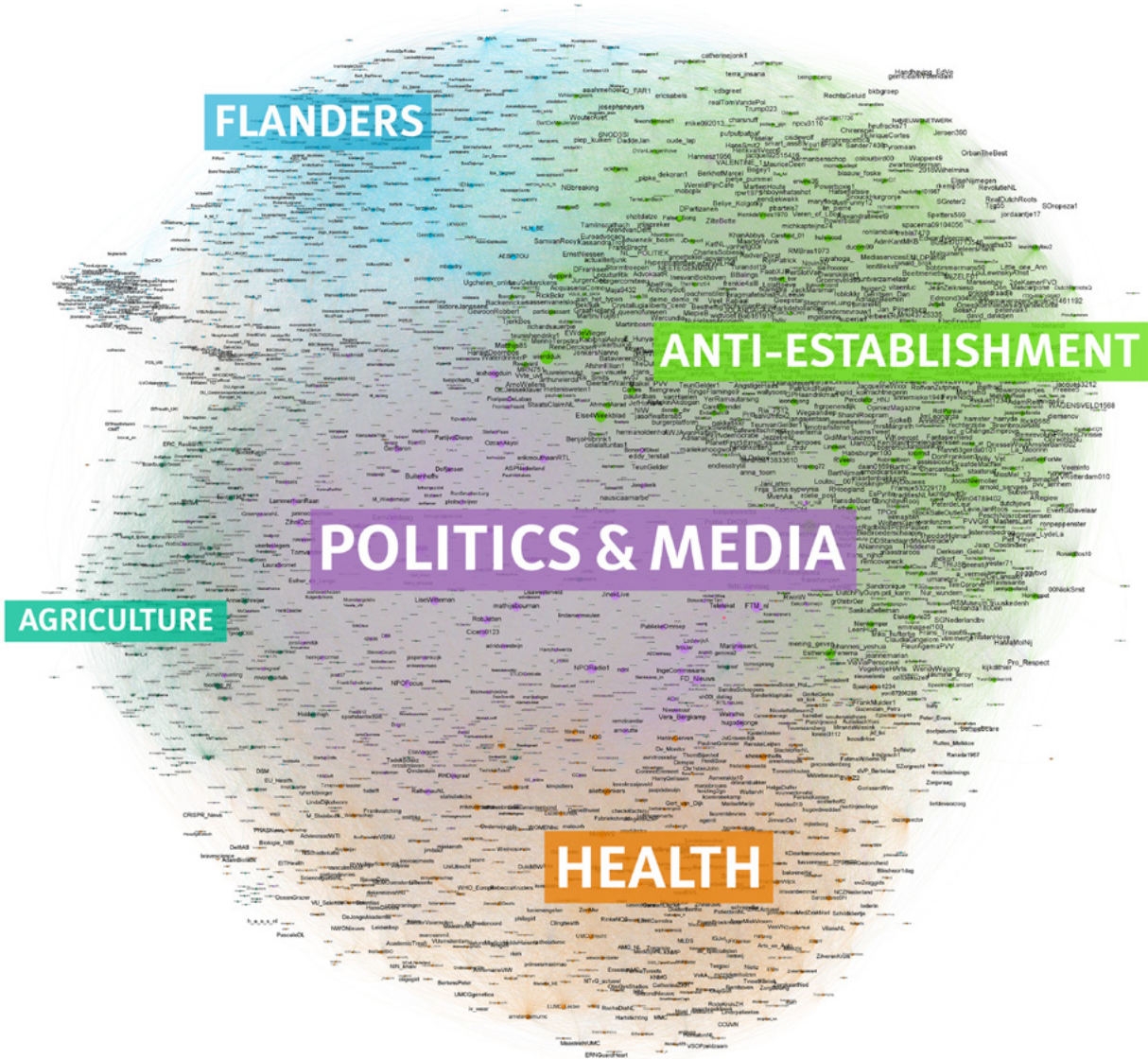
Anti-Establishment. While the Anti-Establishment is the second largest community, it is also the least engaged community in the network. Most of their tweets show little relation to the topics that we searched, mostly concerning replies or quotes—short messages sent to react to another message—used to push a different agenda. In addition to well-known columnists and MPs from the anti-establishment parties, potential collaboration partners include the editors of the online news magazine *OpinieZ.nl*.

Table 7 Main Characteristics of the Communities in the Ego Network (Twitter)

	Nodes		Engaged		Top Words
	Users		Actively tweeting		high frequency and/or salience Profile texts
Politics & Media	771	28%	279	36%	politics, parliament, media, economics, cda (christian democratic party, education
Anti-Establishment	722	26%	180	25%	anti, pvv, fvd (right-wing populist parties), columnist, islam, right-wing, critical
Flanders	483	18%	239	49%	own name, flanders, belgium, science, media, expert, university
Health	472	17%	222	47%	health care, research, medical, netherlands, science, webcare, hospital
Agriculture	297	11%	163	55%	agriculture, food, environment, sustainable, bio, green, innovation, research
Other*	35	0%	35	100%	

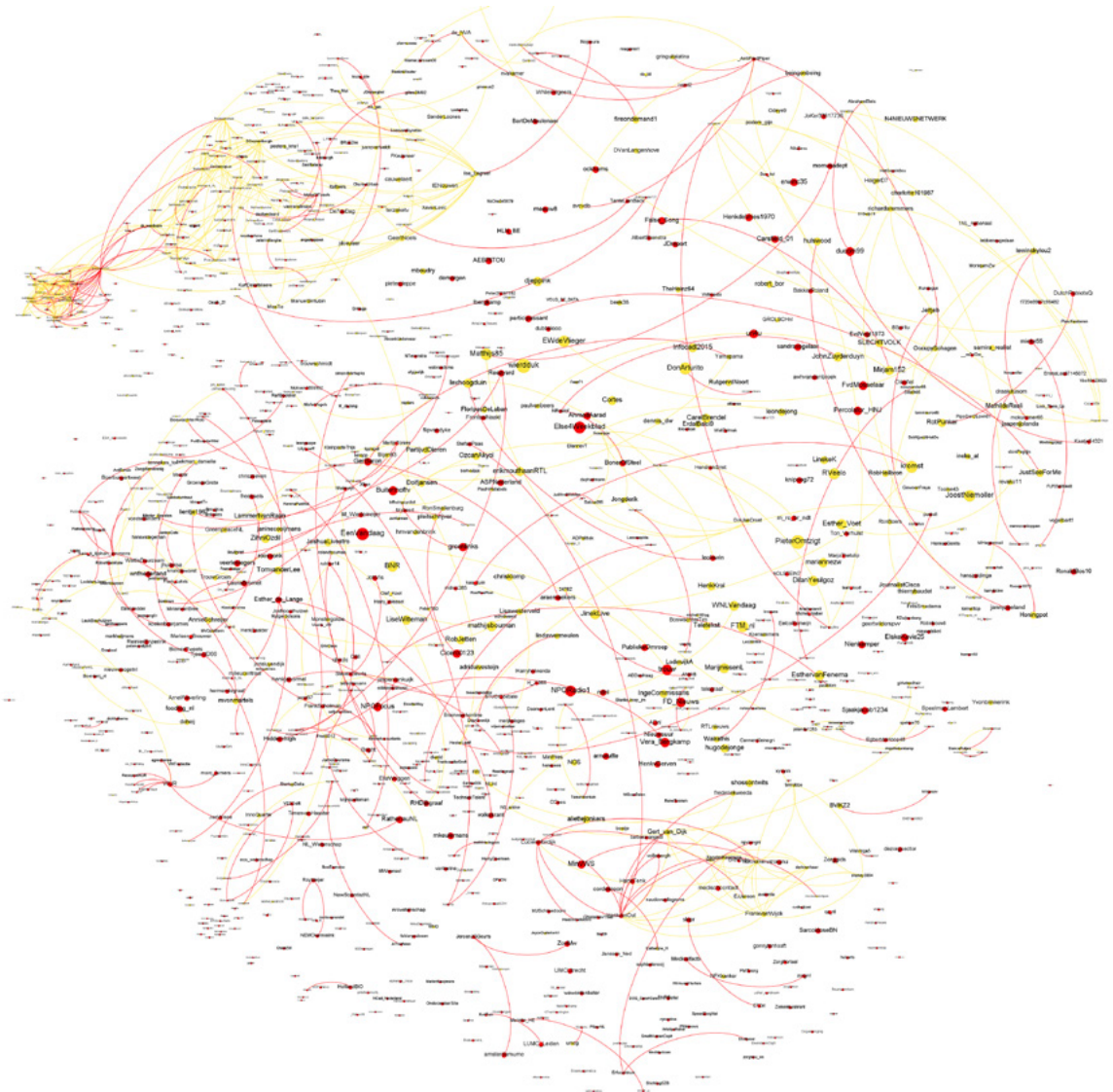
- * Users without followers and not following any users.

Figure 14 Ego Network



Note. The dots represent users, colored by the community they belong to. Grey dots represent users that did not tweet, and thus represent interests or audiences that the authors have in common. The communities are labeled based on analysis of the profile texts of the users in each community. Note that non-tweeting users are colored grey, and that all nodes are sized along their eigenvector centrality scores—a statistic typically used to express influence.

Figure 15 Interactions in the Ego Network



Note. The same network as Figure 15, but only including the authors and using lines to highlight interactions between users. Red dots are users included in our core set of tweets, while yellow dots represent the conversational context.

Flanders. The *Flanders* community is the third largest community and the second most engaged. It includes Twitter users from Flanders, the Dutch-speaking part of Belgium, a country which was beyond the scope of this project. A majority of the active users in this community had Dutch profile texts but conversed in French with co-nationals from the French-speaking part of Belgium (see the dense cluster of interactions on the top-left in Figure 6).

Health. The *Health* community is characterized by those with a medical background and mostly shares news and insights from research. The community mainly uses Twitter to send messages, as only a small proportion have responded to other Twitter users. In addition to the vws, hospitals, public health organizations, and other consortium partners we found among this community, potential collaboration partners include several online magazines focused on the health care sector, a wide variety of MDs, as well as medical philosophers and ethicists, medical universities, and consumer TV shows.

Agriculture. The *Agriculture* is the smallest, yet most engaged community, sharing and discussing news and insights about the application of genetic technologies in agriculture. Potential collaboration partners include (but are not limited to) online magazines about agriculture, livestock, the environment and sustainability; a well-known documentary producer; independent journalists and bloggers; as well as members of public advocacy groups focusing on agriculture and sustainability, a former forester, and Christian Democratic MPs specialized in agriculture.

Recommender Networks (YouTube)

Table 8 shows the main characteristics of the communities in the recommender network; Figure 16 and Figure 17 include visualizations of the recommender network, where nodes are colored along the community to which they belong.

Communities

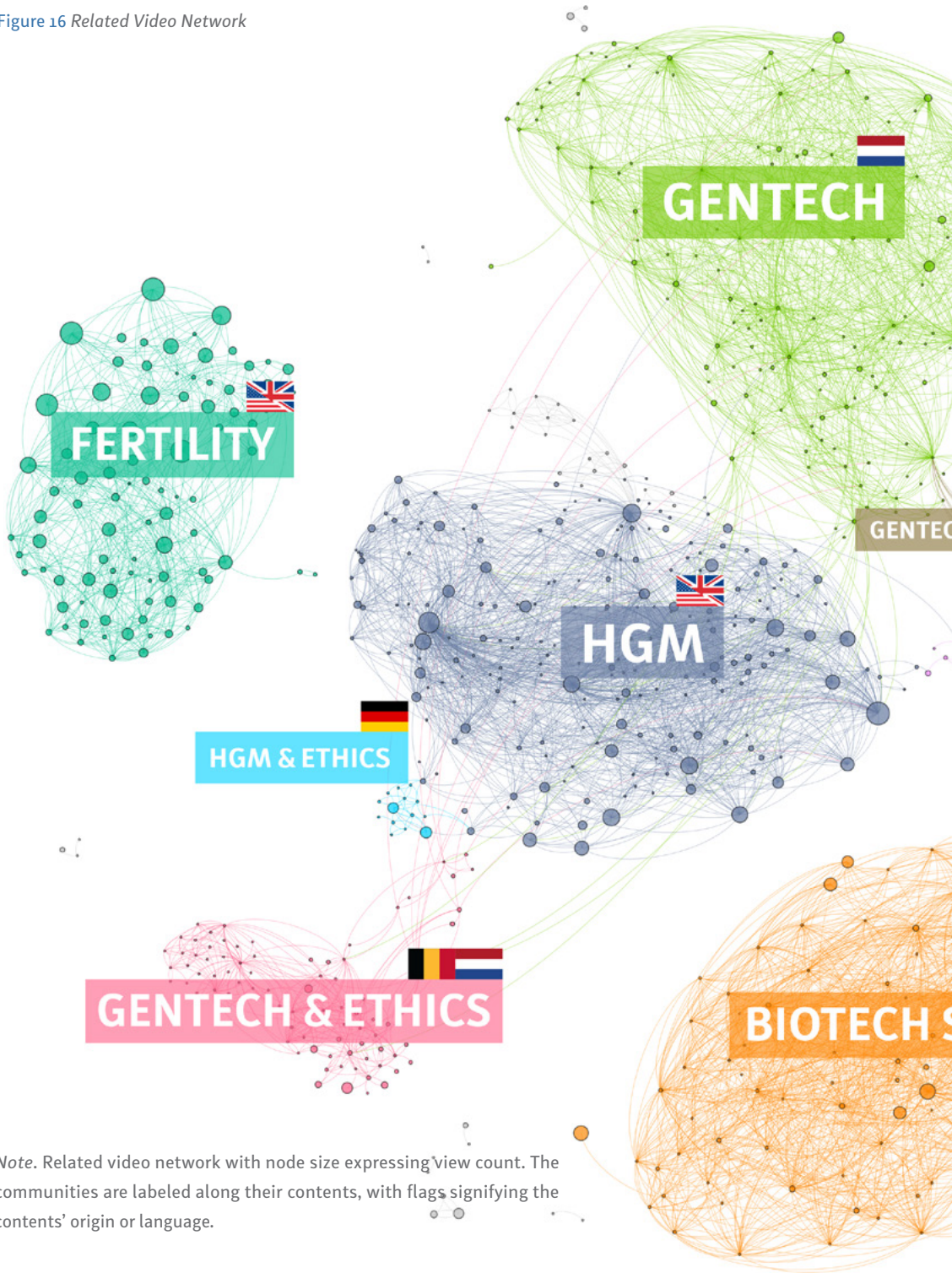
Human Germline Modification. The *HGM* community includes videos in English that are mostly about how CRISPR-Cas9 technology can be applied to edit human genes. This community is linked to and plays a central role in most of the communities

Table 7 Main Characteristics of the Communities in the Ego Network (Twitter)

	Nodes		Engaged	Top Words high frequency and/or salience
	Videos		Language / Orientation	Most salient words in video titles
HGM	215	25%	English / International	crispr-cas, gene, human, babies, embryos, technology, jennifer doudna
Gentech	170	20%	Dutch / the Netherlands	manipulation, genetic, food, gmo, monsanto, embryo, world, protest, gentech
Biotech Startups	99	11%	English / International	biotech, startup, pitch
Fertility	95	11%	English /International	ivf, embryo, transfer, baby, tube, process, frozen, infertility, journey
Gentech and Ethics	89	10%	Dutch	engineering humans, genes, think, science, technology, impact, bio, ethics
HGM, Popular Media & Conspiracy	21	2%	English /International	crispr-cas, gattaca, mosquitoes, blueprint, immunity, biohack, chimera
HGM and Ethics	15	2%	Germany	crispr-cas, trans genetic, secret, genetic manipulation, gene
Gentech & Fertility	11	1%	Dutch / Belgium	A Belgian MP, medical, contraception, fertility, gattaca
Other [□]	152	18%		

- Nodes from communities spanning less than 1.5% of the network, mostly concerning small clusters that are not connected to the giant component.

Figure 16 Related Video Network



Note. Related video network with node size expressing view count. The communities are labeled along their contents, with flags signifying the contents' origin or language.

in the recommender network. Some of the videos are among the most watched in the network. However, as these videos are mostly in English and published by channels targeting international audiences, they are beyond the scope of the project reported in this chapter.

Gentech. The *Gentech* community includes videos in Dutch that explain genetic technology in a light way, while a smaller subset wields a more sensationalistic approach (i.e., conspiracy theories). Some videos are linked to the (international) *HGM* and *Gentech & Fertility* communities. Being in Dutch, the videos are among the least-watched in the network. Within this community, several videos have relatively high PageRank scores, meaning that they are most likely referred to by other well-connected videos (Xing & Ghorbani, 2004). Potential collaboration partners include (but are not limited to) the YouTube channels of various Dutch tv shows, a series of biology classes for high school students, an online science magazine, a futurist/technologist and public speaker, and the YouTube channels of a few newspapers.

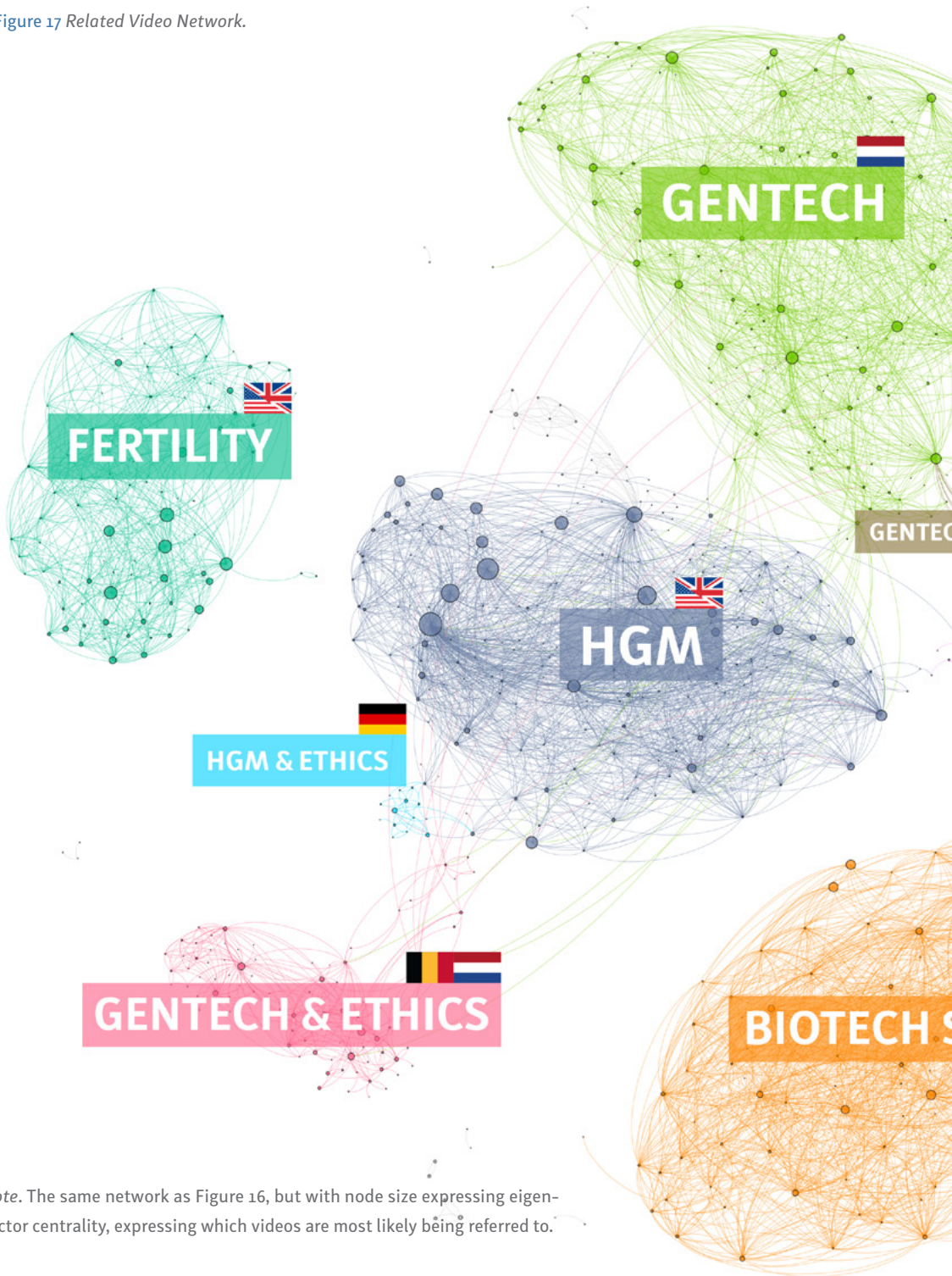
Biotech Startups. The *Biotech and Startups* community includes videos in English about biotech startups, such as show reels, reports, and short documentaries. This community is not linked with the other communities in the network. Although this community does not include Dutch channels, it includes an online magazine covering the European Biotech Industry as a potential collaboration partner.

Fertility. The *Fertility* community includes videos in English about fertility treatments such as IVF as well as video dairies by couples undergoing IVF. This community is not linked with other communities in the network and its videos are among the most-watched and most-linked. Without any Dutch channels, this community is beyond the scope of the project reported in this chapter.

Gentech and Ethics. The *Gentech and Ethics* community includes videos in Dutch, including speeches, reports, and short informational videos highlighting the ethical aspects of genetic technology (e.g., the altering of human species). The videos are published by Dutch and Belgian channels,



Figure 17 Related Video Network.



Note. The same network as Figure 16, but with node size expressing eigenvector centrality, expressing which videos are most likely being referred to.

and some videos are linked to the *HGM* community. Being in Dutch, the videos are not commonly watched and do not have high PageRank scores. Potential collaboration partners include (but are not limited to) public speakers who specialize in science and society, online science magazines, public speaking events, theatres, and public debate centers.

HGM, Popular Media & Conspiracy. The *HGM*, Popular Media & Conspiracy community is a small cluster with videos in English about CRISPR-Cas9 technology, of which are loosely connected to the (international) *HGM* and (Dutch) Gentech communities. Most videos are characterized by a sensationalistic approach, lean toward conspiracy theories, and refer to popular media (e.g., ‘gattaca’).

HGM and Ethics. The *HGM* and Ethics community is a cluster of videos in German about CRISPR-Cas9 technology, of which some are connected to the *HGM* community. This community does not include any Dutch channels.

Gentech & Fertility. The *Gentech and Fertility* community is a small cluster including interviews with a Belgian member of the European Parliament. This community does not include any Dutch channels.

DISCUSSION

In this chapter, we explored online networks to find new avenues and potential collaboration partners for a wide and inclusive societal debate on *HGM* in the Netherlands. Our results include unexpected options for online collaborations as well as collaborations beyond the Internet. Although we expected to find blogs, vlogs, and websites of micro-celebrities, our results also include the websites; YouTube channels; as well as Twitter, Instagram, and Facebook accounts of health and public advocacy organizations, businesses, hospitals, libraries, and news and science magazines. These comprehensive results could be explained by the fact that many of these organizations, businesses, and institutions use multiple channels to represent themselves in the virtual domain.



CH & FERTILITY

HGM, POPULAR MEDIA
AND CONSPIRACY.

STARTUPS

Content formats and partnership arrangements

To collaborate with potential partners, the DDC must establish partnership arrangements and develop media formats that stimulate the exchange of expertise and perspectives around HGM. To shed light on a wide range of real-world perspectives, the consortium has studied real-world scenarios that reflect risk and safety issues as well as ethical aspects of the prospective application of HGM (van Baalen et al., 2019). This has resulted in several scenarios and ‘vignettes’, connecting real-world perspectives to expertise and providing angles to produce media content as well as the organization of public discussion events.

In collaborations with micro-influencers, the scenarios and vignettes can serve as dialogue starters—micro-celebrities may sketch or enact a scenario, share their views on its implications, or ask audiences for their opinion, doubts, and questions (Lutkenhaus et al., 2019b). Moreover, micro-celebrities may follow up on their audiences’ responses by sharing their views on these opinions or by responding to doubt and questions, ideally in collaboration with topical experts or other stakeholders in order to approach the topic from numerous angles.

To prevent the spread of misinformation, it is important to establish partnership arrangements that enable the DDC to introduce topical expertise—either by double-checking for factuality or prospectively providing briefing documents and source materials. Micro-celebrities have built their social capital based on what their peers appreciate (Frobenius, 2014; Senft, 2009; Usher, 2018; Van Eldik et al., 2019); as such, they should be responsible for creating the media content.

In addition to micro-celebrities and online magazines, our results included channels spanning organizations, businesses, and institutions. Some point to or offer specific products, events, and (public) services (e.g., online bookstores, science festivals, and reference works). From a content strategy perspective, this offers various opportunities for content formats and partnership arrangements.

