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Mark My Words: The Design of an Innovative Methodology to Detect and Analyze Interpersonal Health Conversations in Web and Social Media

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Mark My Words: The Design of an Innovative Methodology to Detect and Analyze Interpersonal Health Conversations in Web and Social Media

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Internet technology in which social media play a central role offers new opportunities for health communication. The Center for Media & Health (CMH) in the Netherlands in collaboration with the University of Twente developed a methodology called Mark My Words (MMW) to detect and monitor interpersonal conversations on social media. The MMW methodology is based on the concept of "markers" and on data analysis via text mining techniques. MMW is applied in an innovative web-based entertainment-education series called SndBites. This article describes the design of this new research methodology and shares the methodological advantages and challenges.

KEYWORDS computer-mediated communication (CMC), entertainment-education, health communication, media research, social media, text and data mining techniques

SOCIAL MEDIA AND THE NEED FOR INNOVATIVE RESEARCH METHODOLOGIES

Recent advances in Internet technologies, in particular the participative Internet known as social media, have transformed health-related communications

(De Nooijer et al. 2005; Crutzen, 2009; Van Deursen, 2010). More and more health organizations worldwide use web-based formats and digital entertainment media (e.g., virals, Internet drama series, videos and podcasts, serious games, and all kinds of transmedia and cross-media formats) in their communication strategies (Singhal, Wang, & Rogers, 2012). Recent examples are the Safe Sex campaign of SoaAids Netherlands and the Sound Effects hearing loss campaign of the Center for Media & Health (CMH) (Bouman, Van Tol, Rijnja, & De Regt, 2009).

These advances in Internet technology offer not only the possibility for innovative formats for health communication but also new ways of disseminating the health messages of such interventions. Social media's potential to reach large audiences is particularly important as the impact and effect of public health interventions depend to a large extent on their capability for diffusion. According to the five steps of the RE-AIM model, this capability comprises Reach, Effectiveness, Adoption, Implementation, and Maintenance (Glasgow, Vogt, and Boles, 1999; Glasgow, 2007). The ultimate aim of these interventions is to create social change by stimulating interpersonal conversations among peers around specific health issues.

In order to measure the potential impact of new digital and interactive health communication formats, however, we need more sophisticated and attuned research methodologies (Denzin & Lincoln, 2000; Kohler-Reismann, 2008; Gubrium & Holstein, 2009). In this article, we propose Mark My Words (MMW), a new methodology to address this gap in online research strategies. MMW aims to measure the potential impact of new digital and interactive (health communication) media. The MMW is currently being used to evaluate the impact of SndBites (an abbreviation of SoundBites), a web-based entertainment-education series, on teens and young adults ages 15–18 years in the Netherlands.

This article begins with background information on SndBites and its theoretical foundations. It continues with a discussion of monitoring and text mining strategies. On this basis, the MMW methodology is introduced, and its theoretical and practical implications are illustrated through concrete examples in the MMW study protocol design as it has been tailored for SndBites. The article closes with a discussion and critical reflection on the advantages and challenges of this new methodology.

SNDBITES: AN ONLINE ENTERTAINMENT-EDUCATION SERIES

Imagine the following scene:

> Backstage in a big discotheque, melting into the shadows cast by the stage light, Eltjo and Mariset are kissing. Eltjo: *"Damn, you're good."* Mariset, whispers: *"No, you are. You really turn me on …"*. Eltjo kisses

Mariset's neck, and Mariset presses her body closer to Eltjo. Eltjo takes
her hand, and presses it to his chest. *"I'm crispy hot for you."* Mariset
stretches her arm to get a better look at him, laughs curiously, then
presses her body against his again. *"Crispy hot?"* she asks. "*Yes, crispy
hot,"* he says. *"Come on, let's do it. Do you want to?"* Mariset nods. Eltjo
fumbles at her bra, then: *"Oh, shit, I didn't bring a condom with me. Did
you?"*

This dialogue is part of the drama script of SndBites, a Dutch web-based
series launched in April 2012. The storyline is narrated from the perspectives
of four main characters (see www.SndBites.nl).

SndBites was designed by the CMH and its partners[1] as an innovative
digital entertainment platform to promote a healthy lifestyle among Dutch
teens and young adults ages 15–18 years from middle and lower socioeco-
nomic groups (see Figure 1). SndBites aims to inspire this target group to
wear earplugs to prevent hearing loss, to practice safe sex, and to moderate
alcohol consumption (Bouman, 2012). These health behaviors are all related
to common leisure activities such as clubbing. Hence, the setting for SndBites
is a (music) nightclub (see Box 1).