For example, in the Popular Media community, we identified web stores selling books, music, and movies. Web stores seem unlikely collaboration partners in the organization of a societal debate. However, if we see them as the digital equivalent of bookstores—also known to frequently host

public discussion events—web stores become interesting venues to extend the DNA Dialogue. This can be achieved in various ways. For example, the web store might ‘tag’ their books and movies about genetic technology and gather them on a ‘landing page’. When customers search for books and movies about genetic technologies, they would be directed to this page, from where the web store could provide links to digital extensions of the DNA Dialogue, adding contextual entry points.

Additionally, the DDC could offer their expertise to the editors of each web store’s content marketing teams managing their digital extensions (e.g., Facebook pages, YouTube channels, and online magazines). This would enable the editors to write interesting features about, for example, which fictional genetic technologies have become (or are about to become) reality, thereby providing links to products in their web store and to digital extensions of the DNA Dialogue. In doing so, the web store would position itself as a ‘hub of knowledge’, which is interesting from a branding perspective, while also contributing to its corporate social responsibility profile. In these ways, collaborations would not only use each collaborations partners channels to diffuse information, but also strike a balance between the interests of the collaboration partners and the objectives of the societal debate.

Similarly, the Popular Media community includes multiple online magazines about cinema. In these magazines as well as their digital extensions, content formats can tap into the public consciousness of cinema lovers by using movies or movie scenes about genetic technology as conversation starters. For example, in a scene from Jurassic Park⁷, Dr. Hammond, the park’s owner, and Dr. Malcolm, a visiting scientist who Dr. Hammond wants to affiliate with the park, have a fierce discussion about whether it was morally right to ‘resurrect dinosaurs.’ Dr. Hammond (“*How can we stand in the light of science, and not act?*”) and Dr. Malcolm (“*You wield genetic power like a kid that has just found its dads gun*”) represent two poles in the public debate about HGM. Accordingly, the scene can be used to incite a debate on genetic modification among cinema lovers.

On YouTube and Twitter, we found various micro-celebrities who wield a sensationalistic tone, with a minority sharing myths or misinformation. It is easy to dismiss these micro-ce-

➤ <https://youtu.be/oNz8YrCC9X8>

lebrities as unreliable partners; yet in doing so, we would exclude their audiences—people consuming their content on YouTube—from the DNA Dialogue. Instead, the DDC could approach these micro-influencers and seek collaboration by offering its expertise to address myths and misinformation or by affording channel owners the opportunity to interview topical experts, in which experts can respond to the channel owners' doubts and questions.

Finally, offline collaborations might be needed to boost the salience of the DNA Dialogue in some communities. For example, in the Theatre and Reference Work community, we found performances and public discussion events on the website calendar pages of various theatres and public libraries. This is an important insight in itself, as the consortium has not previously considered organizing performances or public discussion events with theatres. Moreover, by doing so, it is likely the DNA Dialogue becomes more prominent in this community through calendar pages as well as digital extensions of theatres and public libraries.

Methodological limitations

Building in room for reflexivity allowed us to adapt to the circumstances, ultimately providing insights that mattered most to the DDC. During the process, several issues emerged that may require attention in future research.

First, our goal was to identify websites, micro-celebrities, and other potential collaboration partners in online networks using a comprehensive list of key phrases. During the earliest phase of this study, the members of the DDC were asked to share ideas for themes, topics, and angles that ultimately led to our list of keywords and phrases. However, by creating a list of key phrases ourselves, we only searched in areas that the DDC was already aware of, and the resulting media content may have only spanned a small part of all possible real-world views and associations.

The Rathenau Institute, also part of the DDC, studied real-world scenarios that reflect risk and safety issues as well as ethical aspects of the prospective application of HGM (van Baalen et al., 2019). This report became available a few weeks after we presented our final results to the DDC, and, in retrospect, provides additional input for the list of keywords and phrases. For future societal debates, we recommend to

thoroughly study the real-world scenarios associated with the debate's topic before generating the keywords and phrases.

Second, by using Google Search for key phrases, we strongly relied on their search algorithm—even though we disabled personalization, safe search, and searched from an IP address with no search history. Nonetheless, Google is commonly used by a large majority of Dutch Internet users, and thereby provides a shared interface to navigate the Internet. In our study, we approached these search results as a snapshot of this common interface, being aware that the results might vary due to algorithmic personalization and the high level of activity in the networks. Especially for formative studies (Bouman, 1999), we believe this snapshot is meaningful as it represents how the Internet actually looks to its end users.

Third, we used a condensed list of key phrases to search for content on Twitter and YouTube. For each theme and level, we selected the key phrases for which Google returned the most relevant results. Consequently, the results from Twitter and YouTube appeared to be equally relevant and did not require us to do any manual filtering. This addressed an important problem, as there was no time to manually filter three separate data sets with the media strategist waiting for our inputs. However, a narrower set of keywords may have led to a smaller set of results.

Lastly, links between web pages do not always signify meaningful pathways of information but can also be used as a tactic to boost web pages' significance in Google's search results. This practice is called "link building" (Moogan, 2020), and it is likely that the issue network includes noise as a result. We have aimed to diminish the noise by filtering nodes with a small number of connections—a rather crude approach. Future researchers could explore the practical use of various filtering approaches (Waldherr et al., 2017).

CONCLUSION

In recent years, experts have called for societal debates about hGM. Societal debates such as the Dutch DNA Dialogue do not aim to reach unequivocal societal agreement on specific implementations; rather, they aim to propel the exchange of expertise and a wide range of stakeholder perspectives.

As such, the DNA Dialogue could enhance the conditions for informed, widely supported consensus decisions that can be implemented through quality standards and legislation.

Currently, new media platforms can be used to extend the scope of societal debates by reaching out to online communities and to create interactive media formats that enable and invite audiences to engage with each other on the topic of HGM. To achieve this, there is a crucial role to be played by media strategies. Our case study provides insights and suggestions for the media strategy of the Dutch DNA Dialogue, helping to widen and deepen the societal debate in three specific ways:

- (a) we identified online communities as avenues for public dialogues, often beyond the reach of traditional mass media;
- (b) our results contribute to a deeper understanding of how communities relate to HGM, helping the DDC to tailor media formats to their preferences; and
- (c) we provide a wide variety of potential collaboration partners such as micro-celebrities, magazines, web stores, fan communities, and reference works.

This chapter shows that formative analysis of online networks around socio-technological issues is relevant, important, and ready to be applied in future societal debates. This is especially evident nowadays, as the organization of societal debates seems to fit within a larger trend of public engagement, playing an integral part in innovation trajectories in Europe, Australia, and North America (Fisher et al., 2015). ©

CHAPTER 6 Using Markers for Digital Engagement with the Audience of ‘Main Kuch Bhi Kar Sakti Hoon 3’:

A transmedia Entertainment-Education initiative for hygienic sanitation, family planning, and gender equality in India^{11,12}

¹¹ This chapter describes a research project by the Center for Media & Health, commissioned by the Population Foundation India (New Delhi, India). The report has been published as Lutkenhaus, R. O., & Bouman, M. P. A. (2020). *Using Markers for Digital Engagement with the Audience of “Main Kuch Bhi Kar Sakti Hoon 3”*: A transmedia Entertainment-Education initiative for hygienic sanitation, family planning, and gender equality in India. Center for Media & Health.

¹² This work would not have been possible without the generous guidance of dr. Helen Wang and prof. dr. Arvind Singhal.

➤ <https://www.mkbksh.org>

With a population of over 1.3 billion as of 2020, India is struggling with serious environmental and societal issues. Unsafe sanitation and hygiene pose a threat to a healthy and sustainable future for millions of people and is becoming more urgent as India is expected to soon surpass China as the most populous country in the world (Ritchie, 2019). Family planning programs have been recognized as a cost-effective way to decrease birth rates and improve the literacy and economic conditions of citizens (Muttreja & Singh, 2018). Furthermore, by giving women control over their body, family planning programs contribute to gender equality (Starbird et al., 2016). Family planning programs typically address structural issues such as the availability of contraceptives. However, in India—where there is a need for education on contraceptive options as well as a need to increase male participation in family planning (Muttreja & Singh, 2018)—family planning programs often also include Social and Behavior Change Communication (SBCC).

Main Kuch Bhi Kar Sakti Hoon (मकबकश): an Indian and EE- serial

Entertainment-Education (EE) is an SBCC strategy that uses popular media to educate and motivate audiences to improve their health, safety, and equality (Bouman, 1999; Chatterjee et al., 2017; Singhal & Rogers, 2002; The World Bank, 2011). The Indian serial *Main Kuch Bhi Kar Sakti Hoon (मकबकश)* or ‘I, a woman, can achieve anything’, is an EE initiative that aims to use storytelling to reach large audiences; captivate them over a longer period of time; enhance knowledge; and address sociocultural norms around family planning, gender

equality, and sanitation (Muttreja & Singh, 2018; Wang & Singhal, 2018). In *MKBKSH*, viewers see the world through the eyes of protagonists Sneha Mathur, a young doctor who decides to leave her lucrative medical practice in the city in order to return to her hometown to help her family and community. It confronts viewers with the realities of rural life and aims to spark informal conversations about regressive norms and practices surrounding family planning, gender equality, and sanitation.

Recent development in EE includes the use of transmedia storytelling to create a narrative experience for audiences across different media platforms (Wang & Singhal, 2016). The third season (*MKBKSH3*) attempted to leverage transmedia strategies to extend media content through creative coordination across TV, radio, an interactive voice response system, and social media platforms. *MKBKSH* is an initiative by the Population Foundation of India (PFI) in association with Feroz Abbas Khan, a well-respected writer-producer-director. The first season (*MKBKSH1*) was launched in March 2014 and was broadcast by public broadcaster *Doordashan* (DD-1); *MKBKSH1* reached an estimated 58 million viewers (PFI, 2020). The second season (*MKBKSH2*) focused on issues such as mental health and drug abuse among youth and adolescents, and was broadcast in 2015 (Wang & Singhal, 2018). *MKBKSH3* was broadcast from January to September 2019; in addition to family planning and gender equality, it focused on sanitation and hygiene.

Adapting to transitions in the Indian media landscape

Broadcasting media such as radio and TV have always played a central role in the EE strategy and are also at the heart of *MKBKSH*. However, since *MKBKSH2*, the number of Indian Internet users increased sharply from 260 million in 2015 to 483 million by 2018 (Diwanji, 2019b). The availability of inexpensive *feature phones* (e.g., JioPhone, I Kall, and Lava) seemed to play an important role in this rise—in 2018, 80.9% of Indian Internet users had access to the web through their phone (Diwanji, 2019c). Like their peers in the West, Indians go online to socialize, for entertainment, and to search for information (Arora, 2019; Diwanji, 2019a). Social media have thus afforded Indian Internet users the ability to communicate with each other on topics they share a passion for, including dramatic serials such as *MKBKSH*.

In EE serials such as *MKBKSH*, stories aim to keep audiences engaged and motivate them to talk about the issues and dilemmas raised by the dramatic events on screen. As such, EE is not just another message; rather, it is:

a point of engagement, a site of discourse. [...] It can be a powerful impetus for negotiation within families about roles, responsibilities and priorities. It can also provide a forum for interaction between audiences, media, and health institutions over social priorities and values. (Storey, 1998, p. 354)

The rapid uptake of mobile Internet in India offers the opportunity to use *MKBKSH*'s social media pages as online sites of discourse. Social media posts invite audiences to talk about the social priorities and values interweaved into the series' narrative, motivate audiences to join in raising awareness around these issues across the web (Lutkenhaus et al., 2019b).

EE and social media

Although there is considerable information available about social media strategy for businesses and institutions, there is little known about social media strategies for EE, especially in the wake of largescale EE TV serials such as *MKBKSH3*. This chapter addresses this gap by presenting a research project that aimed to extend *MKBKSH3* to social media and the Internet. In this project, the research team systematically monitored online audience responses to *MKBKSH*'s social media posts in the wake of the TV episodes. Doing so allowed the research and social media team to set the features of social media content formats and strategies apart that most strongly contributed to meaningful media engagement around family planning, sanitation, and gender equality on social media. The research team periodically reported to *MKBKSH*'s social media team, who used the reports to optimize their social media pages as online points of engagement.

This chapter describes the theoretical foundations underlying *MKBKSH3*'s media strategy, explains the design of this specific study, and reports the results of the analyses. The closing sections reflect on the optimal conditions for social media pages to work as online points of engagement in the wake of a largescale EE TV serial.

THEORETICAL FRAMEWORK

Similar to most places in the world, the Indian media landscape is in transition, moving from a relatively orderly situation where print and broadcasting media are setting the agenda and are functioning as the main gatekeepers to a more dynamic structure where communities of online audiences play an increasingly influential role. Within these communities, collective media engagement can contribute to setting the public agenda (Barberá, Wang, et al., 2015; Boynton & Richardson, 2016) and to renegotiating norms, values, and cultures (Alleyne, 2015; Bennett & Segerberg, 2012; González-Bailón, 2017). For EE, this offers the opportunity to reach out to communities of audiences beyond the scope of traditional mass media and invite them to share their views and amplify the messages of their choice.

Seeking to grab these opportunities, three theoretical concepts have been of particular importance in the creation of *MKBKSH3*:

- (a) *markers*, which are words, phrases, or practices designed to enhance knowledge, introduce ideas and practices, and challenge regressive norms (Singhal & Rogers, 2002);
- (b) *story circles*, a concept that allows to stimulate collective media engagement (Clark et al., 2015; Couldry et al., 2015); and
- (c) enhancing visibility on and beyond its social media platforms by anticipating the dynamics of online social networks.

Markers as digital points of engagement

In EE, markers are uniquely designed words that introduce new concepts or reframe existing phenomena that break regressive norms and practices (Bouman et al., 2012; Singhal & Rogers, 2002). Furthermore, markers are uniquely labeled ideas or practices that are weaved into a dramatic narrative.

In *MKBKSH3*, markers served three main purposes. First, the markers addressed family planning, sanitation, and gender equality issues and proposed a pro-social alternative. For example, in *MKBKSH3*, the marker *Lambi Sagai*—literally meaning ‘long-term engagement’—provides an alternative for dowry and arranged marriages, where couples marry before they are financially and emotionally capable of supporting a family. In a romantic scene in episode 25, *Lambi Sagai* is the point of conversation between a health worker (Panna) and IT student

(Sameer) when he promises to marry her as soon as they are capable of supporting a family. This example shows that the meaning of Lambi Sagai is not confined to its literal meaning; rather, the associated characters, quotes, and events from the TV serial comprise a system of knowledge, practices, and beliefs.

Second, markers allow audiences to share their perspectives on the markers. MKBKSH's social media posts tapped into the markers by creatively referring to the associated characters, quotes, and events from the TV serial. Marker-related social media posts aimed to not only enhance knowledge and address sociocultural norms, but also invited audiences to share their perspectives, potentially empowering them to co-shape the system of stories underlying each marker.

Third, markers enabled the research team to track media engagement around the key themes of the intervention (Bouman et al., 2012). As markers are unique words or phrases, they could attribute marker-related media engagement to the intervention despite it taking place in a media saturated environment with many competing messages.

Story circles: conversation catalysts

Social media and digital storytelling tools have afforded audiences to create and share media content themselves (Blank & Reisdorf, 2012; Couldry, 2008; van Dijck, 2009). Online fan communities offer audiences an interactive, shared level of engagement with movies, TV series, and the characters they have come to despise or admire (Jenkins, 2006). Fan communities also facilitate collective storytelling processes that enrich the original fictional world with user-generated content (Scolari, 2009). Both processes can be understood as *narrative exchange* (Clark et al. 2015; Couldry et al. 2014). Narrative exchange can be stimulated by setting up story circles, a concept that has been defined previously as “a set of agents, processes and infrastructural conditions that enable narratives to consistently emerge and be acknowledged through exchange and mutual interaction” (Clark et al., 2015, p. 924).

In MKBKSH3, the social media team used social media posts to set up story circles for each marker. Scenes from the TV serial introduced the markers, the social media platforms provided an infrastructure to exchange media content, and PFI's social media team—responsible for online community management—used different social media content formats

to invite the pages' followers to join the conversation. To set up story circles, the social media strategy included series of posts that followed a conceptual model with four components:

1. *Inspire*: a social media post refers to a character, quote or event from the TV serial that enhances knowledge or addresses a normative issue;
2. *Introduce*: a marker coins the underlying system of knowledge, ideas, and practices; or proposes a better solution in a playful way;
3. *Invite*: the social media post invites audiences to respond or follow-up with their perspectives;
4. *Inspire (again)*: audience responses are aggregated in a new (series of) social media posts.

Leveraging the dynamics of online social networks

While story circles stimulated narrative exchange, additional strategies were used to make shared, interactive media engagement with *MKBKSH3* visible to a larger audience. Social media platforms such as Facebook are known for algorithmically tailoring their news feeds to match individual users' interests (Pariser, 2012). News feeds also highlight activities by friends— such as likes, comments, or new profile pictures— and are most likely to favor activities by the friends that users most frequently engage with. For this reason, some of *MKBKSH*'s social media content formats specifically focused on extending the visibility of *MKBKSH* through friend networks of *MKBKSH* fans. *MKBKSH*'s marker-related social media posts therefore focused on sparking the most interactive kinds of media engagement such as *tagging* others, posting pictures, or applying visual effects on profile pictures.

The social media team was also interested in enhancing the visibility of markers beyond *MKBKSH*'s social media pages. Phenomena such as the ALS Ice Bucket Challenge, the *Je suis Paris* Facebook Frame (Strange, 2015), and *planking* ("Planking [fad]," 2020), or the *dab* ("Dab [dance]," 2020) showed that gestures, visual symbols, and dance moves are capable of gaining social momentum, spreading far and wide. Such phenomena are most likely to spread when they are well-attuned to structural and technical features of social media networks, tailored to the preferences and behaviors of the target audiences, and include a strong moral and social imperative to engage (Jenkins et al., 2013; van der Linden, 2017). *MKBKSH3* aimed to introduce a gesture, dance move, or

behavior that had the potential to become a *visual marker*, allowing audiences to playfully endorse on its associated values by applying a visual effect or by sharing a picture or video.

METHOD

This project aimed at learning more about strategies and social media content formats capable of

- (a) stimulating media engagement around markers on social media, and
- (b) enhancing *MKBKSH*'s visibility on, across, and beyond social media platforms.

The following research questions were central to this research project:

RQ1 (setting up story circles): How can meaningful media engagement around markers be stimulated, and what are the most effective social media content formats and strategies to achieve this?

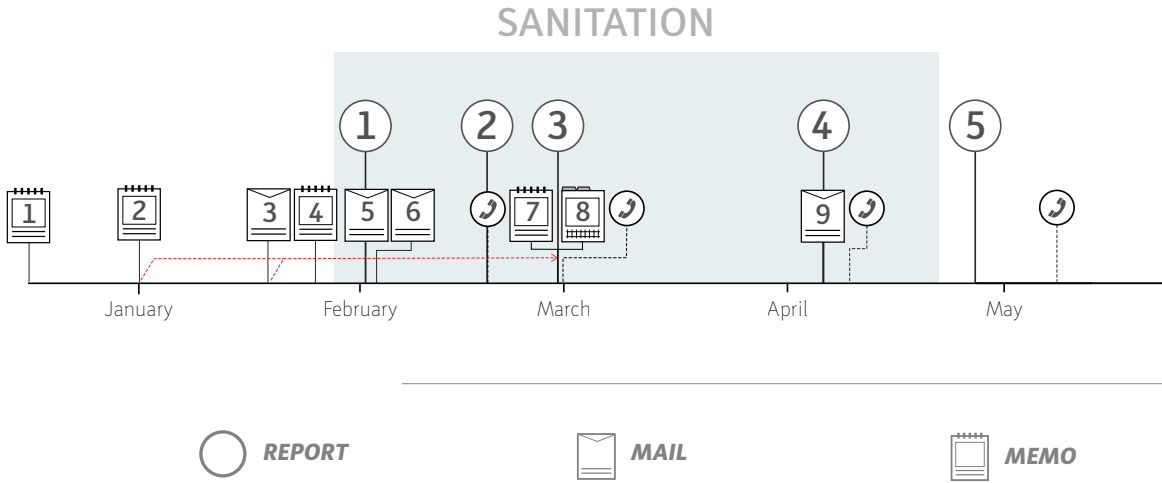
RQ2 (enhancing visibility): How can the visibility of marker-related media engagement be enhanced through the social networks of *MKBKSH*'s fan community, and what are the most effective media content formats and strategies to accelerate marker-related media engagement beyond *MKBKSH*'s own channels?

Team composition

PFI was in charge of the content of the series, setting the strategic goals and providing message matrices, while the team of Feroz Abbas Khan was responsible for script writing and production of the tv serial. The tv serial was broadcast nationwide by public broadcaster Doordashan. An audio version of the tv episodes was broadcast on various regional radio stations throughout India.

tv and radio lay at the heart of the media strategy and were extended to an array of interactive communication channels created and managed by different partners. PFI's social media team, which is part of the larger communications team, created and managed *MKBKSH*'s website and social media pages (e.g., Facebook, Twitter, Instagram, YouTube, and TikTok). Together with AI for Good—a company applying artificial in-

Figure 18 Engagement and Collaboration Between the Research Team, PFI, and Creative Team



➤ <http://mkbksh.org/sneha-ai/>

telligence (AI) technology for SBCC—the communications team also created a Dr. Sneha chatbot on Facebook Messenger. The IT and telecommunications company Gram Vaani further developed the Interactive Voice Response System (IVRS) that was introduced in *MKBKSH1* (Wang & Singhal, 2018), providing a low-tech alternative for mediated community engagement.

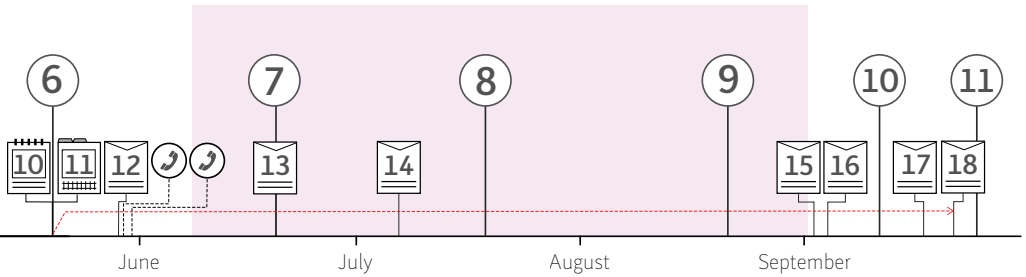
The role of the research team was to strengthen *MKBKSH*'s media strategy, where each researcher focused on different aspects. The research team was led by prof. dr. Arvind Singhal, dr. Helen Wang focused on studying the impact of the TV show through field work and the IVRS (Wang & Singhal, 2018), and the Center for Media & Health (CMH) monitored online audience engagement and provided advice for social media content formats and strategies.

Project structure and collaborative process

The research project was set up in three stages:

- (a) preparations before broadcasting of the first episode;
- (b) broadcasting period from late January to early September 2019 with a break from April 22 to June 8; and
- (c) post-broadcast. Engagement and collaboration between the research team, PFI, and the creative team were sustained through these three phases.

FAMILY PLANNING



CALENDAR



CONFERENCE CALL

Over this duration, the research team participated in about 12 face-to-face meetings (spread over several days across several visits) and six partner Skype conference calls, and shared 18 memos and checklists as well as 11 digital tracking reports to discuss progress, mid-course corrections, and cumulative findings (see Figure 18).

During the second phase—loosely-inspired on action research approaches for organizational learning (Greenwood et al., 1993)—the research team periodically shared and discussed the digital tracking reports with the social media team. This allowed the research team to finetune the data-retrieval and analysis methods, while enabling the social media team to improve their social media content formats and strategies. Post-broadcast, the data were retrieved and analyzed again for consistency purposes.

Preparation phase. The launch of the series was preceded by two field visits to India by the research team in September and December 2018. During these visits, the team led ideation workshops with different stakeholders such as Feroz Abbas Khan, the knowledge management team, the communications team, and PFI's partners involved with PR; social media; and the production of the website, IVRS, and chatbot. These sessions created the foundation for a transmedia strategy—mass media such as TV and radio were put in place to captivate and inspire

audiences, while the website, chatbot, IVRS, and social media pages provided greater depth to the story, serving as points of engagement for interactive, personalized (IVRS and chatbot), and interpersonal communication (social media pages).

Prior to launch, the key themes and issues that PFI aimed to address with *MKBKSH3* were specified in a message matrix by the knowledge management team. In September 2018, there were some rough ideas on markers, but it was not yet clear which markers would be designed and included in the script of the TV serial and which would be followed up online. A first version of the screenplay was shared in November 2018; the social media team used the screenplay to create a rough framework of the marker strategy that was shared in January 2019. The producers shared the scripts of specific episodes as soon as they became available. A few days before the TV show episodes were broadcast, they were shared with the communications and social media team. This allowed the specifics of the marker strategy to develop organically.

Markers and storyline. In the TV serial script, the key topics of the intervention were weaved into plots around a set of markers. The first part of the season, spanning 26 episodes broadcast between January 26 and April 21, 2019, addresses sanitation and hygiene issues through the marker *Swachhta Eaan*—meaning ‘cleanliness pledge’—a clarion call for clean houses, streets, cities, and ultimately a clean and healthy India. The marker was introduced when young female protagonist Panna is attacked by a group of unknown men in a field that is used for open defecation, and a local movement responds by setting out to improve the sanitation and hygiene conditions in the village of Prattapur. Dr. Sneha takes Panna under her wing and makes house visits to educate the local community. They also make appearances on the local radio station Pratap Vaani, hosted by comic-relief characters Munna and Buaji. During a concert event on the village’s square, Dr. Sneha educates the community and Munna and Buaji perform the *Qawwali* song, addressing sanitation and hygiene issues in a playful manner.

Meanwhile, the marker *Lambi Sagai*—meaning ‘long-term engagement’—is introduced by a romantic storyline featuring Panna and her crush Sameer, an IT student from a higher cast. They overcome a struggle with Sameer’s mother, who

does not want Sameer to marry Panna. By the end of the first part of the season, the young couple decides not to rush into marriage, but rather to choose *Lambi Sagai*, allowing them to first establish a foundation for a healthy and happy family.

The second part of the season, broadcast from June 8 to September 1, revolves around family planning. Different contraceptive options such as condoms, pills, and copper-t are introduced by Panna, who brings a *Mast Pitara* (pleasure basket) to the Pratap Vaani radio stations where she has lively conversations with Munna and Buaji about the pleasures of *mast topi* ('pleasure hat,' meaning condom), *mast goli* (pleasure pill), and *mast bandi* (pleasure vasectomy). Later, a new character enters the stage: Condom Baba, a mystical man who preaches the advantages of condom use through riddles and anecdotes. This ruffles some feathers in the local community, and Condom Baba—who also just opened his 'condom dhaba' (store)—is brought to court for promoting vulgarity. Condom Baba manages to convince the judge of his innocence and is pleaded free.

In addition to the markers that were specifically addressed in the TV show, the social media team introduced their own markers, often loosely inspired on the events in the TV show. For example, the concept of *Laadlidin*—a wordplay on *ladki* (girl), *ladalee* (dear), and *din* (day)—celebrates the presence of girls in the family. The TV serial does not mention this marker specifically, but a scene in episode 2 where the birthdays of two girls are celebrated is used to coin it in a social media post.

Table 9 shows eight markers that were ultimately implemented and monitored.

Broadcasting phase. Four weeks before the first episode of *MKBKSH3*, the research team started to retrieve and analyze audience engagement on the social media pages. The analyses were synthesized into reports specifically focused on social media comments as main indicator of meaningful media engagement. The reports compared how audiences responded to different markers and social media content formats. In addition to engagement with social media posts, the reports focused on marker diffusion. The research team systematically searched the Internet for websites and social media users beyond *MKBKSH3*'s own channels that had published about any of the markers. Furthermore, the periodic

Table 9 Markers That Were Studied in *MKBKSH3*

Theme	Marker	Description	TV	Facebook
Sanitation	Swachhta Ealaan (Cleanliness Pledge)	A clarion call to take responsibility for clean houses, streets, and cities to ultimately live in a clean and healthy India.	Episodes 1-26 (Jan 26-Apr 21)	46 posts: Feb (6), Mar (8), Apr (15), May (14), & Sep (3)
Family Planning	Mast Pitara (Pleasure basket)	A basket of contraceptive options, allowing for carefree enjoyment	Episodes 39-64 (Jun 8- Sep 1)	45 posts: Jun (7), Jul (19), Aug (11), & Sep (8)
Gender Equality	Lambi Sagai (Long-term engagement)	Finishing education, laying the foundations for a career, and getting to know each other before marrying (alternative to regressive practices as dowry and child marriage).	Episodes 1-55 (Jan 26-Aug 3)	26 posts: Apr (12), May (3), Jun (2), Aug (2), & Sep (7)
	Laadlidin ('Beloved' day)	A day to celebrate daughters, sisters, mothers, and other women in the family.	Episode 2, but not specifically coined as such (Jan 27)	11 posts: Jan (2), Feb (1), Jun (4), Jul (1), Aug (2), & Sep (1)
	Aurat Ki Marzi Ka Din ('The day that women can choose')	A special day where women can choose what to do.		34 posts: Mar (11), Apr (1), May (6), Jul (8), Aug (7), & Sep (1)
	Dono Barabar ('Both equal')	A slogan promoting gender equality.		16 posts: Feb (2), Mar (8), Apr (1), & Aug (5)
Other	Kahani Badlo ('Flip the story')	A slogan closely-connected to the purpose of <i>MKBKSH</i> : promoting change through storytelling.	Title of episode 25, where it is closely connected to Swachhta Ealaan and Gandhian principles	95 posts: Jan (21), Feb (16), Mar (3), Apr (10), May (8), Jun (18), Jul (13), Aug (3), & Sep (7)
	Log Kehte Hain ('People say ...')	A colloquial phrase, often used for 'common knowledge'.		9 posts: Jun (2), Jul (1), Aug (3), & Sep (3)

Note. The Facebook-column reports the number of total Facebook posts that the social media team posted for each marker. The social media posts can be tagged with multiple markers; for example, *Kahani Badlo* was often combined with *Aurat Ki Marzi Ka Din*.

reports included recommendations to stimulate engagement, drawing from the theoretical concepts outlined in the theory section. The reports were discussed in periodic calls between PFI's social media team and the research team.

PFI's social media team shared the content calendar for each week, helping the research team to reconfigure the data collection tools that captured engagement around markers. PFI's social media team, who managed MKBKSH3's social media pages, posted a mix of planned and improvised media content. Throughout the season, the research team highlighted opportunities to use markers to further integrate the TV serial and digital platforms.

Post-broadcasting phase. As the series progressed, the digital tools to retrieve and analyze user engagement were often reconfigured to retrieve engagement around different sets of markers. For consistency, the data were retrieved and analyzed again 4 weeks after the last episode was broadcast. These data were also used to create temporal semantic networks that were used to understand how user engagement evolved around each marker.

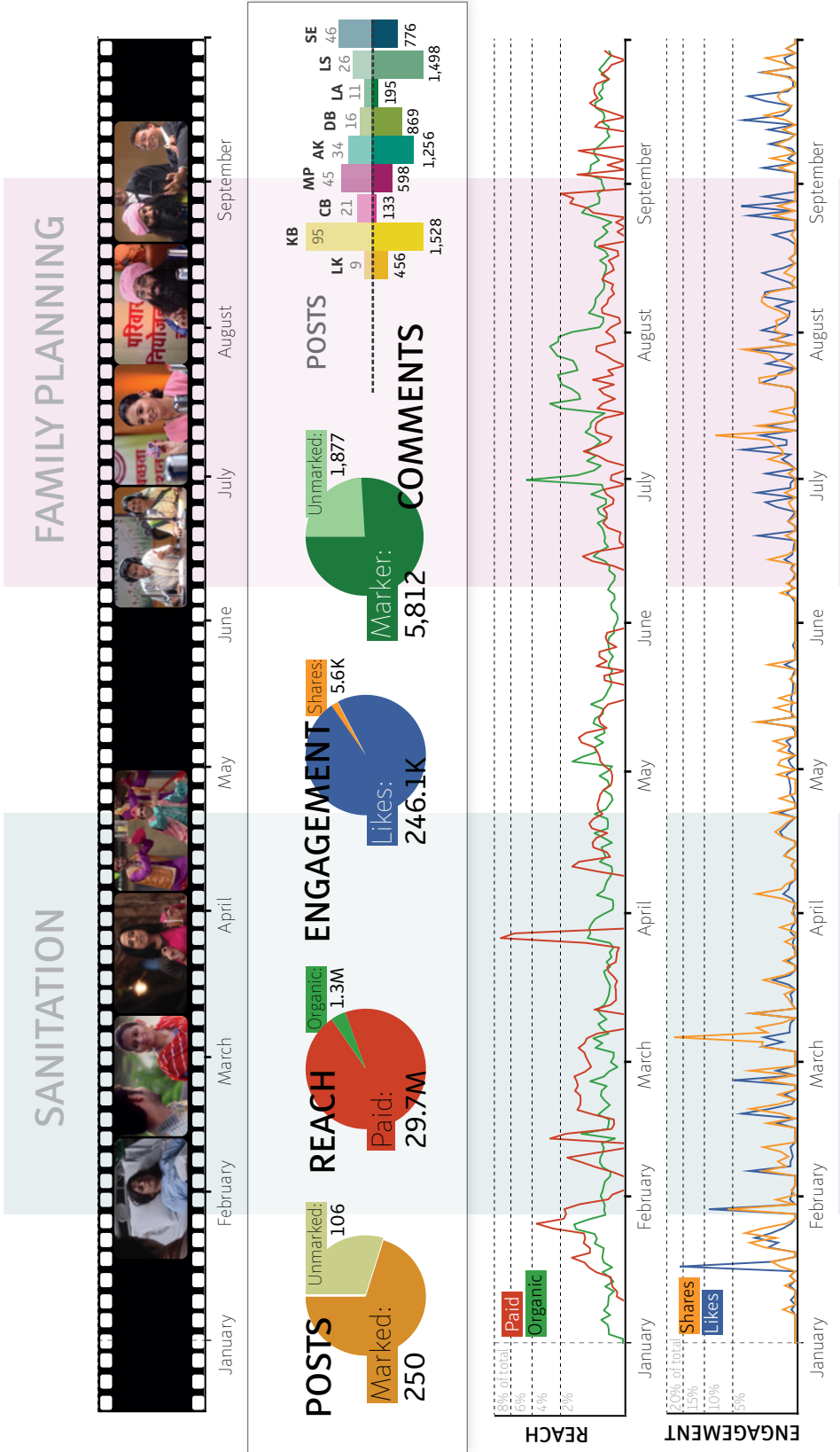
Data collection plan

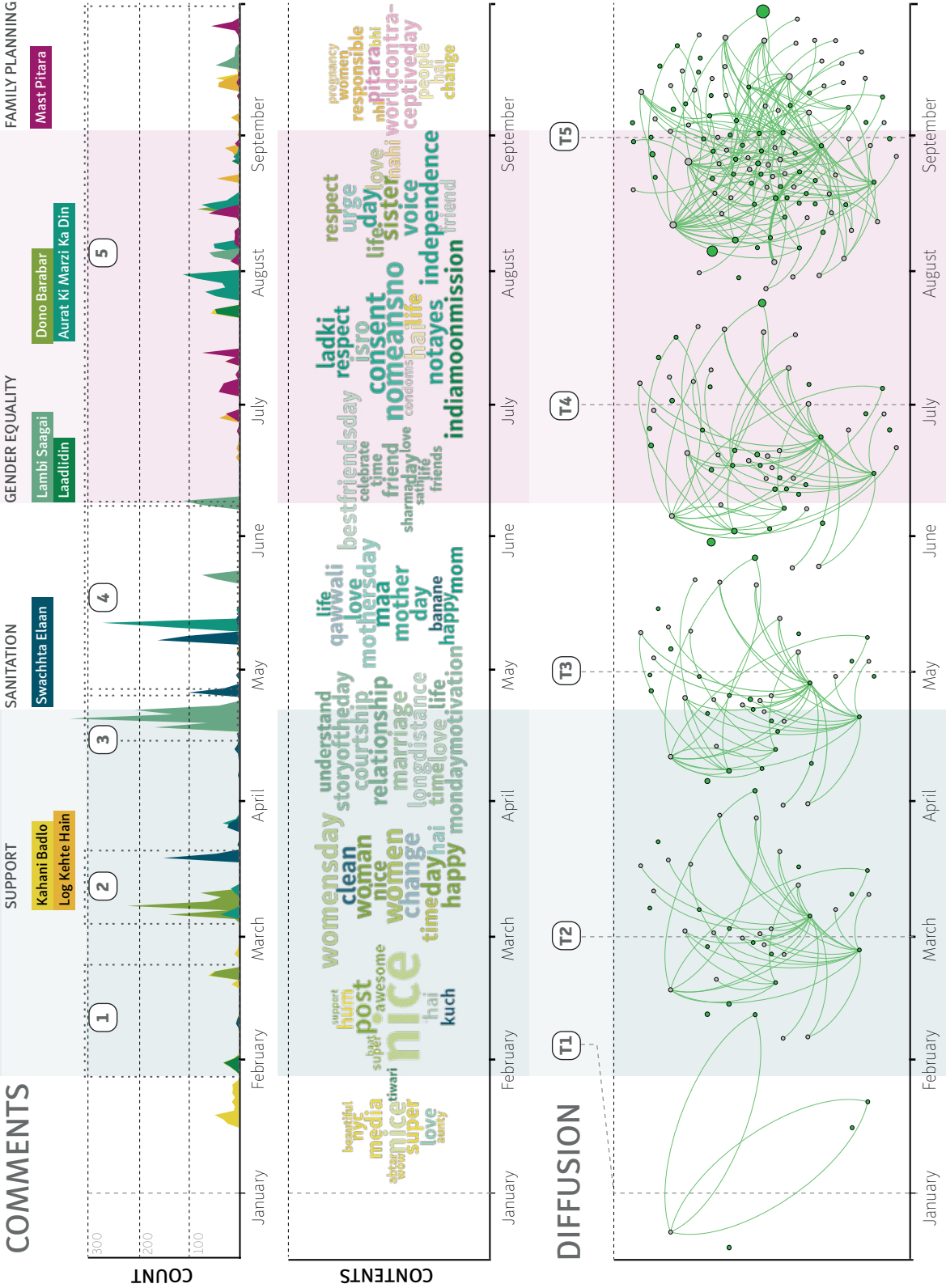
The research team retrieved and analyzed data from Google, Facebook, Twitter, and YouTube, using web interfaces or R-packages to access the services' APIs (Barbera et al., 2017; Kearney, 2017; Rieder, 2017), and R-packages to analyze the text of the social media posts and comments (De Queiroz et al., 2017).

Social media platforms (engagement). Each week, the research team searched Facebook, YouTube, Twitter, and Google for posts and comments that included markers, and retrieved all comments of these posts on MKBKSH's social media pages. The comments and posts were grouped by marker, looking at whether a comment included a marker or was posted in response to a post or comment that included a marker. Prior to further inspection, the texts were translated from Hindi (and other languages spoken in India) to English using the Google Natural Language API (Google Cloud, 2020).

For each marker, the number of reactions (likes, loves, favorites, etc.); shares (retweets); and comments were considered. This allowed the research team to see how engagement

Figure 19 ▾





► **Figure 19** *Overview of Marker Engagement Around MKVKSH3*

Note. Figure 19 can be read vertically to see interactions between the tv serial, Reach, Engagement, Comments on the Facebook page, and Diffusion of the markers across the web.

A key section is the upper stream graph in the Comments section (count), where five different phases of the season are highlighted. The stages are discussed in more depth in the corresponding paragraphs below this Figure. The other sections show:

Film Strip: Shows key moments in the tv serial. The pie charts below show the most important Facebook post and comment characteristics, while the bar chart shows the number of marker-related posts and comments.

Reach: Paid and organic reach over time, as a percentage of paid and organic reach throughout the season.

Comments: The stream graph shows the number of daily comments (longer than a single word) in response to marker-related posts. The word clouds show the most frequently used words in the Facebook comments for each month. The words' color and color intensity show which marker the word is associated with.

Diffusion: Five snapshots of link networks show the websites that were found when Googling for markers (green dots), and shows how these websites are connected in the first (connections between green dots) or second degree (connections through grey dots) through hyperlinks.

around each marker developed over the weeks. For each marker, word clouds of the 25 most common words were plotted, where size expressed word frequency and saturation word salience (tf*idf statistic; Ramos, 2003).

Through the reports and in subsequent calls, the research team and social media team tried to determine the factors that set successful posts (i.e., number of comments, number of shares, and contents of comments) apart from less successful posts (i.e., little response and superficial if any).

Post-broadcast, the research team used Gephi (Bastian et al., 2009) to create periodic semantic networks for the Facebook comments.

Google (diffusion). Each week, the research team connected to an Indian VPN and used an R-script to search Google for media content including markers. For the first 50 results (i.e., websites returned in response to a search query), the research team retrieved the embedded hyperlinks and backlinks (i.e.,

➔ <https://www.ahrefs.com>

web pages linking to any of the results) from the Ahrefs[➔] (2020) link report platform. This allowed the research team to track how markers may have inspired websites beyond *MKBKSH3*'s own platforms to create marker-related media content, as well as how markers may have diffused from one page to the other.

RESULTS

This section synthesizes the main findings from the data analyses. Below, the project is described chronologically, showing how the reports allowed the social media team to continuously improve social media content formats and strategies.

The first part of this section focuses on RQ1 (setting up story circles) and shows how audiences have responded to different social media content formats and strategies that aimed to stimulate meaningful media engagement such as social media comments. The research mainly focuses on engagement with social media content on Facebook, where *MKBKSH* has built up a lively community of 134,700 likes. Engagement on YouTube (52,600), Twitter (2,400 followers), Instagram (1,400 followers) was comparatively smaller.

The second part of this section focuses on RQ2 (enhancing visibility and spreading awareness) and shows responses to social media content formats and strategies to extend the reach of *MKBKSH* through the social networks of the fan community. It also describes how markers have spread across the Internet by analyzing the networks that underlie the websites and social media pages that have published marker-related media content.

Figure 19 shows an overview of marker-related social media engagement from January 1 to September 30, 2019.

RQ1: Setting up story circles

The research team and social media team were interested in finding social media content formats to stimulate meaningful media engagement around markers. In periodic analyses, the research team identified strategies and features of content formats associated with a strong audience response. The periodic reports considered the number of social media comments, shares, and likes; considered advertising patterns (paid reach), as well as organic traffic (direct visits, backlinks, viral exposure); and used word clouds to probe what the audiences were exactly saying about the markers.

1: First responses. The first success was booked with the *Laadlidin* marker during the first weekend of broadcast (see Figure 20). A scene in which a community celebrated the birthdays of two girls was featured in an image with the text ‘Indians up to 25 years of age are in search of a son, while 210 million girls are unsolicited. #Change! Give daughters equal status. Celebrate #*Laadlidin* as his birthday.’ The accompanying post wrote: ‘If you are a friend of your family, share your photo with us in the comments with #*Laadlidin*! Don’t forget to tag your friends!’ (MKBKSH, 2019d[↗]). The post received 11,000 likes, 139 shares, and 94 comments, of which nearly 25% included a family picture. The word clouds included words such as ‘girls’, ‘papa’ ‘mama’, ‘love’, ‘marry’, ‘sweet’, and ‘mom’, showing that the *Laadlidin* marker was successfully used to stimulate social media comments about girls and their families. Two days later, the social media team posted a collage of these pictures, and asked for more: ‘Join us with your #*Laadlidin*! Thanks for sharing! You too become a part of this team! Share your photo!’ (MKBKSH, 2019e[↗]).

↗ <https://www.facebook.com/mainkuchbhikar.saktihood/photos/a.1412528482334839/2205031796417833/>

↗ <https://www.facebook.com/mainkuchbhikar.saktihood/photos/a.1412528482334839/2206270206293992/>

↗ <https://www.facebook.com/mainkuchbhikar.saktihood/photos/a.1412528482334839/2217981378456208/?type=1&theater>

The social media team used this format for a second time on February 19 in a post tagged with *Kahani Badlo* and *Dono Barabar*. A picture of Dr. Sneha and her fiancée Arjun was posted, including the message: ‘Real men are not torturers, but empowers! If you know someone who has empowered and changed the story, send us his photos and tell the story! Tag them and don’t forget to use #*KahaniBadlo*!’ (MKBKSH, 2019f[↗]). The post received 110 comments, and 43 shares. However, the responses mostly concerned evaluative comments (‘nice’, ‘superb’, and ‘awesome’), meaning that the posts did hardly receive comments that directly addressed the gender equality issues associated with the marker.

2: Connecting the dots. Next, the social media team started experimenting with messages that asked audiences for a more specific response (i.e., rather ‘tell us what your sister means to you’, than ‘tag your sister’). They also tried turning posts into contests, rewarding audiences for their response, and connecting markers with international events and media content beyond the *MKBKSH* universe.

Photos, contests and markers beyond the *MKBKSH*’s universe. On March 4, a picture of a group of teenagers on a *MKBKSH3*

Figure 20 First LaadliDin Post Resulting in Comments About Family



Note. Comments are anonymized for privacy reasons.

➤ <https://www.facebook.com/mainkuchbhikarsaktihood/photos/a.1412528482334839/2225570431030636/?type=1&theater>

➤ <https://www.facebook.com/watch/?v=411030799471671>

➤ <https://www.facebook.com/mainkuchbhikarsaktihood/photos/a.1412528482334839/2227319750855704/?type=1&theater>

event was posted with the message: 'On the occasion of international women's day #womensday, we invite all of #balanceforbetter to meet together' (MKBKSH, 2019g⁷). The post received 3,000 likes, 72 shares, and 167 comments that mostly addressed the need for gender equality. On March 5, a statistic about inequality between men and women was shared and connected to *Dono Barabar*, yielding 411 likes, 38 shares, and 160 comments. On March 6, 2 days before International Women's Day, the social media team posted a recital of the poem 'Aurat' (Women) by Shabana Amzi, with images of Dr. Sneha edited in. The post was connected to the marker *Aurat Ki Marzi Ka Din* and read '#ContestAlert! Take this beautiful poem of Kaifi Azmi in your own words. Write 2 lines on the subject in the comments section. One lucky winner will get Rs. 250 cash' (MKBKSH, 2019h⁷). The post received 1,900 likes and 88 comments with poetry about women. One day later, a photo collage of people at public viewing sessions of MKBKSH3 was posted with the message: 'Who brings balance to your daily life? Share a photo with them along with #DonoBarabar' (MKBKSH, 2019i⁷). The post received 91 likes, was shared 52 times, and received 211 comments - including 100 photos of couples that consider themselves to be 'both equal'. On March 11, referring to *Aurat Ki Marzi Ka Din*, the social media team posted a visual with a quote about how women should have

➤ <https://www.facebook.com/mainkuchbhikar/saktihood/photos/a.1412528482334839/2229642850623394/?type=1&theater>

➤ <https://www.facebook.com/watch/?v=305907230095332>

the freedom to live at their own will (MKBKSH, 2019j[↗]). The post received 8,100 likes, 198 shares, and 111 comments, making it the best-performing post in terms of shares.

On March 18, the social media team posted a scene from that day's *MKBKSH* episode where Dr. Sneha and Panna—who are making house visits to raise awareness for sanitation and hygiene—encounter a citizen that does not want to change her old ways. The post asks how the followers would react in Sneha's place (MKBKSH, 2019k[↗]). This post received 1,500 shares and 235 comments detailing reasons why it is important to keep India clean.

The semantic network for March (see Figure 21) shows that the posts received comments that specifically addressed gender equality and hygiene issues. Furthermore, the network shows that the comments touched upon various aspects of gender equality (e.g., relationship + love + child + promise + marriage + sneha; reason + trust; wife + child + spend) and hygiene (e.g., *SwachhtaElaan* + change + clean + india; toilet + answer). *Aurat Ki Marzi Ka Din* and *Kahani Badlo* stand rather isolated, mostly connected with peoples' names. This indicates that marker-related posts are more capable of stimulating meaningful engagement, especially when the marker is also coined in the TV series.

3: Syncing tv and social media. Building on the reports, the social media team continued posting contests, asking for specific responses, and connecting markers with public events and media content beyond *MKBKSH*. The *Swachhta Elaan* post had showed the potential of more carefully aligning posts with the dramatic arc of the serial. By mid-April, the TV serial had been building up the *Lambi Sagai* story around Panna and Sameer. Around the weekend in which this storyline came to a dramatic resolution—when Sameer promised to marry Panna—a series of *Lambi Sagai* posts contributed to a second sustained wave of comments.