SndBites is a contemporary example of what is known as the entertain-
ment-education (EE) communication strategy, which is defined as "the process
of purposively designing and implementing a mediating communication form
with the potential of entertaining and educating people, in order to enhance
and facilitate different stages of prosocial (behaviour) change" (Bouman, 1999,
p. 25). Entertainment platforms (such as Internet series, serious games, pop
music, and television soaps) reach large sections of young audiences (Bouman,
2002). According to Montgomery (1990): "Popular art forms have a unique
ability to engage viewers in ways that news and public affairs programs do

FIGURE 1 Screenshot www.SndBites.nl with Eltjo and Mariset. (Figure available in color
online.)

*When **DJ Kozmoz** gets the chance to play a set at the SndBites dance night, he feels the pressure to stage a great performance. Desperate to control his nerves, he turns to every alcoholic drink he can get.*

*His best friend and roadie **Eltjo** lets him do it because he's absorbed by his new love interest Mariset. They have been seeing each other for a while now and are planning to have sex. They trust each other, and everything seems to be ready to give it a go tonight. Eltjo's former girlfriend Sjarda is the only one who stands between Eltjo and Mariset.*

***Sjarda** has been trying all night to get Eltjo's attention. Mariset thinks she still wants him and Eltjo is averting her as much as he can, but maybe it's not a bad idea to listen to what she has to say.*

*To make things worse there is **Tiejo**, a hyperactive newshunter, trying to score a shocking story. Collecting quotes, his eagerness seems to be rewarded when suddenly there's a conflict and the storylines of all four characters literally come together … .*

BOX 1 Synopsis SndBites.

not. For young people, it serves as an 'electronic classroom,' in which lessons are taught each week through the actions of its characters" (p. 115).

SndBites places strong emphasis on interactivity, gamification, and interconnectivity. The interactivity in SndBites lies in the fact that the media user starts with the perspective of one character, and during the storyline, he/she can interactively switch to the perspective of another character. The gamification element is present by applying game-design thinking in the storyline of the series to make it more fun and engaging. SndBites audience members can unlock seven hidden codes (Easter eggs) around the three main issues (hearing loss prevention, safe sex, and moderate alcohol use) and have a chance to win tickets to a dance party for themselves and their six best friends. The goal of gamification is to motivate people and involve them in parts of the story through interactive processes. Gamification can be considered one of the most important trends in recent technology. The interconnectivity of SndBites is based on an integrated online communication strategy that incorporates several social media platforms: Hyves, Twitter, Facebook, and YouTube.

THEORETICAL FOUNDATION FOR THE DESIGN OF SNDBITES

The potential effects of SndBites primarily lie in interpersonal communication among peers. In order to stimulate interpersonal communication, the

design of the SndBites series is based on the Elaboration Likelihood Model (ELM) (Petty & Cacioppo, 1986), Social Cognitive Theory (Bandura, 1994), and Agenda Setting Theory (McCombs & Shaw, 1972).

Petty and Cacioppo's (1986) ELM model suggests that people can follow two possible routes in the persuasion process: the *central route* and the *peripheral route*. Persuasion through the *central route* is achieved through the receiver's thoughtful examination of issue-relevant thinking (high elaboration likelihood). People will follow this route when they are able and motivated to engage in issue-relevant thinking. The peripheral route is relevant when thoughtful examination of issue relevant thinking is relatively low (low elaboration likelihood). In this route people employ simple decision rules or heuristic principles during information processing (Bouman, 1999). The CMH and its partners used in SndBites the peripheral route of persuasion to reach teens and young adults with low or no level of interest in health issues. The design team utilized emotional appeals and liking heuristics to attract attention to and increase audience involvement with the targeted health issues (hearing loss prevention, safe sex, and moderate alcohol). For example, one of the main characters of the series DJ Kozmoz is actually a well-known DJ with an international career in real life.

According to Social Cognitive Theory (Bandura, 1994), people learn not only in formal learning situations, such as in schools, but also vicariously, by observing the overt behavior of models. The models used in observational learning can be real-life people or characters in films and on television. In SndBites, social role models were selected with the specific goal of showing that a new behavior can be practiced feasibly in real life. For example, Tiejo, who plays a reporter in the series, exemplifies that earplugs can be used while clubbing, and Sjarda, one of the female characters, illustrates how it is possible to be an advocate in your social environment to protect others in case of a sexually transmitted infection. Furthermore, Agenda Setting Theory says that the media are not always successful at telling us what to think, but they are quite successful at telling us what to think *about* (McCombs & Shaw, 1972). Hence, agenda-setting is referred to as the power to "structure issues." In SndBites, agenda-setting has been embedded into social media in the form of trailers and YouTube clips. This way, SndBites can be on the social agenda of teens and young adults and inspire them to talk with friends about the serial's most intricate ideas and messages.