On April 17, 18, and 19—the days before the last two episodes of the first part of the season were broadcasted—the social media team posted the following:

- (a) a dictionary definition of *Lambi Sagai* (MKBKSH, 2019l[↗]), asking the audience for their perspectives (233 likes, 185 comments, and 5 shares);

➤ <https://www.facebook.com/mainkuchbhikar/saktihood/photos/a.1412528482334839/2251876085066737/?type=1&theater>

- b) a video clip from episode 9 broadcast on February 23 where Sameer and Panna meet on a romantic location and talk about *Lambi Sagai* (MKBKSH, 2019m↗), with the message: 'Sameer chose *Lambi Sagai*. If you were in his place then what path would you choose and why?' (614 likes, 248 comments, and 25 shares); and
- (c) a video clip from last weekend's episode where Buaji explains *Lambi Sagai* to villagers, with the message 'Who is your *Lambi Sagai* partner? Tag them and share your story' (528 likes, 296 comments, and 12 shares; (MKBKSH, 2019n↗).

↗ <https://www.facebook.com/watch/?v=831846563844792>

↗ <https://www.facebook.com/watch/?v=447215609181605>

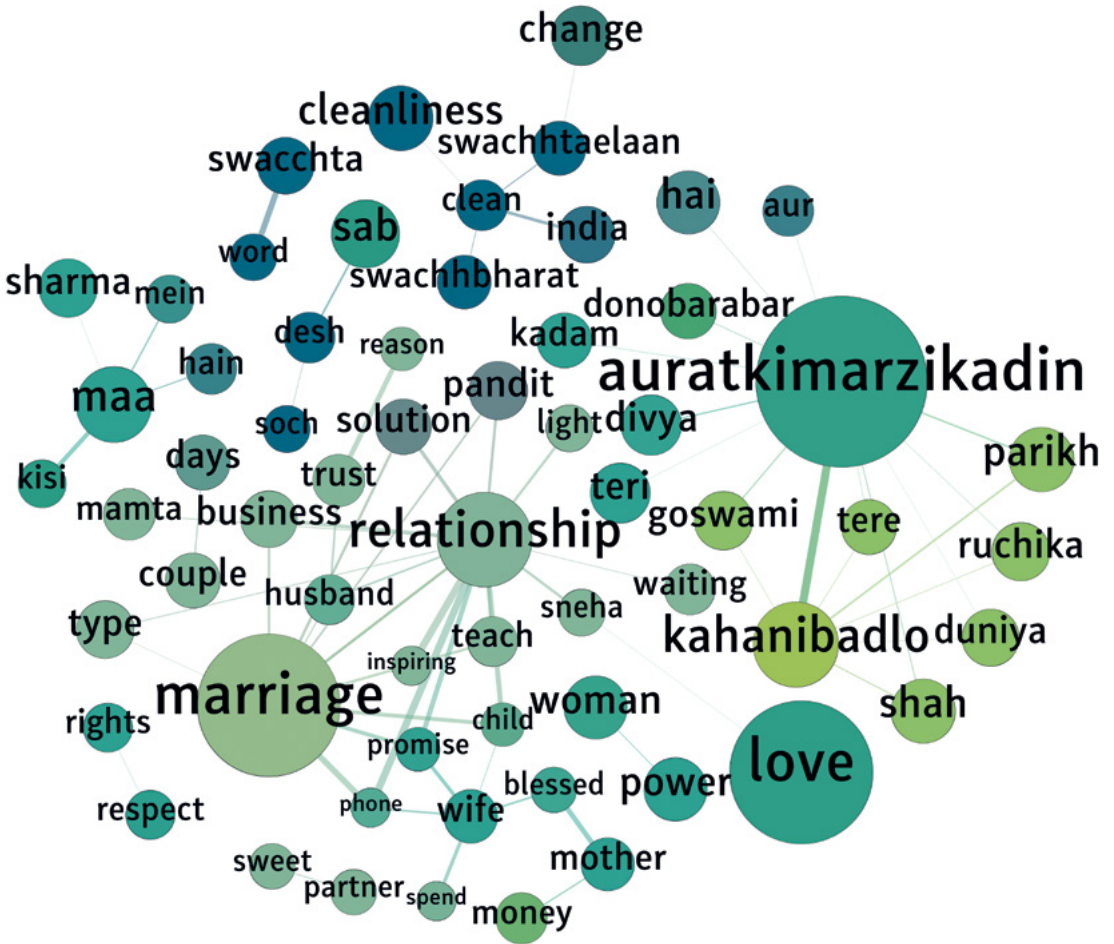
↗ https://www.facebook.com/mainkuchbhikar_saktihood/photos/a.1412528482334839/2255376888049990/?type=1&theater

During the weekend, Sameer promised to marry Panna on television.

The following Monday, the social media team posted a collage of pictures with Panna and Sameer and Dr. Sneha and Arjun, with the message: 'Every pair has a story of their own. Share a photo with a partner, and tell your story in the comments! Don't forget to tag them!' (MKBKSH, 2019o↗). This post received a relatively large number of likes (2,300), possibly because of the post's personal appeal. It received 30 shares and 245 comments, mostly including pictures and short love stories about how couples met and are still happily together. Meanwhile, the social media team shared the same posts as Instagram stories, asking the audiences why they would choose for *Lambi Sagai*, reposting 10 of the responses as a 'sticky story' on top of the Instagram page.

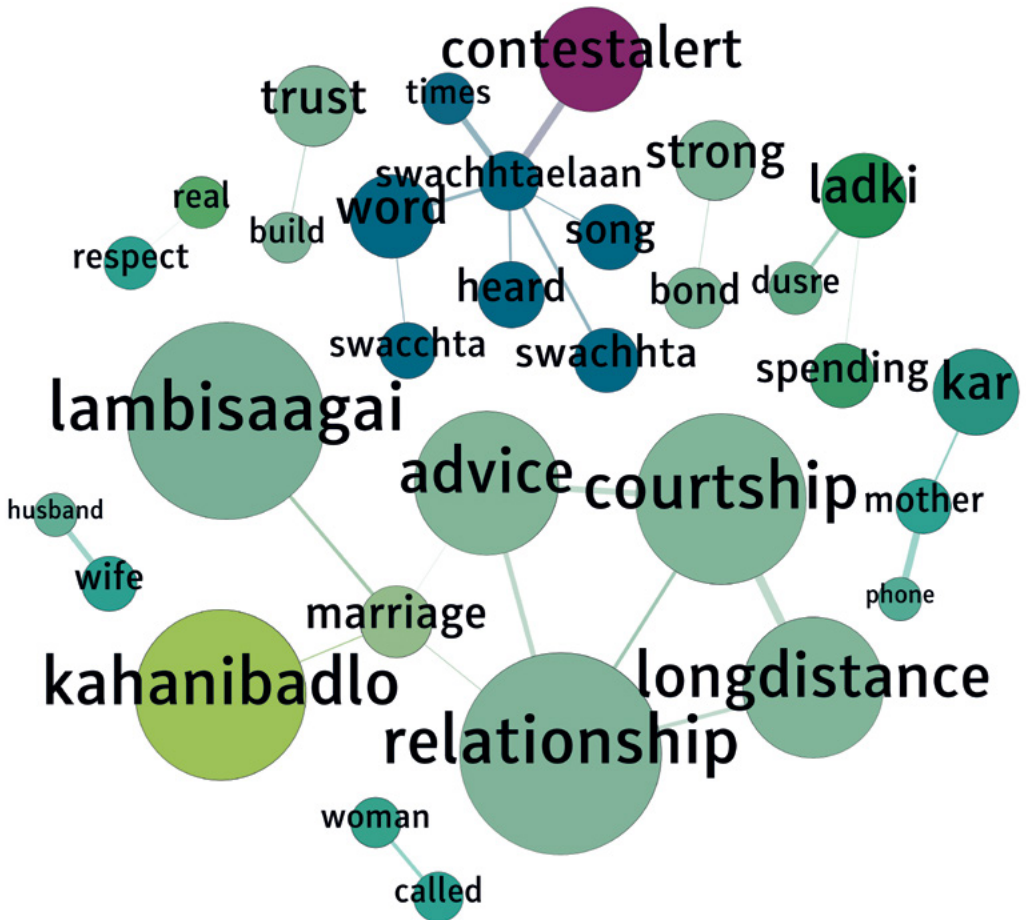
During this series of posts, Figure 22 shows that the comments were clearly discussing the meaning of relationships in terms of the associations made in the *Lambi Sagai* scenes on tv (e.g., *Lambi Sagai* + marriage; marriage + relationship; relationship + longdistance + advice; build + trust; strong + bond).

Shortly after the *Lambi Sagai* success, on April 26, the social media team posted a link to a YouTube video where Munna and Buaji perform the Qawwali song¹³, an Indian pop classic with lyrics adapted to *Swachhta Elaan* and drawn from episode 18 broadcast on March 24. On Facebook, the audience is asked how often they hear the word 'cleanliness' in the song. The words associated with *Swachhta Elaan* illustrate how the question received rather similar responses (heard + song + word + times), likely as a logical consequence of the question asked in the post (see Figure 22). Notably, the video resulted in 7,700 views, 207 comments, and 414 likes vs. 9 dislikes on YouTube.

Figure 21 *МКВКШЗ Semantic Network in March 2019*

Note. This semantic network provides insight into the topics that are raised in response to marker-related posts. Each node represents a word, and its size is based on how often the word occurred throughout all the comments. The network only includes words that occurred frequently (more than 13 times, which is the average frequency plus 1.5 times its SD; calculated after outliers were excluded). Two words are connected if they often appeared in the same comment, and the strength of the connections is based on how often the words co-occurred (the more often the thicker). The colors show in response to which markers the words were most frequently used (e.g., *Kahani Badlo* and *Dono Barabar* are green instead of yellow, indicating that the phrases were often used in response to *Aurat Ki Marzi Ka Din*). Note that different notations of markers have been recoded into single strings (i.e., 'auratkimarzikadin', 'lambisagai', etc.)

Figure 22 MKBKSH3 Semantic Network in April 2019



Note. This semantic network provides insight into the topics that are raised in response to marker-related posts. Each node represents a word, and its size is based on how often the word occurred throughout all the comments. The network only includes words that occurred frequently (more than 17 times, which is the average frequency plus 1.5 times its SD; calculated after outliers were excluded). Two words are connected if they often appeared in the same comment, and the strength of the connections is based on how often the words co-occurred (the more often the thicker). The colors show in response to which markers the words were most frequently used (e.g., *Kahani Badlo* and *Dono Barabar* are green instead of yellow, indicating that the phrases were often used in response to *Aurat Ki Marzi Ka Din*). Note that different notations of markers have been recoded into single strings (i.e., 'auratkimarzikadin', 'lambisagai', etc.)

4: **Sustaining momentum.** The social media team continued posting on the digital platforms during the break from April 22 and June 8. During the break, engagement peaked twice for *Swachhta Elaan*, once for *Aurat Ki Marzi Ka Din*, and twice for *Lambi Sagai*.

The previously mentioned *Qawwali* post resulted in the first *Swachhta Elaan* peak during the transitional break. On May 8, the social media posted the *Qawwali* song again, cutting it off after the first sentence to ask the audience to finish the lyrics with their own lines (MKBKSH, 2019p↗). This resulted in 436 likes and 284 comments, mostly including poetry about a clean India.

On Mother's Day (May 12), the social media team adapted *Aurat Ki Marzi Ka Din* to *Mummy Ki Marzi Ka Din* and posted a photo collage of mothers with the message 'Your bond with your Mother is very special. Tell us one 'extra special' thing you're doing for her this Mother's day?' (MKBKSH, 2019q↗), receiving 3,000 likes, 35 shares, and 304 comments that mostly were odes to mothers. On the same day, the social media team also posted a scene from the TV serial, where a male citizen of Prattapur recites a poem about mothers and wives. The post also asked the audience to share poems for their mothers (MKBKSH, 2019r↗), resulting in 445 likes and 131 comments.

On 16 May, the social media team launched their *Lambi Sagai* Facebook Frame—a digital picture frame that Facebook users could add onto their profile pictures with a simple click. The message read 'Share your *Lambi Sagai* moments on your profile picture using our new Facebook Frame: [link](MKBKSH, 2019a↗). Share a screenshot in the comments maybe? We would love to see.' (MKBKSH, 2019s↗) The post received 130 likes, 18 shares, and 128 comments, mostly with screenshots of the audiences' newly-framed profile pictures (see Figure 23).

May's social media content formats were light and playful, and aimed at keeping the audience engaged. This is reflected in the semantic network (see Figure 24), where word associations around *Aurat Ki Marzi Ka Din* revolve around mother's day, and responses to *Lambi Sagai* touched upon different aspects of the concept (time + speak + truth + lovely + spend; couple + feeling + talking; bond + children + understand; child and situation). Responses to the *Qawwali* song mostly concerned variations of the lyrics, touching upon many different aspects of hygienic sanitation (*desh* [country] + *hame* [us] +

↗ <https://www.facebook.com/watch/?v=1547669345367939>

↗ <https://www.facebook.com/mainkuchbhikarsaktihood/photos/a.1412528482334839/2268397416747937/?type=1&theater>

↗ <https://www.facebook.com/watch/?v=1042911802564215>

↗ https://www.facebook.com/profilepicframes/?selected_overlay_id=468502190622614

↗ <https://www.facebook.com/mainkuchbhikarsaktihood/photos/a.1412528482334839/2271935746394104/?type=1&theater>

Figure 23 The Lambi Sagai Frame



Note. The *Lambi Sagai* frame on a picture with Arjun and Dr. Sneha (left), and several comments with screenshots of the newly adopted frames on each user's profile picture. Pictures of users have been anonymized.

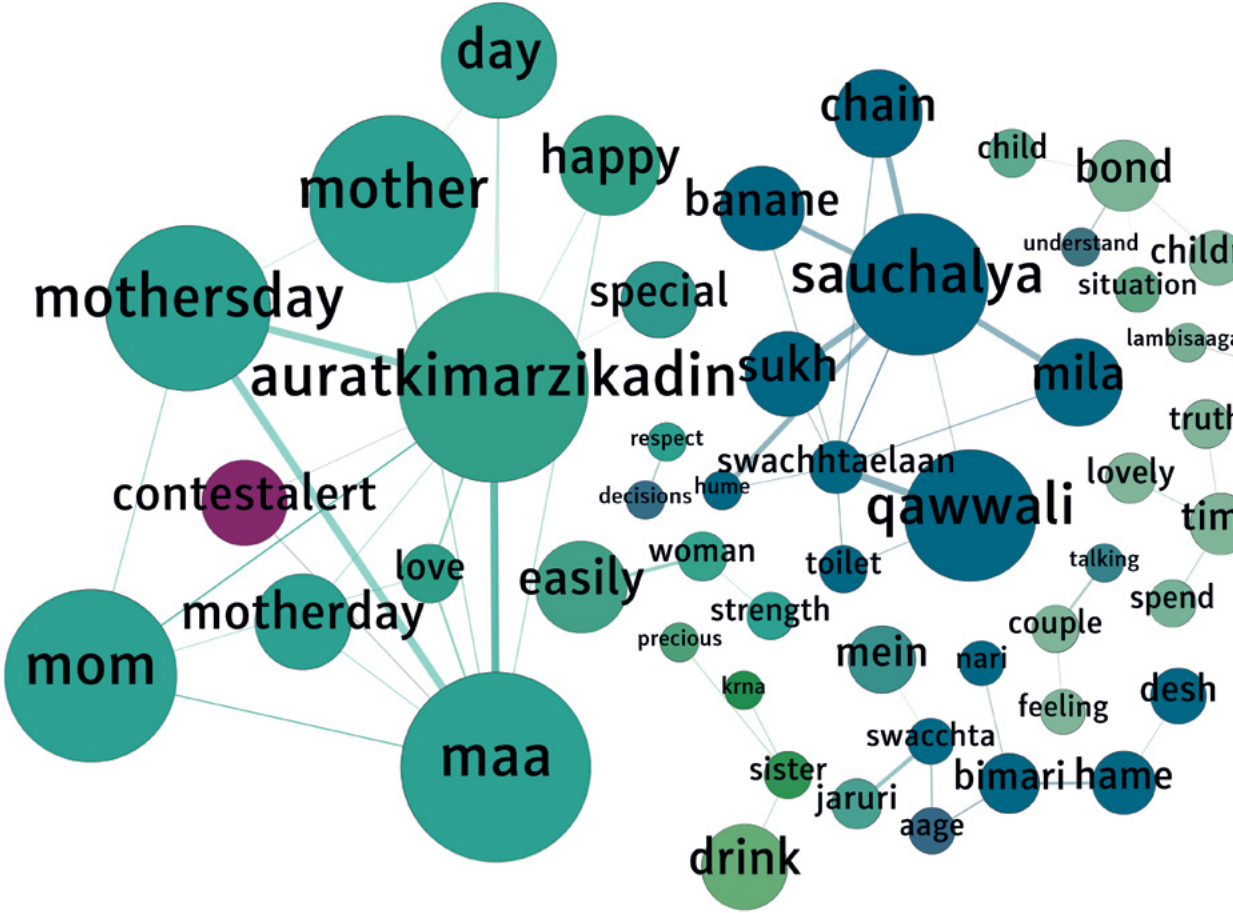
bimari [disease]; *bimari* + *aage* [ahead] + *swachhta* [cleanliness] + *jaruri* [must]. Furthermore, the semantic network shows that, in the context of the Qawwali song, audiences associate the word toilet with positive emotions (*saachalya* [toilet] + *sukh* [happiness] + *chain* [ease] + *hume* [us] + *banane* [make]).

On June 8, the second part of *MKBKSH3* started. The social media team posted a photo collage with pictures of Dr. Sneha and Arjun, and Panna and Sameer with the caption ‘Who are you celebrating best friend’s day with?’ (MKBKSH, 2019b⁷), resulting in 201 likes, 13 shares, and 241 comments about friendship.

↗ <https://www.facebook.com/mainkuchbhikarsaktihoon/photos/a.1412528482334839/2288179911436354/?type=3&theater>

5: Addressing taboos. After the break, the series seem to have lost some of its online momentum. Although the social media team’s posts tapped into the TV serial—with video clips of Panna and her *Mast Pitara*, Condom Baba quotes, and funny conversations between Munna and Buaji—the audience seemed hesitant to respond. As contraceptives are still considered a taboo in many Indian communities, audiences might have felt uncomfortable publicly sharing their views on the topic.

Figure 24 Semantic Network for May



Note. This semantic network provides insight into the topics that are raised in response to marker-related posts. Each node represents a word, and its size is based on how often the word occurred throughout all the comments. The network only includes words that occurred frequently (more than 8 times, which is the average frequency plus 1.5 times its sd; calculated after outliers were excluded). Two words are connected if they often appeared in the same comment, and the strength of the connections is based on how often the words co-occurred (the more often the thicker). The colors show in response to which markers the words were most frequently used (e.g., *Kahani Badlo* and *Dono Barabar* are green instead of yellow, indicating that the phrases were often used in response to *Aurat Ki Marzi Ka Din*). Note that different notations of markers have been recoded into single strings (i.e., ‘*auratkimarzikadin*’, ‘*lambisagai*’, etc.)

Quizzes and puzzles. Searching to break the silence around contraceptives, a series of quizzes and puzzles involving prize money were posted from late June into early July. These posts received a substantial number of comments but did not manage to stimulate meaningful media engagement: most comments were merely responded to close-ended questions. A word finder was posted on June 25 with the message 'Spot the word 'CONDOM' and tell us how many times can you see it in the comments below' (MKBKSH, 2019t[↗]), receiving 958 likes, 1 share, and 50 comments such as '2 times', '4', and '6'. On July 4, an animation of objects flying out of a Mast Pitara was shared and audiences were asked to count the number of contraceptives (MKBKSH, 2019v[↗]), receiving 99 likes and 120 comments. On August 13, audiences were asked to spot contraceptives in a drawing of a living room (MKBKSH, 2019ae[↗]), receiving 107 likes and 101 comments. Both posts received similar, descriptive comments such as 'condoms', 'pills', and 'copper-t'.

By mid-July, the social media team started combining posts focused on family planning with posts focused on gender equality. Although responses were modest, the daily stream of comments was more consistent compared to the prior 6-month period, indicating that the social media team stimulated a continuous sense of engagement among the community.

Indian Space Research Organization: an inspiration. In mid-July, the Indian Space Research Organization launched the Chandrayaan-2 rocket on its way to the moon—a highly prolific event in India. On July 22, the social media team posted an image of the two women who led the project, Ritu Karidhal and M. Vanitha, and connected the event to the *Laadlidi*n marker with the text: "Let's celebrate this historical moment when women lead India into the frontiers of space. Tag and tell us of girls and women who are special to you and their #Laadlidi achievements that make you proud" (MKBKSH, 2019aa[↗]). The post received 594 likes, 43 shares, and 113 comments, sparking social media comments about how these female scientists were 'a true inspiration'.

Memes. Meanwhile, the social media team tried to break the ice around contraceptives through humor by posting *memes*

↗ <https://www.facebook.com/mainkuchbhikar.saktihood/photos/p.2243463405908005/2243463405908005/?type=1&theater>

↗ <https://www.facebook.com/watch/?v=694251634338225>

↗ <https://www.facebook.com/mainkuchbhikar.saktihood/photos/a.1412528482334839/2334255910162087/?type=1&theater>

↗ <https://www.facebook.com/mainkuchbhikar.saktihood/photos/a.1412528482334839/2319546428299702/?type=1&theater>

Figure 25 *Lambi Sagai Memes*

Note. From left to right: (a) an impatient sigh by Arjun, who is waiting for Dr. Sneha to marry him for three seasons (*'lambi'* means long-term); (b) Sameer and his mother Vinodi, who does not want him to marry Panna; and (c) Sneha and Arjun (*'jaldi shaadi'* means early marriage, with the text referring to the song 'Call me, maybe' by Carly Rae Jepsen).

often featuring Buaji and Munna or Condom Baba with a funny quote or caption. While two memes in particular received more than 1,000 likes (MKBKSH, 2019u, 2019w[↗]), none managed to spark more meaningful media engagement, possibly because sex and condoms are considered too private to discuss in a public forum such as Facebook.

In September, the social media team posted another series of memes, this time for *Lambi Sagai*. One of these memes received a substantial number of comments (on the right in Figure 25). The element that set this post apart, was the accompanying message asking for specific audience responses: '*Lambi Sagai* or *Jaldi Shaadi*. What's your pick? Share your funny #*LambiSagai* moments with us.' (MKBKSH, 2019ah[↗]) The post received 92 likes, 1 share, and 75 comments, which were mostly short anecdotes about how couples met, engaged, or married each other.

Dance challenge. On World Population Day (July 11), the social media team posted a music video of the rap song *Condom Bole*. The song was written for MKBKSH3 and would later make an appearance in the TV serial on August 11 (MKBKSH, 2019y[↗]). The video was shared with the message: 'Promise to use condoms and keep up with your partner for double protection and fun! Listen and share this song together too!'

↗ <https://www.facebook.com/mainkuchbhikar.saktihood/photos/a.1414169358837418/2306205539633791/?type=3&theater> and <https://www.facebook.com/watch/?v=694251634338225>

↗ <https://www.facebook.com/mainkuchbhikar.saktihood/photos/a.1412528482334839/2358244234429921/?type=3&theater>

↗ <https://www.facebook.com/watch/?v=718326538603594>

Figure 26 The Condom Bole Dance Challenge That Resulted in Seven Creative Videos ↗



↗ <https://www.instagram.com/stories/highlights/18056571328184497/>

↗ <https://www.facebook.com/watch?v=FFjSm8JboPw&feature=youtu.be>

↗ <https://www.facebook.com/watch/?v=362883467708096>

↗ <https://www.instagram.com/stories/highlights/18056571328184497/>

resulting in 346 likes, 32 comments, and 134 shares. On YouTube (MKBKSH, 2019x ↗), the video received 216 comments.

In subsequent posts, on Instagram, YouTube, and TikTok, the social media team asked audiences to share their own music videos for the *Condom Bole* song (MKBKSH, 2019z ↗). The social media team received seven videos (Figure 26) that were later shared on Facebook and Instagram (MKBKSH, 2019c ↗).

Overall, organic reach peaked for about 2 weeks after the *Condom Bole* video clip was shared. This could be explained by various news websites posting about *Condom Bole* at this time (see RQ2).

On World Contraceptive day (September 26), the *Condom Bole* video was reposted, together with the seven videos that were posted as Instagram stories earlier. This time, the posts aimed to repeat the Qawwali format and read: 'This World Contraceptive Day, complete our condom rap with your own lyrics and take your stand on male involvement in family planning. Don't forget to use #MastPitara. Three of the best entries will win a surprise.' The post received 124 likes, 1 share, and 60 comments, leaving its mark on the word cloud for September ('mastpitara' and 'worldcontraceptiveday').

Let myths challenge themselves. By late July, the social media team started posting provocative quotes using the

marker *Log Kehte Hain* ('People say that...') to address myths and norms that underlie sexual health issues and gender inequality, often cross-tagging the posts with *Aurat Ki Marzi Ka Din* and *Kahani Badlo*. On July 25, the social media team posted the quote 'The girl's NO hides a YES', asking audiences to share their opinions in the comments (MKBKSH, 2019ab↗). The post received 167 likes, 1 share, and 110 comments, mostly from users disagreeing with the statement. Three days later, following the same format, the message 'Girls who drink alcohol are easily available' (MKBKSH, 2019ac↗) was shared, receiving 754 likes, 112 comments, and 4 shares. Again, the majority of commenters shared their disagreement. On July 29, the social media team posted a video of women sharing their views on consent (MKBKSH, 2019ad↗), with the message: 'Because 'no' only means 'no'. Whether it is your 'friend', 'girl-friend' or 'wife' who says it. Think of "no" as "no", "yes?!". The post received 200 likes and 104 comments, this time mostly agreeing with the post's message.

On Independence Day in India (August 13), the social media team released an *Aurat Ki Marzi Ka Din* frame: 'Use the *Aurat Ki Marzi* Facebook Frame and share a screenshot in the comment section along with #*AuratKiMarzi*. We would also love to read about what is your 'MARZI' this Independence Day' (MKBKSH, 2019af↗). This post received 1,000 likes, 2 shares, and 116 comments, mostly including screenshots of newly framed profile pictures, as well as *marzi* (wishes) for more equality in India.

One day later, the social media team posted a *Dono Barabar* contest: 'Tell us about your special bond with your brother/sister, along with a photo in the comments section below. Two lucky brother-sister duos will make a chance to win watches.' (MKBKSH, 2019ag↗) This post received 446 likes, 2 shares, and 143 comments, most of which included pictures of brothers and sisters with a short description of what they mean to each other.

This modest number of responses to *Mast Pitara* posts is reflected in the word clouds for June, July, August, and September in Figure 27—hardly including any words associated with *Mast Pitara*. Meanwhile, the series of *Lambi Sagai*, *Aurat Ki Marzi Ka Din*, and *Log Kehte Hain* posts received comments about friendship (friend, life love); consent (no-meansno, not-a-yes, consent, *nahi* [no]); equality between

↗ <https://www.facebook.com/mainkuchbhikar.saktihood/photos/a.1414169358837418/2321594558094889/?type=3&theater>

↗ <https://www.facebook.com/mainkuchbhikar.saktihood/photos/a.1414169358837418/2323613397893005/?type=1&theater>

↗ <https://www.facebook.com/watch/?v=500634044075449>

↗ <https://www.facebook.com/mainkuchbhikar.saktihood/photos/a.1412528482334839/2334230776831267/?type=1&theater>

↗ <https://www.facebook.com/mainkuchbhikar.saktihood/photos/a.1412528482334839/2334890593431952/?type=1&theater>

brothers and sisters (sister, respect, and love); female rights (independence, urge, and voice); and gender equality (women, responsible, pregnancy, and change).

The wide variety of words associated with *Swachhta Eaan*, *Lambi Sagai*, *Aurat Ki Marzi Ka Din*, and *Laadlidin* in the semantic network for June, July, August, and September (see Figure 27) illustrates how the social media comments touched upon various aspects of gender equality and sanitation issues. Words associated with *Mast Pitara* were most prominent from June to September and were more 'descriptive' due to challenges where audiences were asked to count and find words and objects.

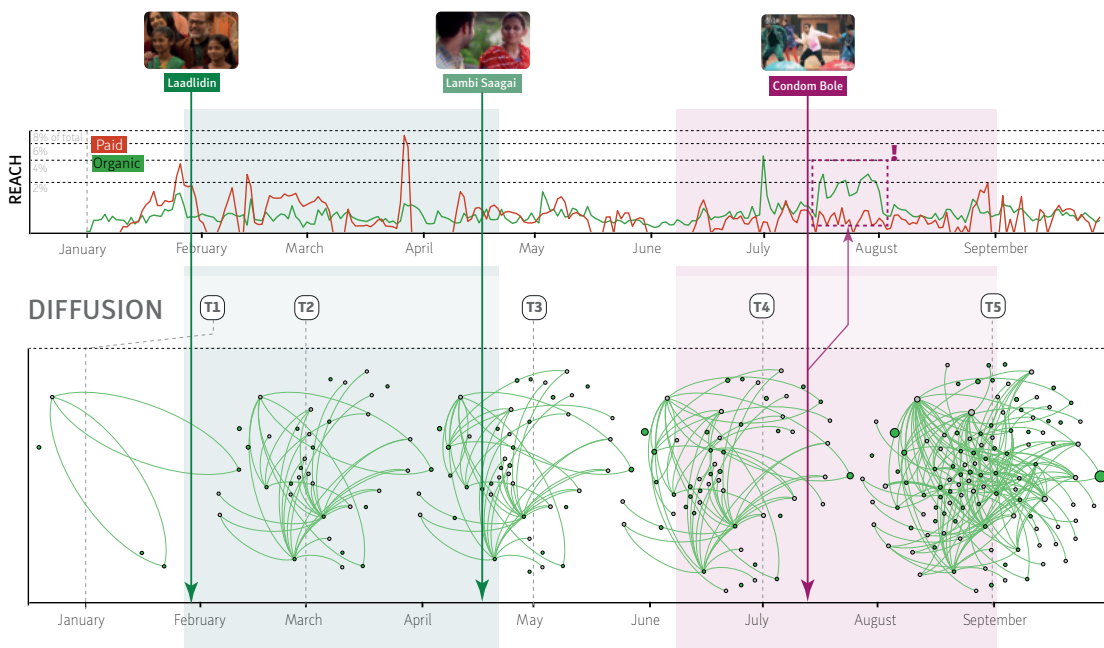
RQ2: Enhancing visibility

In addition to stimulating meaningful media engagement, the research team and social media team were interested in social media content formats and strategies to enhance the visibility of marker-related media engagement in the social networks of the fan communities. The research project identified features of social media content formats and strategies that received many likes and shares and tracked which websites and social media pages published marker-related media content beyond *MKBKSH*'s own channels. The research team and social media team traced back the strategies which contributed to new marker-related media content appearing in other places on the Internet.

On digital platforms. Throughout the project, the reports identified the social media content formats that audiences primarily liked, shared, and responded to, which was similar to how the successful social media content formats and strategies for RQ1 were identified. Many posts focused on stimulating social media comments, while some also focused on inviting audiences to actively spread awareness around markers in their social networks. The analysis for RQ1 shows that visuals with inspirational quotes, a personal note, shocking stats, or provoking myths are likely to receive likes and shares, while the Facebook Frames allowed audiences to endorse gender equality in ways that are also highly visible to their social networks.

Furthermore, the release of the *Condom Bole* video on World Population Day seems to have kickstarted an increase

Figure 28 Periodic Plots of the Diffusion Network



Note. Press releases were sent for *Laadlidin*, *Lambi Saagai* and *Condom Bole*, each providing an impulse to the network. The relatively large number of news outlets that have picked up *Condom Bole*, may explain the periodic increase in organic reach of the Facebook page.

in organic reach that was sustained for more than 2 weeks—likely caused by an increase in traffic from audiences that had read about *Condom Bole* in other places on the Internet (e.g., Twitter, YouTube, Instagram, and news websites). Despite the elevated reach, the *Condom Bole* story circle did not gain momentum in terms of social media comments.

Beyond MKBKSH's website and social media pages. The social media team also aimed to spread awareness around markers to places beyond MKBKSH's own website and social media pages. This research followed potential diffusion patterns by analyzing how the websites are linked to each other in the first and second degree.

The five snapshots located at the bottom of Figure 28 show how the network of marker-related pages developed over

time, telling a story of how markers mostly spread through press releases rather than social media challenges.

In February, shortly after introducing the first gender equality markers, only the markers that the communications team sent press releases for were picked up by other online media. The communications team continued publishing press releases for the markers that were introduced, resulting in two waves of marker-related media content: the first wave came in April, directly after sending press releases about the *Lambi Sagai* scenes and story circles (third network in Figure 28); the second wave followed after releasing *Condom Bole* in early July, which was picked up by the largest number of news websites and blogs. Meanwhile, only a few public social media pages and profiles were found. It is important to point out that the research team only tracked diffusion of markers on publicly available social media pages, and was not able to track any media content that occurred on private social media pages and profiles.

By the end of September, the highest number of web pages with marker-related media content within the network were found on *MKBKSH*'s own Facebook page and on the news aggregation website *dailyhunt.in*. Within the network, social media platforms such as Facebook, Instagram, Twitter, and YouTube connect *MKBKSH*'s website and social media accounts to a variety of regional and national news websites (e.g., *sarita.in*, *asianage.com*, and *telanganatoday.com*) as well as online magazines and blogs about Indian cinema and television (e.g., *indiantelevision.com*, *indiatvnews.com*, and *indiantvfanclub.wordpress.com*). However, the majority of the web pages that include marker-related media content are not connected the cluster with the major social media platforms.

Figure 29 shows the state of the network on October 1, 2019.

The low number of green links between dots (i.e., links referring to marker-related content) in Figure 29 indicates that the markers did not spread beyond the containing websites and social media platforms through narrative engagement. Instead, e-mails and connections with press agencies helped to get the press releases published on a variety of websites.

DISCUSSION

This project primarily intended to explore how markers could be used to connect an EE TV serial with social media posts to stimulate meaningful media engagement around issues such as family planning, gender equality, and sanitation (RQ1). In addition, the project aimed to enhance the visibility of *MKBKSH*-related media engagement through the social networks of the audiences (RQ2).

The results indicate that, on several occasions, the social media team succeeded in stimulating an exchange of messages around a wide variety of ideas, beliefs, and practices associated with markers. Furthermore, the results show that some of the markers have diffused to news sites and cinema magazines, while diffusion through and across social media platforms remained limited.

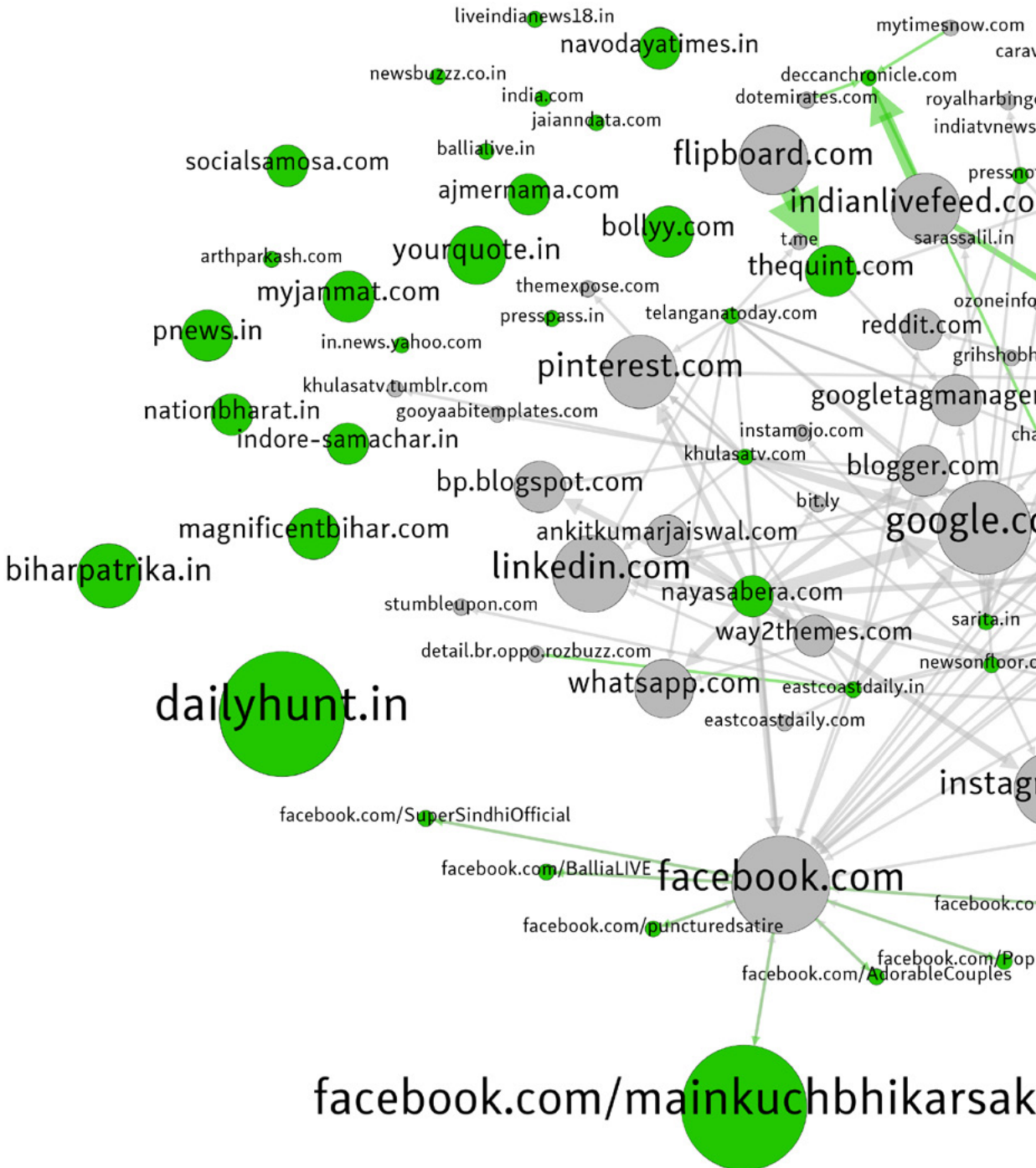
Furthermore, this research project was able to identify features of successful social media content formats and strategies. The findings show that the concept of *story circles*—“a set of agents, processes and infrastructural conditions that enable narratives to consistently emerge and be acknowledged through exchange and mutual interaction” (Clark et al., 2015, p. 924)—provides a useful conceptual model to set up ideal conditions for *narrative exchange*, and enhancing its visibility on, across, and beyond *MKBKSH* social media pages. This section discusses the results along four categories that represent the conditions required for narrative exchange (Clark et al., 2015):

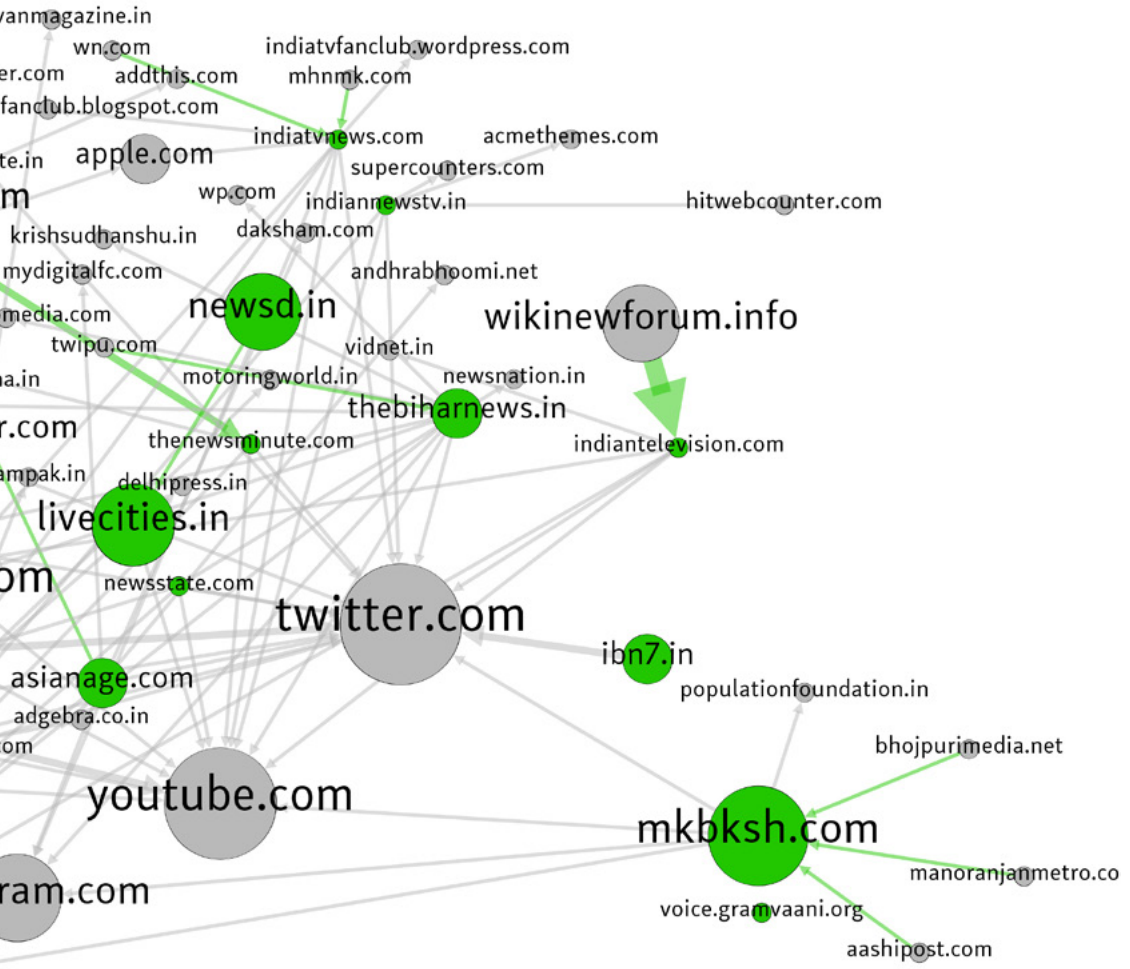
1. Social and technical *infrastructures* allowing for actual exchange;
2. The availability of *narratives*;
3. The ways in which story circle *agents* start and sustain media engagement; and
4. The social media content formats to structure and focus narrative exchange *processes*.

(1) Infrastructure

Story circles require infrastructures for narratives to continuously emerge and be acknowledged. Without the infrastructure, messages and impulses cannot travel between different groups of individuals. The research project specifically focused on the Internet, where technical and social infrastructures for

Figure 29 Network of (Websites That Are Connected to) Websites That Have Published Media Content prior to October 1, 2019





m/HyderabadDeccanNews

FoundIndia

tihoon

Note. The color of the dots expresses whether the website published marker-related media content (green) or is only linked to marker-related media content (grey). Dot size expresses the number of pages with marker-related or linked unique web pages published on the website. The lines represent links, and line thickness expresses the number of unique links between two websites. The color of the links signifies whether a website is linking to marker-related media content and counts as an 'entry point' (green), or linking (away) from marker-related media content.

widespread media engagement are largely in place. The social media content formats and strategies aimed to enhance the visibility of *MKBKSH* and the markers on three levels:

- (a) on the same social media platforms,
- (b) across different social media platforms, and
- (c) beyond social media platforms.

(a) **On the same social media platforms.** On Facebook, an important strategy was to expand exposure by enabling audiences to like, share, comment, and tag their friends in posts. These activities are known to be aggregated in Facebook news feeds or appear as Facebook notifications, thereby offering entry points to the *MKBKSH* world through the fans' social networks. Posts with close-ended slogans, quotes, and statistics served the purpose of keeping audiences engaged and expanding exposure through likes and shares.

Facebook Frames were introduced to enhance *MKBKSH*'s visibility through the profile pictures of Facebook users. However, tracking the uptake of the frames in Facebook Frame Studio appeared to be problematic. Previously, the owner of a Facebook page could see the number of Facebook users currently using a frame (Sullivan, 2017). At the time of broadcast, Facebook was gradually phasing out Frame Studio, moving much of its functionality to the newer VR Effects framework. The new framework does not allow for following how many Facebook users are using the frame.

In the comments, hundreds of users have shared screenshots as "evidence" that they were using the *Lambi Sagai* or *Aurat Ki Marzi Ka Din* frames. Assuming not all users that used the frame also posted evidence, actual adoption is likely to be higher.

(b) **Across different social media platforms.** Through the *Condom Bole* challenge, *MKBKSH* tried to stimulate marker-related engagement across different social media platforms. Once the *Condom Bole* song was released on Facebook, audiences were invited to share their videos through Instagram and TikTok—platforms that, especially compared to *MKBKSH* on Facebook, have a relatively small community and user base.

As a result, only the small *MKBKSH* communities on Instagram and TikTok were able to directly see and engage

with social media content posted under the challenge's hashtag. Facebook users could participate by following a cross-posts, but were not able to use the platform to engage with it directly, for example by browsing through recent submissions of other users.

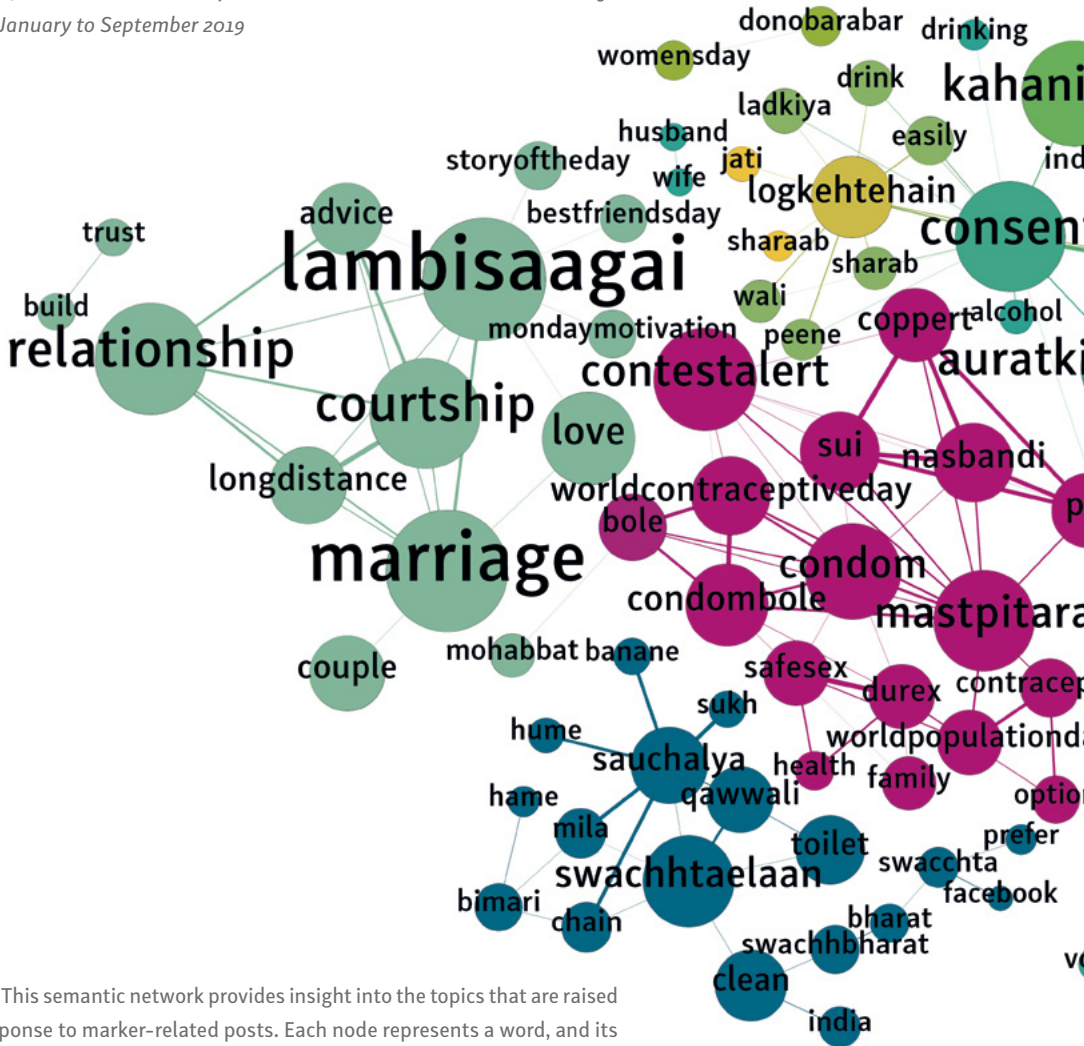
Exclusively enabling the *MKBKSH* communities on Instagram and TikTok to participate directly in the *Condom Bole* challenge played a role in limiting the challenge's initial exposure. It is likely that this has prevented the challenge from involving a critical mass of audience members required for wider diffusion (Barberá, Wang, et al., 2015; González-Bailón, 2017). In the future, Facebook Stories can be used to implement user-generated content challenges such as *Condom Bole*.

(c) **Beyond social media platforms.** The link network (Figure 29) indicates that without a mechanism in place allowing *MKBKSH* social media content to spread easily between platforms, a press release is the most effective way of generating audience attention beyond the website and social media pages of *MKBKSH*. Various news articles and blog entries specifically mentioned *MKBKSH* and its markers, but the lack of edges between the majority of green nodes and the social media platforms shows that the links rarely provided clickable paths to marker-related social media content. This is not ideal, as these articles and blogs could serve as entry points to the world of *MKBKSH*, and could inspire audiences to join the conversation. Beyond a hyperlink, future studies could experiment with embeddable social media elements that provide stronger calls to action, along with a clickable path to marker-related media engagement on *MKBKSH*'s social media pages (e.g., Facebook post with user photos or a collection of *Condom Bole* entries).