MARK MY WORDS: AN INNOVATIVE METHODOLOGY FOR WEB AND SOCIAL MEDIA RESEARCH

Mark My Words (MMW) is a promising methodology for researchers and practitioners to gain more insight on how social media can contribute to the dissemination and effect (on interpersonal communication) of web-based

health communication interventions. In order to know whether this type of intervention creates change by stimulating online interpersonal conversations among peers around the campaign health issues, we have designed the research project MMW. MMW is designed to evaluate the reach and impact of web-based health communication interventions (in this case the SndBites series) by analyzing interpersonal conversations in social media.

MMW addresses the urgent need to bridge the gap between new media practices and traditional media research. Chou, Hunt, Beckjord, Moser, and Hesse (2009) state, "It is clear that the rapid development of new online media in health communication practice is not matched by an adequate and timely development of new research methodologies" (p. 1). Traditional evaluation designs in the field of health communication such as randomized controlled trials (RCTs) with pre–post control group designs are not suitable for analyzing and measuring the impact of interventions on social discourse in new media. This is for several reasons: (1) the Internet's open and free access makes it almost impossible to create (randomized) control groups; (2) online conversations and users' Internet behavior cannot be controlled or steered due to the autonomy of the open web; and (3) web-based information stays on the web (the "long tail") and does not have a clear endpoint. These new media characteristics make it difficult to use traditional pre–post control group designs.

Monitoring and Text Mining

Simple data such as number of visitors on a website, length of their stay, and geographical spread can be monitored using Google Analytics. One way to dive deeper and understand the nature of conversations is through text mining methods. Corley, Cook, Mikler, and Singh (2010) describe text mining as "the process of discovering information in large text collections and automatically identifying interesting patterns and relationships in textual data" (p. 600; see also Mihalcea, 2008). Text mining technologies use search engines that automatically collect conversations from social media according to specified search terms to explore relevant patterns within these conversations. These texts are then analyzed and interpreted. Until now, text mining has been used mostly by the marketing sector to measure branding impact and for reputation management; this is also known as opinion mining (Pang & Lee, 2008).

Recent studies in the field of health communication have used a combination of different text mining strategies. For example, Corley et al. (2010) used text mining to identify trends in online conversations in the United States about influenza on the web, to see whether web conversations correlated with real-world influenza-like illness patient report data. And Veldkamp, He, and De Vries (2010) collected 300 ego documents from Internet forums of people with posttraumatic stress syndrome (PTSS). They

used text-mining techniques to develop a new Internet-based intake procedure (psychological measurement protocol).

These studies, however, have not been based on an entertainment-education and social media approach.

Hypothesis and Research Questions

The hypothesis and central idea behind the development of the MMW methodology is that the use of "markers" makes it possible to track the amount and type of interpersonal communication in web-based communication interventions and related social media use. Markers are distinctive and identifiable message elements incorporated into an EE intervention design (Singhal & Rogers, 2002). When markers are powerful (memorable to audiences) they can be a potential trigger for conversations. For example, in the EE radio soap series *Nasberry Street* about sexually responsible fatherhood in Jamaica, there was a skirt-chasing character called Scattershot. Scattershot became a common term in Jamaican discourse, as in "Oh, you Scattershot you," providing the opportunity to trace the direct and indirect effects of listening to the radio program (Singhal & Rogers, 1999). This principle of using markers is a central element in the design of the MMW methodology.

The MMW methodology will be used to detect (a) how and when online conversations around the markers of the SndBites web-based communication intervention started; (b) which and how many markers are identified in the conversations; and (c) what is the specific context in which these markers are used in the conversations (positive or negative valence, direct or indirect exposure, self-reported behavior, social cognitive determinants) and whether the conversations align with the aims of the web-based communication intervention and in the way the markers were intended.

The design of the MMW methodology has given way to two main research questions: (1) How can interpersonal conversations in web-based health communication interventions and related social media use be detected and monitored with the use of markers; and (2) what are the strengths and weaknesses of text mining and data mining as techniques used to analyze these online conversations?

Plan of Action

In order to answer the two main research questions, the following steps need to be taken: (1) design specific markers and integrate them into the SndBites storyline; (2) diffuse the series among the intended audience (middle and lower educated teens and young adults ages 15–18 years) via Internet and social media; (3) implement the use of a social media monitoring tool and define search strategies for data collection; and (4) analyze data using text mining techniques.