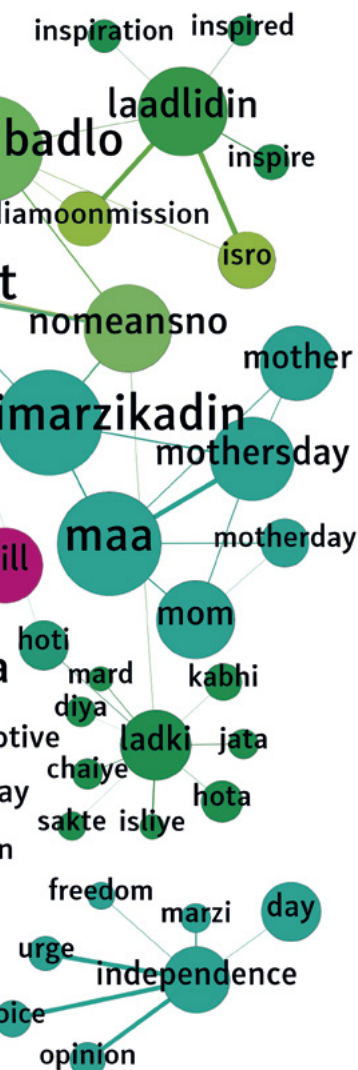
(2) Narratives

Story circles offer optimal conditions for “narratives to consistently emerge and be acknowledge through exchange and mutual interaction” (Clark et al., 2015, p. 924). In *MKBKSH3*, narratives emerged top-down through the tv serial, producing a steady stream of stories around a master narrative. The social media pages structured posts along markers to be consistently acknowledged through media engagement, allowing new narratives to emerge from bottom up.

Figure 30 Semantic Network of Comments on the MKBKSH Facebook Page from January to September 2019



Note. This semantic network provides insight into the topics that are raised in response to marker-related posts. Each node represents a word, and its size is based on how often the word occurred throughout all the comments. The network only includes words that occurred frequently (more than 21 times, which is the average frequency plus 1.5 times its SD; calculated after outliers were excluded). Two words are connected if they often appeared in the same comment, and the strength of the connections is based on how often the words co-occurred (the more often the thicker). The colors show in response to which markers the words were most frequently used (e.g., *Kahani Badlo* and *Dono Barabar* are green instead of yellow, indicating that the phrases were often used in response to *Aurat Ki Marzi Ka Din*). Note that different notations of markers have been recoded into single strings (i.e., ‘auratkimarzikadin’, ‘lambisagai’, etc.)



The semantic network from January to September 2019 (see Figure 30) shows that throughout the season, marker-related posts received responses reflecting a wide variety of knowledge, ideas, and practices associated with markers. New narratives can theoretically be found by looking at connections between markers and words that signify aspects beyond the markers' system of knowledge and values. These are scarce however, showing that the messages that accompanied the social media posts played an important role in determining the focus of audience engagement. Audiences rarely touched upon aspects of the markers that were not specifically highlighted in the tv show or in social media posts.

Dramatic arc. Markers that were strongly rooted in the narrative of the tv serial proved to be the most valuable sources of conversation material, especially if the dramatic arc and social media post schedule were synchronized. The *Lambi Sagai* posts in late-April provide a pertinent example of how the social media team set a story circle in motion toward the climax of the romance between Panna and Sameer. In particular, a dictionary definition introduced the marker, dramatic scenes provided context and inspiration, and specific messages invited audiences to share their views on marriage.

Characters. Our results indicate that higher levels of engagement can be a product of narrative transportation and para-social interaction (Green & Brock, 2005; Horton & Wohl, 1956). When audiences follow a story, they may enter a cognitive mode where they become absorbed into the story and identify with the characters (Murphy et al., 2013; Slater & Rouner, 2002). This mode, called narrative processing, allows audiences to build imaginary relationships with characters, which is called para-social interaction. Narrative transportation and para-social interaction have been associated with enhancing EE interventions' persuasive effects (Murphy et al., 2013; Papa et al., 2000). Furthermore, our results indicate that affiliating messages with popular, knowledgeable, and inspirational characters—real or fictional (e.g., Dr. Sneha as well as the ISRO team)—also increases audience engagement. This can be explained by Petty and Cacioppo's Elaboration Likelihood Model (1986; Slater & Rouner, 2002), which proposes audiences tend to place more trust in sources they like, trust, or identify with.

Timing. The waves of *Swachhta Elaan* comments in May show that story circles do not necessarily have to be set up shortly after the associated scenes are broadcast on tv—the *Qawwali* contest took place 6 weeks after the song was performed on tv. In contrast, the *Condom Bole* video premiered online on World Population Day and was broadcast on tv a month later. When the *Condom Bole* video premiered online, it had not yet been provided the dramatic context that the successful *Lambi Sagai* and *Swachhta Elaan* posts were characterized by.

Connection fiction to reality. Markers also allowed the social media team to connect concepts from the *MKBKSH* universe with the real world. The social media team achieved this by connecting markers to events such as World Population Day and International Friends Day as well as the women-led launch of the Chandrayaan-2 moon rocket and female Tennis champion PV Sindhu. It is challenging to assess how and to what extent synergies between the tv serial and social media posts contributed to setting story circles in motion. For this, the posts, tv episodes, key issues, and contexts differed far too much across the markers. Future studies can further explore timing strategies and study narrative processing, identification, and para-social interaction in the context of transmedia storytelling.

(3) Story circle agents

Story circle agents provide impulses that start, sustain, or alter narrative exchange, playing an important role in the direction and moderation of media exchanges. As the managers of the *MKBKSH* social media pages—capable of reaching a substantial part of each page’s followers—the social media team played the role of agent in the story circles they set up. During the season, the social media team shared posts and messages that introduced new ideas, asked questions, or challenged beliefs. The *MKBKSH* fans were potential agents as well because as soon as they started engaging with *MKBKSH* media, they might have in turn inspired others to do so.

Our results include cues that story circle visibility and engagement can be boosted by inviting influential story circle agents. Two weeks before the broadcast started, the social media team shared Facebook posts by Indian celebrities such

➤ https://www.facebook.com/mainkuchbhikar_saktihood/photos/a.1412528482334839/2208106136110399/

as Farhan Akhtar and Kareena Kapoor holding up a sign with the text ‘#MKBKSH’ (MKBKSH et al., 2019⁷). The post was not connected to any markers, nor did it include a specific, actionable message. However, the post with Kareena Kapoor received 34,500 likes, 39 shares, and 103 comments, making it the best-performing post in terms of likes and exposure.

This case shows that it is possible to boost the exposure and engagement levels of story circles by asking celebrities and micro-influencers to be guest agents—their influence could provide an extra incentive to engage with media or partake in a challenge, while their connectedness potentially enhances MKBKSH visibility radically. Instead of holding a sign with #MKBKSH, celebrities and micro-influencers may play a more proactive role in stimulating meaningful engagement by participating in the *Qawwali* or *Condom Bole* challenges themselves and asking their followers to do the same.

(4) Processes

Lastly, story circles need processes for continuous emergence and acknowledgement of narratives. During this project, several features of social media content formats capable of setting such processes in motion were identified.

Be specific in invitational messages. Posts that included specific questions and invitations resulted in the highest levels of meaningful engagement around sanitation, gender equality, and family planning. Related examples consisted of requesting audiences to finish song lyrics; showing a scene and asking what audiences would do in the place of Dr. Sneha or Panna; and inviting audiences to share their stories, comments, and pictures. These posts set social processes in motion that resulted in rich responses, including pictures and messages about sisters, mothers, or other family members as well as messages about equality and a cleaner community. It is likely that specific invitations lower the threshold to respond to social media messages. Conversely, when posts or markers only include a strong but close-ended message, audiences seemed less likely to comment. Such posts include slogans, quotes, or statistics and were liked and shared frequently, boosting the MKBKSH page’s online presence.

Stimulate meaningful engagement. Puzzles and quizzes as well as contests with prizes were useful in stimulating engagement around sensitive topics, but only received comments touching upon *MKBKSH*'s key themes and issues when the invitation specifically asked for it. This was the case for the *Qawwali* and *Condom Bole* song text challenges, but not for the *Mast Pitara* word scramblers and counters. Funny videos and memes with Panna's quotes or Condom Baba's riddles received several hundred likes on a few occasions, although responses did not address *MKBKSH*'s key themes and issues (e.g., 'haha' or 'funny'). Also, the results indicate that contraceptives were considered too sensitive to be discussed in a public space such as Facebook.

Do not ask too much. Social media content formats offering audiences to engage with *MKBKSH* in simple, interactive ways, as e.g., Facebook Frames are highly visible in the social networks of *MKBKSH* fans. It is important not to over-ask, however. For example, while the *Condom Bole* video was well-received by social media users and media outlets, it did not result in a large number of participants. The challenge asked audiences to share videos of their own *Condom Bole* choreographies, requiring an effort that is considerably larger than writing custom song lyrics or adopting Facebook Frames. It is likely that this played a role in the limited uptake.

In response to the Facebook Frame posts, the social media team also received pictures that included applied VR-effects: virtual reality effects such as glasses, eye patches, wigs or other funny visual enhancements that are rendered real-time onto the users' camera. In future studies, Facebook VR—as well as its equivalents on Instagram and Snapchat—might offer interesting opportunities for more ways to playfully endorse on key messages and markers.

CONCLUSION

Storytelling has always been the driving force behind EE, providing narratives as a means of discourse about social and behavioral change. This study shows that in the new media landscape, communication channels such as TV, radio, and social media can be layered into interactive media systems to

offer a continuous stream of engagement points that touch upon various social and behavioral change issues. Moreover, markers are a useful tool to introduce new concepts and ideas, synchronize social media and TV, and track and structure audience responses.

During the research project, periodically sharing and discussing the reports with the social media team allowed the research team to set successful features of social media content formats and strategies apart. The concept of story circles provided a useful tool for setting up ideal conditions for meaningful engagement and enhancing visibility on social media. The TV serial was a rewarding source of inspiration, allowing social media posts to introduce markers and invite audiences to respond with their perspectives. The most significant successes occurred when the different pieces seemed to fall into place, such as when posts

- (a) tapped into the TV serial's narrative and were synchronized with the dramatic arc;
- (b) offered easy and playful ways of engaging with the markers (e.g., song contests or Facebook Frames); and
- (c) invited audiences to specifically share their story.

Finally, this study shows what a systematic alignment of TV content with social media can provide. Ideally, new narratives emerge from TV in ways that allow social media pages to design chains of conversations around markers, using new scenes from TV to continuously highlight different aspects surrounding key issues. This would require a greater extent of coordination of how stories, markers, and elements are coordinated across different channels in a transmedia strategy. EE interventions can benefit from assigning a platform-independent transmedia *storyteller* who oversees the narrative universe as a whole, and audience engagement as a crucial part of it. A transmedia storyteller uses storytelling to design media systems that allow audiences to contribute their perspectives. This would allow for a feedback loop where the stories of audiences are fed back into the TV serial (e.g., through an epilogue), taking EE as a point of engagement into the digital age. ©

CHAPTER 7 **General Conclusion and Discussion**

Many successful EE initiatives over the last few decades have followed a mass media approach, using dramatic radio or TV serials to engage and influence listeners and viewers. The dramatic storylines of EE serials have provided proxies for interpersonal conversations about topics such as health and sustainability in audiences' living rooms. This dissertation explored how such conversations can be extended to the Internet, where EE narratives provide interactive and highly visible points of engagement.

More specifically, this research proposed and studied media content formats and strategies to stimulate online media engagement around health and sustainability topics (RQ1); developed and applied digital research methods to advance the design and implementation of EE interventions and measure associated effects (RQ2); and reflected on the conditions required for successful collaboration between health communication professionals and new media professionals (RQ3).

RQ1: Toward Spreadable EE

Nowadays, the interplay between algorithms and human interactions in the networks that comprise the Internet and its social media platforms plays an important role in media exposure patterns (Barberá, Jost, et al., 2015; Helmond, 2015; Pariser, 2012). To address the first research question, this dissertation introduced the concept of spreadable EE: a collection of theories, methods, and approaches to stimulate interactive online media engagement around topics such as health and sustainability.

Spreadable EE allows health communication professionals to addressing audience fragmentation and user generated content in two ways. First, transmedia storytelling strategies allow for creatively coordinating elements of messages or stories across platforms, offering a large number of entry points to cater to various audiences. Second, spreadable EE extends transmedia strategies with collaborations with *social influencers* to stimulate audience engagement with health and sustainability topics. This can inspire audiences to write chains of communication that ripple through their social networks, enhancing an EE intervention's exposure and providing prolific points of engagement.

Chapters 3 and 4 validated the theoretical roots of spreadable EE by focusing on the Twitter network. The analysis revealed communities of likeminded audiences and the presence of *social influencers* in the Dutch vaccination debate on Twitter. The different communities were distinguished by diverse interests, professional backgrounds, and vaccination-related beliefs. Through spreadable EE, these communities become potential target audiences, while the social influencers among them constitute potential collaboration partners. Social influencers can provide a gateway to reach communities in ways that suit their preferences and behaviors, while addressing specific vaccination-related beliefs.

This research also suggested that narrative theories can be extended to more interactive media formats on social media and other places on the internet. In the wake of a TV serial, EE professionals can collaborate with social influencers by drawing from dramatic narratives to stimulate media engagement. Moreover, audiences use the narrative to make sense of the health and sustainability issues raised relative to their own lives. Drawing from a dramatic narrative can increase audiences' motivation to engage in media exchange through mechanisms such as narrative transportation (Green & Brock, 2000, 2005), social modeling and identification (Bandura, 2004; Moran et al., 2013; Moyer-Gusé, 2008), and para-social interaction (Horton & Wohl, 1956; Papa et al., 2000). Narrative elements can also be used in *story circles* (Clark et al., 2015), providing a site of discourse where audiences are invited to discuss and further diffuse new norms, beliefs and practices.

RQ2: Researching Spreadable EE

Spreadable EE requires health communication professionals to cultivate optimal conditions for creative media exchanges around health and sustainability issues. In addition to monitoring and measuring the effects of spreadable EE (RQ2), this dissertation addressed the need for methods and approaches that enable health professionals to better tailor interventions to target audiences.

The case studies in Chapters 4 through 6 described research methods to advance the design, production, and implementation of EE interventions. These chapters showed the merit in studying target audiences through a post-demographic lens (R. Rogers, 2009) as formative research (i.e., research

supporting the design of EE interventions [Bouman, 1999]). Similar to the ways in which traditional research methods help to tailor health communication programs to different audiences in societies, the current research produced results that can be used to tailor digital health communication programs to communities on the Internet.

The case studies in this dissertation were aligned with the media mapping model, advancing the different stages of the typical EE intervention design process (see Figure 2). This research showed that digital research methods can be applied to:

1. Understand the role of the Internet, social media platforms, and communities of audiences around specific health and sustainability topics (orientation phase);
2. Identify target audiences and potential collaboration partners (crystallization phase); and
3. Monitor and measure audience engagement with health and sustainability topics in the wake of online EE interventions (production phase and implementation phase).

Chapter 4 showed how digital research methods contribute to a better understanding of societal developments around the issue of vaccination, while Chapter 5 covered how digital research methods can be used to analyze issue-, content-, and ego networks in order to find suitable social influencers and other collaboration partners. In addition to social media influencers, the analysis revealed that websites and social media pages of a large variety of initiatives and organizations can be involved in stimulating creative media exchanges around human germline modification—in particular, CRISPR-Cas9 technology. Chapter 6 showed how digital methods can be used to study the impact of spreadable EE as well as how it can be used to finetune social media pages and posts while a TV serial is being broadcast.

RQ3: Collaborating on Spreadable EE

Using spreadable EE as a theoretical point of departure, the digital research methods in this dissertation can directly contribute to increasing opportunities for successful collaborations between media professionals and societal and health organizations (RQ3). The digital research methods provided information about online audiences, helped to identify

- 14 The source code of the digital tools that were developed for the research projects described in the chapters are available online.
- Networked Twitter conversations (CH3, CH4): <https://github.com/roel-sbcc/Networked-Twitter-Conversations>
 - Mapping media networks (CH5): <https://rpubs.com/roel-sbcc/mapping-media-networks>

potential collaboration partners, and followed audience engagement in the wake of an EE intervention.¹⁴

The research projects in this dissertation shed light on the complexity of implementing these methods and principles in current institutional contexts. Previous research has established that health organizations function in a linear fashion compared to creative professionals (Bouman, 1999, 2002), as they have developed institutional and expert-driven repertoires that often focus on production of educative and promotional materials. In collaborations between TV and health professionals, this often led to tensions (Bouman, 1999, 2002), emphasizing the need to establish a common frame of reference in collaborations before health and media professionals embark on a project together.

Since the late 90s, the media landscape has grown increasingly complex. Spreadable EE requires the involvement of a wide variety of new professional backgrounds, including programmers, social media analysts, online community managers, and social influencers. Thus, successful collaborations between health organizations and new media professionals likely require the different stakeholders to get to know each other's professional habits, skills, and dispositions and build a common frame of reference (Bouman, 1999). In the future, valuable work can be done by further exploring the dynamics of the collaborations between diverse professional backgrounds.

DISCUSSION

Changes in the media landscape offer significant opportunities for contemporary EE interventions to stimulate meaningful media engagement around topics such as health and sustainability. This is important as young audiences in media landscapes across the globe are particularly difficult to reach through one-to-many mass media approaches (Livingstone, 2004). In a world where digital networks have become an integral part of daily life (González-Bailón, 2017), strategies that leverage mechanisms in these networks to reach and engage with target audiences will only grow in importance.

Although the media landscape is in a state of flux, popular narratives are still a driving force behind mediated exchanges on the Internet (Alleyne, 2015). In EE, narratives can be used

to provide points of engagement around health and sustainability issues. Classical EE concepts such as social modeling (Bandura, 1986, 2004), para-social interaction (Horton & Wohl, 1956; Papa et al., 2000), and narrative persuasion (Green & Brock, 2005; Petty et al., 2005; Slater & Rouner, 2002) provide opportunities for innovative social media formats featuring social influencers and other influential online organizations or initiatives. The richness of contemporary online media content allows for weaving narratives into virtually any social media format—a music video, visual effect, or live Q&A sessions—that can easily be joined, endorsed, replicated, or remixed by the audience. The audience eventually plays an active role in spreadable EE, enhancing the visibility of the EE intervention through collective engagement with its narrative.

As the design of spreadable EE requires radically new information about prospective audiences, this research provided tools for health communication professionals to understand the media landscape and develop strategies to engage with communities of audiences. Doing so paves the way for digital research methods to contribute to interventions developed through a post-demographic lens (R. Rogers, 2009), segmenting audiences along interests and socio-behavioral patterns that can be derived from social media data. Thereby, the digital research methods which have been presented can be used for formative research. Moreover, the research methods proved valuable for summative research, especially in managing a degree of “conversation” between an EE social media team and their audiences.

RECOMMENDATIONS

This dissertation touched upon two wider topics: first, the availability of data generated by social media platforms’ users, and second, how EE relates to the phenomenon of those who have lost their trust in traditional institutions such as science and the media, leveraging the Internet as a platform to voice their opinions.

Data availability

The digital methods in this research were used to retrieve and analyze publicly-available data from the Internet. At

certain points during this project, retrieving these data became increasingly difficult, as public opinion about data and privacy have changed in the wake of the Cambridge Analytica scandal (Cadwalladr, 2018). Nowadays, available data are GDPR compliant (European Commission, 2019), meaning they are anonymized. In addition to anonymizing their available data, social media platforms have increasingly prevented access to data that do not pose a threat to GDPR compliance or that could have been anonymized instead (e.g., social networks, recommendation networks, or Facebook Frame uptake).

The implications extend far beyond the field of EE. In particular, journalists and communications scholars need a certain degree of access to social media platforms' data to study how Big Tech companies leverage their users' data to tailor news feeds, recommender systems, and advertising frameworks. Without access to these data, journalists and scholars cannot play the role of a society's "watchdog." As a consequence, societies know less about how algorithmic personalization plays a role in shaping the world views of social media users (Barberá, Jost, et al., 2015; Dumitrica, 2016; Pariser, 2012; Tufekci, 2015).

It is known that Big Tech companies have adapted their information delivery algorithms in exchange for access to new markets (Isaac, 2016). Similarly, the European Union could require such companies to participate in initiatives that allow consortia of researchers, journalists, and businesses to study a platform's societal impact and role in line with a larger trend of public engagement in innovation trajectories in Europe, Australia, and North America (Fisher et al., 2015). These initiatives would allow for public engagement with the development and innovation social media platforms, while enabling Big Tech companies to broaden the societal contexts that their designers and programmers take into account when developing social media platforms.

Health communication in the digital era

This dissertation drew attention to a phenomenon that is connected to the ways in which the media landscape has democratized and institutional repertoires of health organizations have co-evolved. Traditionally, health communication scholars have studied strategies to reach and engage with vulnerable audiences, such as those with low socio-economic

status or low health literacy. However, this research showed that the new media landscape has given rise to new vulnerable audiences: communities beyond the reach of mainstream media and traditional health interventions. The anti-establishment communities that were found in the vaccination debate (Chapter 3 and 4) and in the context of genetic technology (Chapter 5) are examples of such communities. In previous studies, similar communities have been associated with a wider sense of distrust toward science, education, and the media (Kata, 2010, 2012). This suggests that it is not a lack of information that causes audiences to think or behave in undesired ways, but rather the sources they have come to trust within highly mediatized societies. This effect is exemplified by the interplay between human activity and algorithms, making it more likely that these audiences are confronted with a larger proportion of disinformation.

Chapter 4 suggests that foreign powers use bots and trolls to sow unrest among societies through controversial topics such as vaccination (Broniatowski et al., 2018). The Cambridge Analytica scandal shows that successful populist individuals and organizations in the West have succeeded in channeling anti-establishment sentiments into serving their interests (Cadwalladr, 2018). The role of such forces should not be underestimated and considered an integral part of the new media landscape. When health organizations fail to address the needs of vulnerable audiences, some are likely to prefer other information sources, marking a gateway through which they are possibly lured into serving the interest of undemocratic forces (Broniatowski et al., 2018; Cadwalladr, 2018; R. Rogers & Niederer, 2019).

The implications of this phenomenon extend beyond health organizations, requiring communication professionals at public institutions and NGOs look for solutions beyond the theories, methods, and approaches that their organizations have grown accustomed to. This can be done by leveraging social media to address audiences' concerns using a conversational approach, including shareable visuals, quotes, and memes referring to e.g., pop culture or current affairs. In turn, audiences can refer to these visuals in debates or use these media content as building blocks to create new content. Through such processes, audiences can play an active role in enhancing the visibility and shaping the discourse around health and sustainability topics.

Community-centered communication. In the Netherlands, health organizations, public institutions, and NGOs are well-connected with initiatives at the local level. This has allowed communication professionals at these organizations to collaborate on and experiment with a wide range of approaches, including community-centered approaches targeting specific vulnerable audiences. Although vulnerable audiences have often been considered difficult to reach, these cases show that community-centered approaches offer a gateway to connect with them.

Similarly, these organizations can reach new vulnerable audiences on the Internet by approaching their online communities. To this end, this dissertation showed that digital research methods can provide essential insights to communication professionals. Project-based studies provided snapshots of audience engagement on specific moments in time. In the future, investing in structurally monitoring audience engagement around key themes and topics would allow for insight into how engagement with key issues and topics develops over time. Structurally monitoring audience engagement enables health organizations, NGOs, and public institutions to keep ‘a finger on the pulse’ of the discourses around their causes. This is important in that audience engagement is continuously evolving, while the linear ways in which mass media interventions are typically planned are comparatively static.

This dissertation suggested that the role of communication professionals at public institutions, NGOs, and health organizations is shifting. Previously, these organizations served as societies’ main information disseminators. However, in the new media landscape, their role shifts to strategically dispersing information across the web and forging strategic alliances with social influencers to stimulate creative engagement around health and sustainability issues. Digital research methods allow communication professionals to identify, amplify, and integrate the voices that make a substantial contribution to discourses around health and sustainability, including those which have come to distrust traditional institutions.

This requires communication professionals to adopt new approaches. In the mass media era, the creation of an EE serial was similar to how a conductor leads a symphony orchestra.

The orchestra plays from a score and the conductor aims to weave the individual melodies into a single overwhelming experience. The role of the audience remains fairly limited—they listen and applaud at the end. In the contemporary, democratized media landscape, the orchestra no longer plays from a score and audiences are not necessarily interested in listening, let alone applauding. The orchestra, as well as the audience, requires a different type of incentive to follow along.

Under these circumstances, communication professionals could try approaching media engagement as a jam session rather than a symphony. For example, health communication professionals can structure communication similar to the ways in which musicians including Miles Davis and Fela Kuti structured their performances. Miles Davis provided a melody for the rest of the band to improvise along, collaborating with different musicians and often taking a step back to share the spotlight. Moreover, Fela Kuti used music as a platform for community engagement and to explore his community's heritage (Gibney, 2014). During long jam sessions in his communal compound, he interweaved music, activism, and education—the audience was free to clap, cheer, and shout and musicians in the audience were free to join the session. Such an experience is relevant to communication professionals at public institutions, NGOs, and health organizations today, as it concentrates on exchanging ideas and perspectives rather than reaching unequivocal consensus. ©

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Summary

In 1992, a scene from the TV series *Medisch Centrum West*—a popular Dutch medical drama—sparked many conversations in Dutch living rooms about organ donation (Bouman, 1999; Bouman et al., 1998). On screen, a doctor had just informed a couple about the worsening condition of their son, who had been admitted to the ICU in critical condition after a car accident. The couple is torn between emotions as the doctor brings up the inevitable: “I am sorry. I know you don’t want to hear this, but Bart’s heart could save the life of another child.”

¹⁵The episode was the result of an EE collaboration between the Netherlands Heart Foundation and the TROS, a Dutch national broadcasting organization.

This scene¹⁵ is an example of Entertainment-Education (EE), a health communication strategy that uses storytelling in dramatic serials on radio or TV (Bouman, 1999). In particular, this scene shows how health organizations and creative scriptwriters can use likeable characters, relatable settings, and dramatic plot twists to motivate audiences to talk about health and sustainability issues. As such, EE is more than a message: it can inspire communities to talk about their roles, priorities, and responsibilities and serve as a path to social and behavioral change (Storey, 1998). Recently, EE interventions have inspired audiences across the world to engage in behavioral changes designed to improve health, safety, and equality (Bouman, 1999; Chatterjee et al., 2017; Singhal & Rogers, 2004).

Many of these interventions, however, are characterized by a classic mass media “one to many” approach; yet since the advent of the Internet, audiences have spread across channels and young audiences have become especially difficult to reach (Livingstone, 2004). Online, audiences gather around a wide variety of niche interests, including health topics such as fitness, cooking, and mindfulness (Blank & Reisdorf, 2012). On social media, vlogs, podcasts, and life feeds are among the most engaged (Abidin, 2017), allowing audiences a chance to experience a shared level of engagement with themes and topics that interest them the most (Jenkins et al., 2013).

These changes pose challenges and opportunities to the EE strategy. While *Medisch Centrum West* inspired conversations in Dutch living rooms, it is now possible to extend these conversations to the Internet. Online, audiences can be invited to discuss, reinforce, and further diffuse health-related messages through online media engagement.

This dissertation explores how this can be achieved. Uniting the EE strategy with digital approaches, it explores strategies that seek to stimulate online media engagement with EE serials to promote social and behavioral change.

RESEARCH SETUP

This work is part of the Media Lab program, initiated by the Center for Media & Health (CMH) in collaboration with the Dutch Heart Foundation, Dutch Alzheimer Society, Dutch Kidney Foundation, and Erasmus University Rotterdam and is funded by the Dutch Friends Lottery. The program aims to design new media strategies and approaches to stimulate healthy and sustainable lifestyles, while exploring and stimulating innovative collaborations between the creative media industry and health organizations (Erasmus University Rotterdam, 2015). The central research questions of this dissertation are:

- RQ1:** How can the EE strategy be extended to the Internet, with the aim of stimulating shared media engagement around topics such as healthy lifestyles and sustainability?
- RQ2:** How can the effects of these media formats be measured?
- RQ3:** What conditions are required for successful collaborations between new media professionals and societal and health organizations?

This dissertation consists of two parts. Part I (Chapters 2 and 3) addresses RQ1 and introduces the concept of *spreadable EE*, a framework of theories, methods, and approaches that can be used to invite communities of online audiences to engage in creative media exchanges touching upon topics such as health and sustainability.

In Part I, it also becomes apparent that the design and production of spreadable EE interventions require radically different types of information about the interventions' intended audiences. Part II (Chapters 4 through 6) explores how digital research methods advance the design and production of spreadable EE interventions (RQ2). These chapters describe research projects based on real-world cases, providing the opportunity to reflect on what is required for successful collaborations between health communication professionals and new media professionals (RQ3).

PART I: Toward Spreadable Entertainment-Education

Chapter 2

Chapter 2 expands on EE's framework of theories, methods, and approaches regarding how today's audiences have come to engage with media. This chapter begins with the concept of *spreadable media* (Jenkins et al., 2013), a term which provides an alternative to the more commonly used idea of *going viral*. Where virality implies that media content spreads by itself, moving from one mind to the other, spreadable media emphasizes audiences' agency, affording the freedom to respond to media content or not (Jenkins et al., 2013). Media content is most likely to spread when it

- (a) appeals to the audience and it allows for personal expression;
- (b) is well attuned to digital and social infrastructures of the audiences; and
- (c) aligns with the interests of stakeholders in these networks, such as media platforms, creative professionals, or groups of audience members (Jenkins et al., 2013).

Accordingly, Chapter 2 reviews 4 decades of EE research, touching upon concepts such as narrative persuasion, social modeling, and community engagement. This chapter proposes the concept of spreadable EE, allowing health communicators to deal with audience fragmentation by means of transmedia strategies and collaborations with social influencers. The transmedia storytelling strategy allows to coordinate elements of stories across platforms to simultaneously cater to various audiences (Jenkins, 2007, 2010; Wang & Singhal, 2016). This includes social media, where strategic collaborations with social influencers can stimulate audience engagement around health and sustainability. Whether *online only* or as a strategic transmedia extension, influencer collaborations can inspire audiences to write chains of messages on health and sustainability topics that ripple through their social networks.

Chapter 3

In order to design spreadable EE interventions, there is a need for new research methods that can highlight the ways in which audiences behave and organize online. Chapter 3 explores how online audiences can be studied to derive audience segments, tailoring media strategies to their preferences and

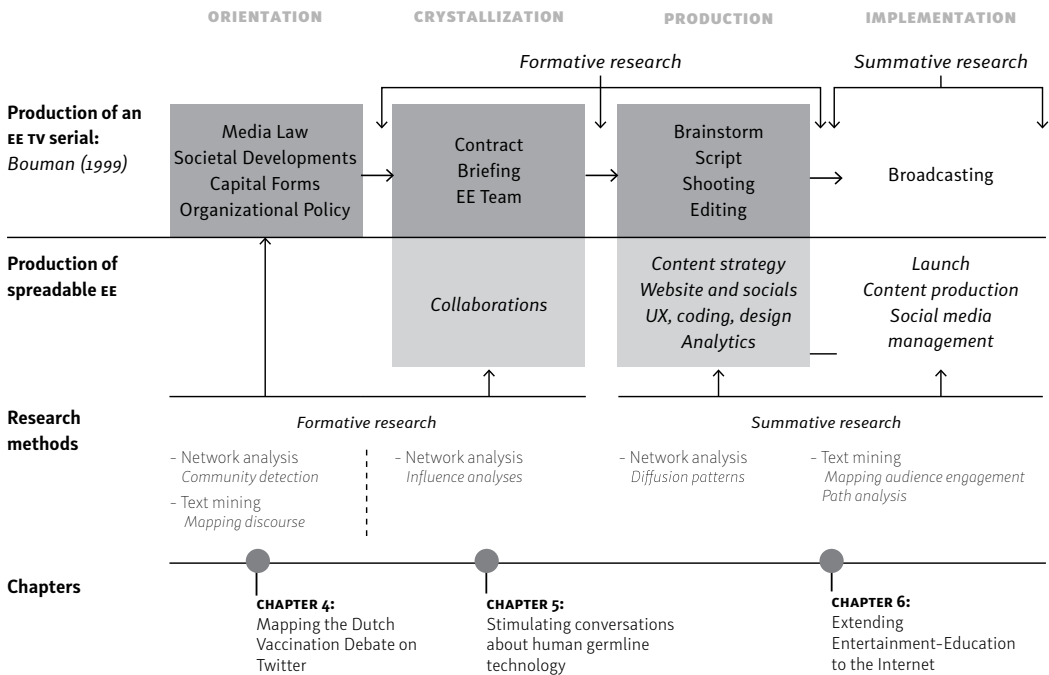
behaviors. In this chapter, strategies drawn from the field of influencer marketing provide opportunities to reach and engage audiences in a personally relevant manner.

Chapter 3 proposes methods and approaches to target and tailor health communication in the digital era. More concretely, it presents methods to:

- (a) identify online communities engaging on a specific health issue;
- (b) map community-specific cultures and health-related perceptions; and
- (c) identify influencers as potential collaboration partners. As such, this chapter adopts a slightly different stance on tailoring by centralizing the creative and cultural competences of social influencers central.

The chapter concludes by aligning the research methods with the *media mapping model* (Bouman, 1999), showing how this alignment allows health communicators to tailor influencer strategies to the cultures and health-related perceptions of different audience segments.

Figure 31 *Media Mapping Model*



Note. Adapted from Bouman (1999).

The potential of these methods is illustrated by a study of the Dutch vaccination debate on Twitter, providing a shortlist of social influencers as potential collaboration partners. An expanded version of this data set is further explored in Chapter 4.

PART II: Researching Spreadable Entertainment-Education

Part II describes how digital research methods can be used to advance the design and production of spreadable EE. The chapters in this part are aligned with Bouman's media mapping model, representing a process for the production of EE serials (Bouman, 1999). During the orientation phase, the initiators aim to gain a clear idea of the societal problem. During the *crystallization* phase, this results in a viable project plan, contracts with partners, and a project briefing. During the production phase, the actual intervention is produced: scripts are written, TV serials are produced, and websites are created. Lastly, the *implementation* phase starts when the intervention is officially launched.

Research plays an important role in advancing this model. Formative research answers questions about the prospective audiences before and during the production phase, while summative research addresses questions about the effectiveness of the intervention during and after the implementation phase (Bouman, 1999; Bouman et al., 2017). The research methods described in these chapters may allow health organizations to:

1. Discover and understand online communities (Chapter 4);
2. Identify influential websites, YouTube channels, or micro-celebrities as potential collaboration partners (Chapter 5); and
3. Measure and monitor how audiences respond to a transmedia EE TV serial (Chapter 6).

Chapter 4

Chapter 4 shows how digital research methods can contribute to a better understanding of societal developments around health issues such as vaccination. The research project described in the chapter was conducted for the Dutch National Institute of Public Health and the Environment (RIVM). In 2017, the vaccination rates in the Netherlands declined slightly, and

the RIVM commissioned a group of social scientists to study the societal context of the decline, and advice the RIVM about potential new strategies to increase vaccination rates. One of the societal contexts was the Internet, where audiences discuss vaccination and refer to sources of health-related information of varying quality.

Chapter 4 explores the Dutch vaccination debate on Twitter in order to:

- (a) identify online communities in the vaccination debate;
- (b) identify vaccine-related narratives; and
- (c) understand how these online communities interact with each other.

Seven different communities are identified, including but not limited to public health professionals, writers and journalists, anti-establishment, and international vaccination advocates.

The debate was spearheaded by the community of writers and journalists. The health community circulated facts, figures, and scientific studies, while negative messages about vaccination—either from a homeopathy or conspiracy perspective—were most prevalent in the anti-establishment community. With a few exceptions, the facts and figures shared by the health community were hardly circulated in other places in the network, whereas the myths introduced by the anti-establishment spilled over to other communities. This chapter provides further evidence that negative perceptions about vaccination might be rooted in a wider sentiment of distrust of traditional institutions.

Chapter 5

Chapter 5 shows how digital research methods can be used to analyze networks of websites, Twitter users and YouTube videos to find suitable social influencers and other collaboration partners. The work in Chapter 5 was conducted for the DNA Dialogue, an initiative by health organizations and institutions supported by the Dutch Ministry of Health, Welfare and Sport (2020). This initiative organized a societal debate about human germline modification (HGM), which represents a technology that can be used to edit the heritable genes of human embryos.

In November 2018, Chinese biophysicist He Jiankui shocked the world by announcing the birth of the world's

first known genetically edited human babies: Lulu and Nana (Marchione, 2018; Regalado, 2018). This case illustrates the growing tensions between innovations which are technically possible and those applications deemed ethical and acceptable as societies. Therefore, governments and funding institutions across the world increasingly support societal debates about new technologies (Fisher et al., 2015). Such debates seek to facilitate and encourage the exchange of expertise and perspectives around novel technologies in order to contribute to societal consensus on the implementation of new technologies (Baylis, 2017; Krabbenborg, 2012, 2016). Previous societal debates in the Netherlands have included public discussion events as well as the production of media and educational materials (Krabbenborg & Mulder, 2015). Furthermore, online social media platforms and formats offer the opportunity to extend societal debates to the digital realm.

Chapter 5 describes a research project commissioned by the organizing committee of the DNA Dialogue to find online collaboration partners for the societal debate (e.g., social influencers). In addition to social media influencers, the analysis revealed that websites and social media pages for a large variety of initiatives and organizations can stimulate creative media exchanges around HGM. Chapter 5 shares the methods and results of this research and reflects on the content formats and partnership arrangements that are required to extend societal debates to the Internet.

Chapter 6

Chapter 6 shows how digital methods can be used to study the online impact of spreadable EE interventions as well as fine-tune social media pages and posts while a TV serial is being broadcast. The methods presented in this chapter contribute to the production and implementation phase.

Chapter 6 describes a research project as part of a unique EE collaboration in India: '*Main Kuch Bhi Kar Sakti Hoon*' (MKBKSH), meaning 'I, a woman, can achieve anything'. This EE serial is an initiative between the Population Foundation India (PFI) and well-respected writer-director-producer Feroz Abbas Khan and focuses on topics such as gender equality, sanitation, and family planning. MKBKSH is a transmedia intervention that revolves around a dramatic TV serial that is strategically extended to other communication channels such

as websites, chatbots, and social media. The research project in Chapter 6 was commissioned by PFI and monitored audience engagement on social media in the wake of the TV serial.

The social media team received feedback of the research team in the form of frequent reports describing how online audiences responded to the themes and topics raised by the EE serial. The reports showed how audiences responded to different key messages and creative content formats. This chapter provides an insightful case as to how digital methods can be used to monitor audience engagement in the wake of a widely broadcasted EE serial. It also shows how monitoring audiences' responses can help social media teams stimulate media engagement on the key messages and ideas of EE serials.

CONCLUSION AND DISCUSSION

The EE strategy is based on the idea that stories can provide communities with a sense of direction. This dissertation expands EE's tradition of street theatre, community radio, and telenovelas through digital approaches. The case studies share how digital research methods can be used to study online engagement around health and sustainability topics and how the results can advance the creation of spreadable EE. While *Medisch Centrum West* inspired conversations in Dutch living rooms, this dissertation shows that such conversations can be extended to the Internet, where EE narratives can provide interactive and highly visible points of engagement.

This dissertation underlines the need for methods and approaches that enable health professionals to target and tailor their interventions as well as measure effectiveness. The proposed digital research methods provide information about prospective audiences, help identify potential collaboration partners, and can follow audience engagement in the wake of transmedia media interventions.

This dissertation also sheds light on the complexity of implementing these methods and principles in modern-day institutional contexts. *Spreadable EE* requires the involvement of a large palette of new professional backgrounds, including programmers, social media analysts, online community managers, and social influencers. In the future, valuable work can be conducted by researchers who seek to explore collaborations between this wide variety of professional backgrounds.

On a more profound level, this dissertation explores how individuals and organizations use social media to introduce new ideas; how audience renegotiate these ideas through networked media engagement; and how this may ultimately leave a mark on the beliefs and behaviors of communities. Traditionally, health communication scholars study strategies to reach and engage vulnerable audiences, such as those with low socio-economic status or limited health literacy. The research projects in Chapters 4 and 5 show that the new media landscape has given rise to new, vulnerable audiences, namely anti-establishment communities beyond the reach of mainstream media and traditional health interventions. Previously, similar communities have been associated with a wider sense of distrust toward science, education, and the media for a number of reasons (Kata, 2010, 2012).

It is not the lack of information that makes some audiences think or behave in undesired ways, but rather the sources they have come to distrust within highly mediatized societies. This requires health communication professionals to look for solutions beyond the usual theories, methods, and approaches. Health organizations can leverage social media to take a conversational approach, addressing audiences' questions and concerns with simple, accessible answers such as shareable visuals, quotes, and memes referring to pop culture or current affairs. Digital research and monitoring tools play an important role in this context, as they can support health communicators who strategically disperse information across the web and forge strategic alliances with social influencers to raise awareness, model behaviors, and stimulate creative engagement around social and behavioral change. ◎



Samenvatting (Dutch Summary)

In 1992 zorgde een scène van de *Medisch Centrum West* – een populaire medische dramaserie – voor een aantal serieuze gesprekken over orgaandonatie in Nederlandse huiskamers (Bouman, 1999; Bouman et al., 1998). Op het beeldscherm had een arts een jong echtpaar op de hoogte gebracht van de toestand van hun zoon Bart, die na een auto-ongeval in kritieke toestand was opgenomen in het ziekenhuis: ‘Het spijt me. Ik weet dat jullie dit niet wilt horen, maar Barts hart kan het leven van een ander kind redden.’

Deze scène uit *Medisch Centrum West* is een voorbeeld van Entertainment-Education (EE); een gezondheidscommunicatiestrategie die draait om populaire media op radio en tv (Bouman, 1999). Het voorbeeld toont hoe gezondheidsorganisaties de kracht van verhalen kunnen gebruiken om mensen aan te moedigen om over gezondheid of duurzaamheid na te denken. De EE-strategie is daarmee méér dan een boodschap: het kan groepen mensen inspireren om over prioriteiten, verantwoordelijkheden en verwachtingspatronen te praten: een belangrijke stap die gemeenschappen kunnen zetten op het pad naar een gezondere, duurzame toekomst (Storey, 1998).

EE in een veranderend medialandschap. De laatste decennia hebben EE-interventies over de hele wereld vooral gebruik gemaakt van radio en tv (Bouman, 1999; Chatterjee et al., 2017; Singhal & Rogers, 2004). Sinds de komst van het internet heeft het publiek zich echter over het medialandschap verspreid en zijn met name jonge doelgroepen moeilijker te bereiken via massamedia (Livingstone, 2004). Op sociale media organiseren mensen zich rond de interesses die ze delen en vormen online communities waar ze zich samen met hun favoriete onderwerpen kunnen bezighouden (Blank & Reisdorf, 2012; Jenkins et al., 2013). Ook maakt het publiek zelf content, wat naast de stroom aan *likes*, *shares*, en *comments*, resulteert in creatieve media-uitwisselingen waarin *memes*, *blogs*, en *podcasts* een rol kunnen spelen.

Binnen *online communities* kunnen mediamakers in het publiek zelfs een invloedrijke positie kunnen opbouwen waarmee ze, op hun onderwerp, worden geaccepteerd als

autoriteit. Deze *social influencers* zetten de toon voor wat we als groepen belangrijk vinden (Abidin, 2017; Van Eldik et al., 2019). Een aantal van hen heeft van de hobby het werk kunnen maken en wordt regelmatig ingehuurd om dingen aan te prijzen; inclusief gezond en duurzaam gedrag.

Deze veranderingen bieden vele uitdagingen en kansen. Waar *Medisch Centrum West* voor gesprekken in huiskamers zorgde, is het tegenwoordig mogelijk om die gesprekken te stimuleren op het Internet; in samenwerking met *social influencers* bijvoorbeeld. Dit proefschrift onderzoekt hoe de EE-strategie effectief kan worden ingezet op het internet. Het verbindt vier decennia EE-onderzoek met een raamwerk aan digitale theorieën, methoden en benaderingen om *online communities* te bereiken.

ONDERZOEKSOPZET

Dit proefschrift is één van de projecten van het Media Lab, een programma geïnitieerd door het Centrum voor Media & Gezondheid (CMG) in samenwerking met de Hartstichting, Alzheimer Nederland, de Nierstichting en de Erasmus Universiteit Rotterdam en dat wordt gefinancierd door de Vriendenloterij. Het programma richt zich op nieuwe media-strategieën en -benaderingen om een gezonde- en duurzame levensstijlen te stimuleren. Daarnaast verkent- en stimuleert het samenwerkingen tussen de creatieve media-industrie en gezondheidsorganisaties (Erasmus Universiteit Rotterdam, 2015).

Binnen het *Media Lab*, richtte dit proefschrift zich op de volgende onderzoeksvragen:

- RQ1:** Hoe kan de EE-strategie worden uitgebreid naar internet, met als doel om creatieve media-uitwisselingen rond gezondheid en duurzaamheid te stimuleren?
- RQ2:** Hoe kunnen de effecten van deze mediaformats worden gemeten?
- RQ3:** Welke voorwaarden zijn vereist voor succesvolle samenwerkingen tussen nieuwe mediaprofessionals en gezondheidsorganisaties?

Dit proefschrift bestaat uit twee delen:

Deel I (hoofdstukken 2 en 3) behandelt RQ1 en introduceert het concept *spreadable EE*; een raamwerk van theorieën, methoden en benaderingen om creatieve media-uitwis-

selingen rond gezondheid en duurzaamheid te stimuleren op verschillende plekken op het internet. Daaruit wordt ook duidelijk dat het ontwerpen van zulke interventies radicaal andere informatie over het beoogde publiek vereist. Deel II (hoofdstukken 4 tot en met 6) gaat daarom dieper in op hoe digitale onderzoeksmethoden kunnen bijdragen aan het ontwerpen, produceren, en evalueren van *spreadable EE* (RQ2). De hoofdstukken van deel II beschrijven drie praktijkcases die het mogelijk maakten om ook op de voorwaarden voor succesvolle samenwerkingen tussen gezondheidscommunicatie- en mediaprofessionals te reflecteren (RQ3).

DEEL I: Op weg naar spreadable EE

Hoofdstuk 2. Hoofdstuk 2 start met de vraag hoe we in het nieuwe medialandschap doelgroepen bereiken. Om doelgroepen te bereiken moet je *viraal* gaan; althans, dat was afgelopen decennium een veel gehoord idee. Maar wat is een *viral* precies? Bekeken als mediamaker impliceert de virus-metafoor dat creatievelingen in staat zijn iets te bedenken dat zó leuk is, dat mensen die het te zien krijgen wel op de share button moeten klikken. Jenkins, Ford en Green hebben moeite met dat idee (2013); in plaats daarvan formuleerden zij een aantal condities die er aan kunnen bijdragen dat mensen content gaan liken, sharen, of besluiten deel te nemen aan creatieve media-uitwisselingen. Volgens Jenkins et al. zijn media *spreadable*, als:

- a) De vorm en/of inhoud goed aansluiten bij het beoogde publiek, en het hen de mogelijkheid geeft om zich uit te drukken;
- b) Goed zijn afgestemd op de digitale- en sociale infrastructuren die belangrijk zijn voor het beoogde publiek, en
- c) Aansluiten bij belanghebbenden in die digitale en sociale netwerken (partner of werkgever, maar ook mediamakers en -bedrijven).