In the following sections the various research steps are described.

DESIGN MARKERS

The CMH is both executive producer of the SndBites series and principal investigator of the MMW research project. This makes it possible to combine these two projects and create markers for the storyline of SndBites. Designing specific markers around the specific health issues (hearing loss prevention, safe sex, and moderate alcohol use) for the series is a challenging process. The markers need to be specific enough to serve as a potential conversation topic, unique for the series, be attuned to the target group (youngsters aged 15–18 years from middle and lower socioeconomic groups), and fit organically into the storyline. Based on these criteria the following SndBites markers have been designed: *Double Dutch* (meaning "protected sex by using both birth control pill and condom"); *Crispy Hot* (meaning "sexually aroused"); *Go Out, Plug In* (meaning "enjoy clubbing and use ear plugs"); *Nocktails* and *Happy Drinks* (both meaning nonalcoholic cocktails). Aside from these specific health-related markers, the name of the series (SndBites) and the names of the characters in the series (DJ Kozmoz, Eltjo, Sjarda, Mariset, and Tiejo) serve as markers.

SOCIAL MEDIA COMMUNITIES

To attract the attention of teens and young adults and to generate traffic to the special interactive SndBites website the CMH has designed an integrated online communication strategy (see Figure 2). SndBites was launched in collaboration with the Dutch Social Media platform Hyves. Through various items on the Hyves platform, the target audience is encouraged to visit the SndBites website (www.SndBites.nl) and/or the SndBites-Hyves fan page (www.SndBites.Hyves.nl), where readers can get information about SndBites, watch the trailer(s), chat, and comment on SndBites.

The Netherlands has 595,000 inhabitants ages 15–18 years (out of a total Dutch population of 16.8 million) (NJI, 2011; CBS, 2011). Teen and young adult participation in social media sites has increased tremendously. Four out of five children aged 8–18 years (79%) have a profile on Hyves (the largest social media platform in the Netherlands), and almost half of this age group (49%) are also on Facebook (Pijpers, 2012).

The new Internet generation, called Netgeneration (Tapscott, 1998) or Digital Natives (Prensky, 2001), is, however, anything but a homogeneous group (Kutteroff & Behrens 2008; Lenhart, Purcell, Smith, & Zuckuhr, 2010; Van den Beemt, Akkerman, & Simonis, 2010; Van den Beemt et al., 2009). In the Netherlands, for example, teens and young adults from the age group 15–18 years with a high educational level are foremost active on Facebook and Twitter. They also use their smart and mobile phones (aside from their
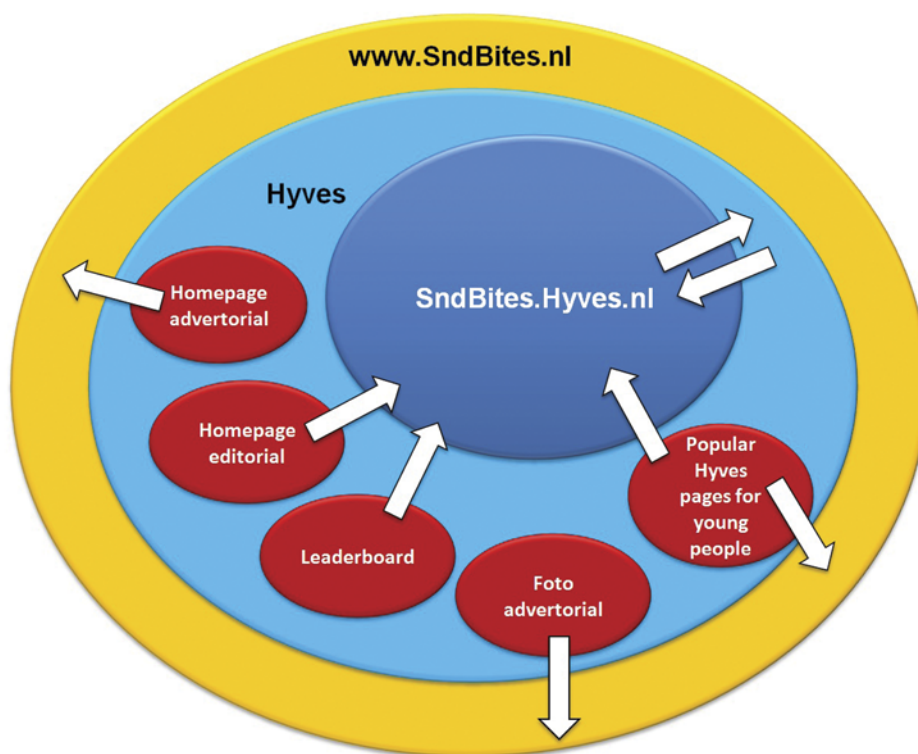
FIGURE 2 SndBites online communication strategy (Bouman 2012). (Figure available in color online.)

computers) more often to connect to social media platforms (Pijpers, 2012). Teens and young adults ages 15–18 years with a middle and lower education level tend to be very active on Hyves instead of on Facebook and Twitter (Pijpers, 2012). Since SndBites targets teens and young adults with a middle and lower educational level, the series was launched on Hyves.