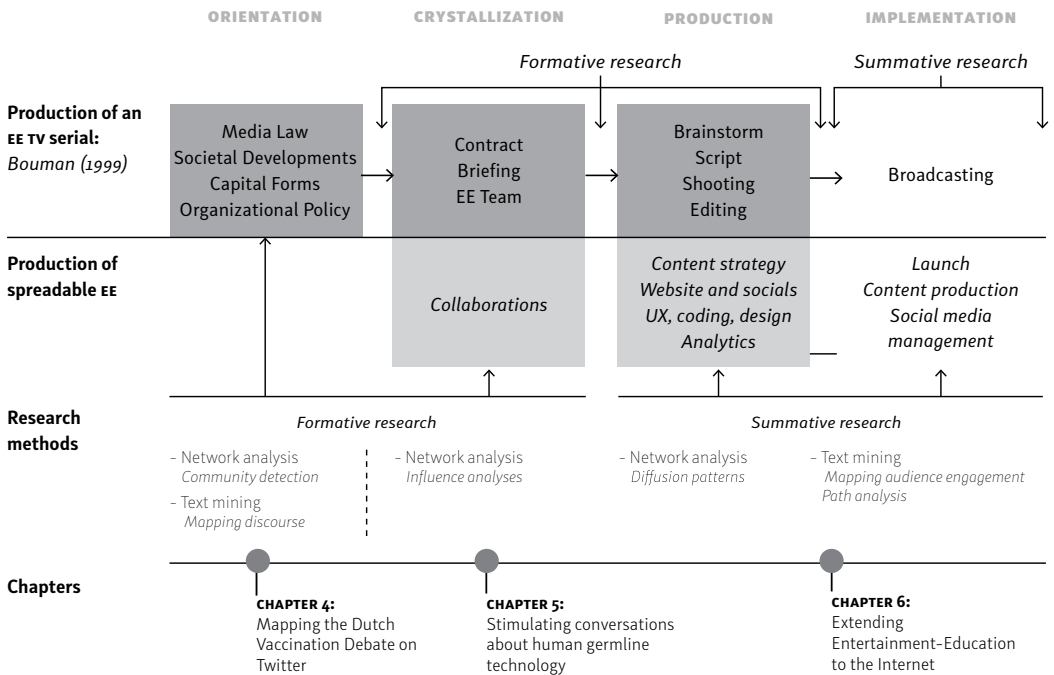
Hoofdstuk 2 verweeft het *spreadable media* concept met de *EE*-strategie en introduceert *spreadable EE*. *Spreadable EE* draait om het inzetten van transmediastrategieën om met verschillende doelgroepen gelijktijdig te communiceren, en samenwerkingen met social influencers om gesprekken en creatieve media-uitwisselingen over gezondheid en sociale verandering in gang te zetten.

Hoofdstuk 3. Om zulke interventies te ontwerpen, is er behoefte aan nieuwe onderzoeksmethoden die gezondheidscommunicatieprofessionals helpt online doelgroepen te identificeren en begrijpen. Hoofdstuk 3 verkent daarom de potentie van digitale onderzoeksmethoden en stemt die af op het media *mapping-model* (zie Figuur 32) – een model om EE-interventies te ontwerpen en implementeren (Bouman, 1999).

In het kort:

- (1) tijdens de *oriëntatiefase* nemen initiatiefnemers de tijd om een duidelijk beeld te krijgen van de problematiek;
- (2) tijdens de *kristallisatiefase* wordt dit vertaald in een haalbaar projectplan, contracten met partners, en een projectbriefing.
- (3) Tijdens de productiefase worden de scripts geschreven, Tv-afleveringen geproduceerd en de website gemaakt.
- (4) Tijdens de implementatiefase wordt de website gelanceerd en de Tv-serie uitgezonden.

Figuur 32 *Media Mapping Model*



Noot. Naar Bouman, 1999.

Onderzoek speelt een belangrijke rol in dit model. *Formatief onderzoek* beantwoordt vragen over het potentiële publiek voor en tijdens de productiefase, terwijl *summatief onderzoek* vragen over de effectiviteit van de interventie tijdens en na de implementatiefase behandelt (Bouman, 1999; Bouman et al., 2017).

DEEL II: Spreadable EE onderzoeken

Deel II presenteert drie onderzoeksprojecten die op verschillende momenten bijdroegen aan de productie van (gezondheids-)interventies (zie Figuur 32). De drie hoofdstukken tonen hoe digitale onderzoeksmethoden gezondheidscommunicatieprofessionals in staat stelt om:

4. Online *communities* te ontdekken en te begrijpen (*oriëntatiefase*, Hoofdstuk 4);
5. Invloedrijke websites, YouTube-kanalen of *social influencers* als potentiële samenwerkingspartners te identificeren (*kristallisatiefase*, Hoofdstuk 5); en
6. Te volgen en meten hoe het publiek reageert op EE-interventies (*productie- en implementatiefase*, hoofdstuk 6).

Hoofdstuk 4. Hoofdstuk 4 toont hoe digitale onderzoeksmethoden bijdragen aan een beter begrip van maatschappelijke ontwikkelingen rond gezondheidskwesties zoals vaccinatie. Het hoofdstuk beschrijft een onderzoeksproject uitgevoerd in opdracht van het RIVM (Lutkenhaus & Bouman, 2017).

Omdat de vaccinatiegraad in Nederland in 2017 licht daalde (RIVM, 2017), vroeg het RIVM een groep sociale wetenschappers om de maatschappelijke context van de daling te onderzoeken en hen te adviseren over nieuwe strategieën om de vaccinatiegraad te verhogen. Eén van de maatschappelijke contexten is het internet, waar in gesprekken over vaccinatie vaak naar bronnen van wisselende kwaliteit wordt verwezen. Hoofdstuk 4 verkent het Nederlandse vaccinatiedebat op Twitter om:

- (a) online *communities* in het vaccinatiedebat te identificeren;
- (b) vaccin-gerelateerde narratieven te vinden; en
- (c) te begrijpen hoe de online *communities* zich tot elkaar verhouden.

Er worden zeven verschillende online *communities* beschreven, met o.a. een zorg-community, schrijvers en journalisten-community, anti-establishment-community en een kleine groep internationale vaccinatievoorstanders.

De schrijvers en journalisten voerden het debat aan en bespraken vaccinatie vanuit verschillende invalshoeken. De zorg-community haakte daar vaak op in met feiten, cijfers, en aankondigingen. Vooral de feiten en cijfers deden het goed onder het eigen publiek, maar werden niet vaak opgepikt in andere *communities*. De meeste sceptische berichten werden verspreid vanuit de anti-establishment community en konden vaak op de hoon van de zorg- en schrijvers en journalisten-*communities* rekenen. Tegelijkertijd stelde dit de anti-establishment community in staat om een groot publiek te bereiken.

Hoofdstuk 5. Hoofdstuk 5 laat zien hoe digitale onderzoeksmethoden kunnen helpen om netwerken van websites, Twitter-gebruikers en YouTube-video's te analyseren en geschikte social influencers en andere samenwerkingspartners te vinden. Het hoofdstuk beschrijft een onderzoeksproject dat is uitgevoerd voor de DNA-dialoog, een initiatief ondersteund door het Ministerie van Volksgezondheid, Welzijn en Sport (2020). Het doel van de DNA Dialoog is om een maatschappelijke dialoog te starten over CRISPR-Cas9, een technologie die kan worden gebruikt om de genen van menselijke embryo's te bewerken.

Het hoofdstuk beschrijft de mogelijke rol van internet in maatschappelijke dialogen en identificeert verschillende *communities* die zich allemaal op hun eigen wijze tot CRISPR-Cas9 en/of gentechnologie verhouden. Het onderzoek vond, naast een aantal social influencers, een grote verscheidenheid aan initiatieven en organisaties die bij de DNA Dialoog betrokken zouden kunnen worden. Het slot van het hoofdstuk reflecteert op de content formats and samenwerkingsverbanden die nodig zijn om de DNA-dialoog optimaal te verbreden naar het internet.

Hoofdstuk 6. Hoofdstuk 6 beschrijft een onderzoeksproject voor een uniek EE-initiatief in India: '*Main Kuch Bhi Kar Sakti Hoon*' (MKBKSH), of 'Ik, een vrouw, kan alles bereiken'. Deze transmedia EE-serie is een initiatief van de Population

Foundation India (PFI) (2020) en de alom gerespecteerde schrijver-regisseur-producent Feroz Abbas Khan en richt zich op onderwerpen als gendergelijkheid, hygiënische sanitaire voorzieningen en gezinsplanning. Het project in hoofdstuk 6 is uitgevoerd in opdracht van PFI om het effect van de serie op het internet te meten. Hoofdstuk 6 laat zien dat digitale methoden ook gebruikt kunnen worden om de effecten van *spreadable EE* te volgen. Terwijl de serie werd uitgezonden, werd het social-mediateam regelmatig van de laatste inzichten voorzien om daarmee hun social media-strategieën te verbeteren. Hoofdstud zes beschrijft de belangrijkste bevindingen.

CONCLUSIE EN DISCUSSIE

De EE-strategie is gebaseerd op het idee dat verhalen gemeenschappen een gevoel van richting kunnen geven. Terwijl Medisch Centrum West gesprekken in Nederlandse huiskamers inspireerde, laat dit proefschrift zien dat dit ook kan op het Internet. Dit proefschrift breidt EE's traditie van straattheater, community radio, en soap series uit met digitale benaderingen. Dit proefschrift laat zien hoe digitale onderzoeksmethoden online betrokkenheid rond gezondheids- en duurzaamheidsonderwerpen kunnen volgen en meten, en hoe die inzichten op verschillende momenten de productie van EE kunnen bevorderen.

Dit proefschrift onderzocht ook hoe sociale media gebruikt (kunnen) worden om nieuwe ideeën te introduceren; hoe het publiek die ideeën opnieuw betekenis geeft door erop te reageren; en hoe dat uiteindelijk een stempel drukt op de overtuigingen die maatschappelijke groepen erop nahouden. Er is altijd veel aandacht geweest voor communicatiestrategieën die helpen 'moeilijk bereikbare doelgroepen' (bijv.: mensen met een lage socio-economische status, migratieachtergrond, laaggeletterdheid) te bereiken. Dit proefschrift laat onder meer zien dat veranderingen in het medialandschap hebben bijgedragen aan de opkomst van nieuwe moeilijk bereikbare doelgroepen: anti-establishment *communities* die reguliere media en traditionele instituten steeds meer wantrouwen. Het lijkt erop dat het niet het gebrek aan informatie is dat deze groepen moeilijk te bereiken

maakt, maar de bronnen die ze zijn gaan vertrouwen in een sterk gemediatiseerde samenleving.

Dit vraagt om een aanpak buiten de gebruikelijke theorieën, methoden en benaderingen. Gezondheidsorganisaties zouden online communicatie meer als een open gesprek kunnen benaderen. Ze kunnen zich richten op het strategisch verspreiden van informatie en het smeden van strategische allianties met social influencers om die informatie onder de aandacht te brengen.

In die samenwerkingen draait het erom creatieve media-uitwisselingen rond sociale en gedragsverandering te stimuleren. Samen met social influencers kunnen gezondheidsorganisaties de zorgen en vragen van het publiek beantwoorden met eenvoudige, toegankelijke antwoorden gegoten in *GIFs*, memes, en citaten waarbij af en toe een verwijzing wordt gemaakt naar populaire media. Digitale onderzoeks- en monitoringtools spelen in deze context een belangrijke rol, omdat ze gezondheidscommunicatieprofessionals kunnen helpen een vinger aan de pols te houden van wat er online leeft. ©

Portfolio



Publications related to this project

► Academic articles

- Lutkenhaus, R. O., Jansz, J., & Bouman, M. P. A. (2019). Toward spreadable entertainment-education: leveraging social influence in online networks. *Health Promotion International*, 1–10. <https://doi.org/10.1093/heapro/daz104>
- Lutkenhaus, R. O., Jansz, J., & Bouman, M. P. (2019). Tailoring in the digital era: Stimulating dialogues on health topics in collaboration with social media influencers. *Digital Health*, 5, 1–11. <https://doi.org/10.1177/2055207618821521>
- Lutkenhaus, R. O., Jansz, J., & Bouman, M. P. A. (2019). Mapping the Dutch vaccination debate on Twitter: Identifying communities, narratives, and interactions. *Vaccine: X*, 1, 100019. <https://doi.org/10.1016/j.jvaxc.2019.100019>

► Data sets

- Lutkenhaus, R. O. (2019). Data for: Mapping the Dutch Vaccination Debate on Twitter: Identifying Communities, Narratives, and Interactions. Mendeley Data. <https://doi.org/10.17632/fjvk93bc5m.1>

► Book sections

- Lutkenhaus, R. O., & Bouman, M. P. A. (2020). Het Nederlandse vaccinatiedebat op Twitter. In J. van Dissel, J. van Everdingen, A. van de Graaf, M. te Hennepe, & J. van Steenberg (Eds.), *Help, ik ben besmet!* (pp. 80–81). Stichting Biowetenschap en Maatschappij.

► Projects reports

2017

- Lutkenhaus, R. O., & Bouman, M. P. A. (2017). *#Vaccinatie. Conversatienetwerken op Twitter*. Center for Media & Health; Gouda, the Netherlands.
Commissioned by: The Dutch National Institute for Public Health and the Environment (RIVM); Bilthoven, the Netherlands.

2018

- Lutkenhaus, R. O., & Bouman, M. P. A. (2018). *Donorwet: Conversatienetwerken op Twitter*. Center for Media & Health; Gouda, the Netherlands.
Commissioned by: The Dutch Kidney Foundation

2019

- Lutkenhaus, R. O., & Bouman, M. P. A. (2019). *De medianetwerken rond kiembaanmodificatie*. Center for Media & Health; Gouda, the Netherlands.
Commissioned by: Erfocentrum (Dutch Heredity Institute); Amersfoort, the Netherlands.

2020

- Lutkenhaus, R. O., & Bouman, M. P. A. (2020). *Using Markers for Digital Engagement with the Audience of “Main Kuch Bhi Kar Sakti Hoon 3”*: A transmedia edutainment initiative for hygienic sanitation, family planning, and gender equality in India. Center for Media & Health.
Commissioned by: Population Foundation India; New Delhi, India.

Other publications during this project

► Academic articles

van Eldik, A. K., Kneer, J., Lutkenhaus, R. O., & Jansz, J. (2019). Urban Influencers: An Analysis of Urban Identity in YouTube Content of Local Social Media Influencers in a Super-Diverse City. *Frontiers in Psychology*, 10. <https://doi.org/10.3389/fpsyg.2019.02876>

► Book sections

Lubjuhn, S., Bouman, M., Lutkenhaus, R., & Krumme, K. (2019). Communicating Sustainable Logistic Innovations to Various Consumer Groups. In *Innovative Logistics Services and Sustainable Lifestyles* (pp. 115–139). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-98467-4_6

Courses and workshops followed during this project

2016	Entertainment Media and Social Change (5 EC) Erasmus School of History, Communication and Culture. BA-3.
	System Thinking in Public Health (1 EC) Coursera; Johns Hopkins University (MOOC)
	Statistical Inference (1 EC) Coursera; Johns Hopkins University (MOOC)
	Regression Models (1 EC) Coursera; Johns Hopkins University (MOOC)
	Making your research proposal work for you (2.5 EC) Erasmus Graduate School of Social Sciences and the Humanities; Rotterdam, the Netherlands
	English academic writing (2.5 EC) Erasmus Graduate School of Social Sciences and the Humanities; Rotterdam, the Netherlands
	Doing literature review (2.5 EC) Erasmus Graduate School of Social Sciences and the Humanities; Rotterdam, the Netherlands
2017	RMes Winter School 2017 (2 EC) Erasmus University Rotterdam
	Advanced research methods 1 – qualitative data analysis (2.5 EC) Erasmus Graduate School of Social Sciences and the Humanities; Rotterdam, the Netherlands

	Self-representation (2.5 EC) Erasmus Graduate School of Social Sciences and the Humanities; Rotterdam, the Netherlands
	Big data analysis and visualizations (2.5 EC) Erasmus Graduate School of Social Sciences and the Humanities; Rotterdam, the Netherlands
	Digital methods summer school 2017 (6 EC) University of Amsterdam, the Netherlands
2018	Professionalism and integrity in research (1 EC) Erasmus Graduate School of Social Sciences and the Humanities; Rotterdam, the Netherlands
	Basic Didactics (1 EC) Risbo; Rotterdam, the Netherlands

Courses and workshops taught during PhD-project

► Academic courses

2016	Entertainment Media and Social Change. Term 2, Erasmus School of History, Communication and Culture. BA-3. Course assistant and guest lecturer.
2017	Entertainment Media and Social Change. Term 3, Erasmus School of History, Communication and Culture. BA-3. Course assistant and guest lecturer.
2018	Digital Research Methods. Term 2, Erasmus School of History, Communication and Culture. MA-3. Grading assistant.
	Entertainment Media and Social Change. Term 3, Erasmus School of History, Communication and Culture. BA-3. Course assistant and guest lecturer.
2019	Entertainment Media and Social Change. BA-3. Term 3, Erasmus School of History, Communication and Culture. BA-3. Lecturer.

► Invited and guest lectures

2017	soA/AIDS congres 2017: eHealth Meetup Symposium. 1 December, soA/AIDS Nederland; Amsterdam, the Netherlands Presented: - ‘ <i>Conversatienetwerken analyseren. Inzicht in de sociale structuren die schuilgaan achter online discussies</i> ’
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- 2018 Collaborating Health Foundations' mini lectures
Workshop. 3 April, Dutch Diabetes Foundation; Amersfoort, the Netherlands
Presented:
- 'Towards Spreadable Entertainment-Education: How Transmedia Storytelling and Social Influencers Contribute to Effective Health Interventions'
- Erasmus MC Mini-lectures
Workshop. 31 October; Erasmus Medical Center; Rotterdam, the Netherlands.
Presented:
- 'Stimulating online conversations for a healthy pregnancy'
- 2019 Studio Erasmus, IFFR edition
Media Appearance. 29 January, Studio Erasmus; Rotterdam, the Netherlands.
<https://www.youtube.com/watch?v=SsXSJtrjwOs>
Presented:
- 'How amusement improves the health of the functionally illiterate'
- House of Health lunch time lectures
Academic workshop. 25 February, Collaborating Health Foundations, the Netherlands
Presented:
- 'Gezondheidscommunicatie in het nieuwe medialandschap'
- Voorjaarsbijeenkomst dna Dialoog
Symposium. 28 June, Dutch Association for Community Genetics and Public Health Genomics; Utrecht, the Netherlands
Presented:
- 'In gesprek over kiembaanmodificatie. Mediastrategie in het nieuwe medialandschap'
- Nationale Denktank
Workshop. 23 August, De Baak; Driebergen, the Netherlands
Presented:
- 'Hoe blijft Nederland gezond en weerbaar in de digitale samenleving?'

► Vocational training

- 2016 *Aansluiting vinden bij de doelgroep: de Entertainment-Education strategie.*
13 October & 10 November, Netherlands School of Public & Occupational Health; Utrecht, the Netherlands. Course Assistant
- Storytelling en narratieve communicatiemethoden.*
1 December, Netherlands School of Public & Occupational Health; Utrecht, the Netherlands. Course Assistant.

- 2017 *Entertainment-Education in een veranderend medialandschap.*
12 April, Nederlands Congres Volksgezondheid 2017; Amersfoort, the Netherlands. Speaker.
- 2018 *Inleiding in de Positive Deviance strategie: Een nieuwe onderzoeksbenadering.*
10 April, GGD Hollands-Noorden; Schagen, the Netherlands.
6 September, GGD ZeBraLim; Eindhoven, the Netherlands, the Netherlands.
Co-lecturer.
- Beeldend Werken.*
13 November, Netherlands School of Public & Occupational Health;
Utrecht, the Netherlands. Course Assistant.
- 2019 *Storytelling en narratieve communicatiemethoden,*
14 May, Netherlands School of Public & Occupational Health;
Utrecht, the Netherlands. Lecturer.
- Aansluiting vinden bij de doelgroep: de Entertainment-Education strategie.*
10 September & 8 October, Netherlands School of Public & Occupational
Health; Utrecht, the Netherlands.
17 December & 23 January 2020, GGD Hollands-Midden; Gouda,
the Netherlands. Lecturer.
- Samenwerken met bloggers, vloggers en social influencers.*
24 September, Netherlands School of Public & Occupational Health;
Utrecht, the Netherlands. Lecturer.
- Inleiding in de Positive Deviance strategie: Een nieuwe onderzoeksbenadering.*
19 November & 30 January 2020, GGD ZeBraLim; Eindhoven, the Netherlands.
Lecturer.

Conferences, symposia, and workshops during the PhD project

► Participation

- 2016 *Cross Media Café (New Media Experiences)*
Workshop. 14 April, iMMovator, Hilversum.
- Masterclass Floris Kaayk (Cross Media Storytelling)*
Workshop . 21 April, iMMovator; Hilversum, the Netherlands.
- Narrative Impact Symposium*
Academic symposium. 19-20 May, Radboud University; Nijmegen,
the Netherlands.

Positive Deviance workshop

Academic workshop. 13 June, Center for Media & Health; Gouda.

Mediapark Jaarcongres

Conference . 23 June, iMMovator; Hilversum, the Netherlands.

Cross Media Café (Coming soon: new formats Dutch Broadcasting organization)

Workshop. 1 September, iMMovator; Hilversum, the Netherlands

Cross Media Café (YouTubers)

Workshop. 1 November, iMMovator; Hilversum, the Netherlands.

Alcohol en Sociale Netwerk Sites

Academic symposium. 9 December, Amsterdam Center for Health Communication; Amsterdam, the Netherlands

High Performance Computing in Social Science Research

Academic workshop. 13 December, Erasmus University Library; Rotterdam, the Netherlands

2017

RMes Winter School

Academic symposium. 19–20 January, Research School for Media Studies / Erasmus University; Rotterdam, the Netherlands

Presented:

-‘*The Entertainment-Education in the New Media Landscape*’

Etmaal van de Communicatiewetenschap

Academic conference. 26–27 January, Netherlands-Flanders Communication Association / Tilburg University; Tilburg, the Netherlands.

Cross Media Café (Filter Bubble)

Workshop. 31 January, iMMovator; Hilversum, the Netherlands.

Alles is Gezondheid: de reis gaat verder

Conference. 15 February, Alles is Gezondheid; Amersfoort, the Netherlands.

Cross Media Café (Uit het Lab)

Workshop. 7 March, iMMovator; Hilversum, the Netherlands.

Narratives in Health Communication

Academic symposium. 23 March, University of Antwerp; Antwerp, Belgium.

Nederlands Congres Volksgezondheid 2017

Conference. 12 April, ncvgz; Amersfoort, the Netherlands

Presented:

-‘*Entertainment-Education in een veranderend medialandschap*’

Kick-off research tracks

Academic workshop. 19 May, CLICKNL; Utrecht, the Netherlands

Data, Sports & Health in the City

Academic workshop. 29 May, BOLD Cities, Utrecht, the Netherlands

Follow-up research tracks

Academic workshop. 22 June, CLICKNL; Utrecht, the Netherlands

eScience symposium

Symposium. 12 October, Netherlands eScience center; Amsterdam, the Netherlands

Big data for vulnerable groups

Academic workshop. 27 October, BOLD Cities; Utrecht, the Netherlands

Social Media Data Workshop

Academic workshop. 8 November, ERMeCC, Erasmus University; Rotterdam, the Netherlands

Online content analysis

Academic workshop. 15 November, PhD Club, Erasmus University; Rotterdam, the Netherlands

Tailoring for Health

Academic symposium. 24 November, Amsterdam Center for Health Communication; Amsterdam, the Netherlands

Presented:

-‘*Conversatienetwerken analyseren. Inzicht in narratieven en sociale structuren achter online discussies over vaccinatie.*’

2018

Alles is Gezondheid 2018

Conference. 7 February, Alles is Gezondheid; Amersfoort, the Netherlands

Etmaal van de Communicatiewetenschap

Academic Conference. 8–9 February, Netherlands–Flanders Communication Association / Ghent University; Ghent, Belgium

Presented:

-‘*Vaccination. Narratives and Social Infrastructures behind Online Conversations about Vaccination.*’

Data4Media

Workshop. 20 February, iMMovator; Hilversum, the Netherlands

sbcc Summit, featuring Entertainment Education

Academic conference. 17-20 April, 2018 International Social and Behavioral Change Communication Summit Secretariat; Bali (Nusa Dua), Indonesia.

Presented:

-‘*Vaccination: Narratives and Social Infrastructures behind Online Conversations about Vaccination*’

International Communication Association 68th Annual Conference

Academic conference. 24-28 May, International Communication Association; Prague, Czechia.

Presented:

-‘*Analyzing Conversation Networks: A Procedure to Analyze Online Discussions on Controversial Issues*’

-‘*Analyzing Conversation Networks on Vaccination: Identifying Communities, Narratives, and Social Influencers for Audience Engagement*’

-‘*Towards Spreadable Entertainment-Education: How Transmedia Storytelling and Social Influencers Contribute to Effective Health Interventions*’

2019

Etmaal van de Communicatiewetenschap

Academic Conference. 7-8 February, Netherlands-Flanders Communication Association / Radboud University; Nijmegen, the Netherlands

Presented:

-‘*Tailoring in the digital era: Stimulating dialogues on health topics in collaboration with social media influencers.*’

2020

Etmaal van de Communicatiewetenschap

Academic Conference. 6-7 February, Netherlands-Flanders Communication Association / University of Amsterdam; Amsterdam, the Netherlands

Presented:

-‘*Stimulating conversations about heritable gene editing: a digital approach for societal debates.*’

► **Co-organization**

2017

RMeS Winter school and graduate symposium

Co-organizer. 19-20 January, Erasmus University Rotterdam

2019

Education Lab: Future Education Hackathon

Team Coach. 17-18 May, Erasmus University Rotterdam.