Social Media Monitoring Tool and Search Strategies

To find markers in social media conversations, a social media monitoring tool needs to be in place and search strategies need to be defined. The functionalities of various social media monitoring tools differ. Some search systems are more elaborate and extensive than others.

Finchline, a social media monitoring tool developed by Howard's Home, was chosen for this MMW research project. Finchline is capable of searching large numbers of websites for a specific topic and monitors all the well-known channels such as Twitter, Facebook, YouTube, and Hyves, but also monitors tens of thousands of blogs, forums, review websites, and knowledge sites. Within these websites and types of social media, the

program searches every two hours for new mentions of the topic within status updates, reviews, comments, uploads, and so on. Twitter is monitored separately due to the enormous amount of content that is generated. Tweets are monitored every couple of minutes for a mention of a topic. For each topic the researchers can specify whether they want to search social media, news media, and/or Twitter. As soon as a topic has been introduced, Finchline begins the data collection and processing. A topic can consist of one or multiple words using Boolean logic.

After an initial Finchline training program, the MMW researchers have introduced more than 20 different search strings (e.g., SndBites OR SoundBites; Snd AND Bites; Tiejo; Eltjo). Based on the markers that are interwoven in the storylines of the SndBites series, the search engine system selects and retrieves the online conversations. This can be done directly or even months after the start of the series, as long as the keywords and markers are known from the start. Mark My Words data will be selected during a period of 16 weeks.

Text Mining

Text mining is a method for the automatic classification of large volumes of documents (Weiss, Indurkhya, Zhanga, & Damerau, 2005). Himmel, Reincke and Michelmann (2009, p. 2) state that "it usually consists of finite steps, such as parsing a text into separate words, finding terms and reducing them to their basics ('truncation') followed by analytical procedures such as clustering and classification to derive patterns […], and finally evaluation and interpretation of the output." Depending on the amount of online conversations about SndBites in social media, MMW data will be analyzed using text mining techniques. First we define the corpus (a collection of online conversations) and create a data analysis framework. A text mining software is selected and adapted in order to recognize the specific markers used in SndBites and to classify the content of the discussions (e.g., positive or negative) that teens and young adults have in online conversations.

To answer the questions in MMW—(a) how and when do online conversations around the markers of the Internet series start, and (b) which and how many markers are identified in the conversations—goes far beyond merely counting how frequently markers are found in the online conversations. These questions are about recognition of the markers in the conversations. For this, it is less important how many conversations are collected because all of the conversations will be analyzed. To answer question (c) —what is the specific context in which these markers are used in the conversations (positive or negative; direct or indirect exposure; self-reported behavior, social cognitive determinants) and are the conversations in line with the aims of the Internet series and with the way the markers were intended,—text mining techniques are helpful. Enough conversations will be

needed (around 300–1,000) to train the text mining program on dichotomy decisions and to conduct a more refined categorization (e.g., using five categories: very negative, negative, neutral, positive, very positive) with a description of strengths and weaknesses. It is difficult to indicate how many online conversations we will be able to collect because we do not know how many teens and young adults will spontaneously begin communicating in social media platforms about the SndBites series. If the number of retrieved online conversations is not high, other data analysis methods (e.g., manual or via MAXQAD) will be more appropriate and cost-effective, such as applied in earlier research, for example, by Van Uden-Kraan et al. (2008), who analyzed online conversations of patients in self-help groups.

REFLECTIONS AND DISCUSSION

In this article we have argued why there is an urgent need to bridge the gap between new media practices and traditional media research, especially to gain more insights regarding the way social media can contribute to the dissemination and effect of web-based health communication interventions. We have presented an innovative methodology called Mark My Words that may compensate for the limitations of traditional designs (such as randomized controlled trials) and that may enable researchers to capture the particular mechanisms involved in web-based and social media interventions. This alternative methodology, including data-analytical techniques, is worked out in a study protocol for a new web-based entertainment-education series in the Netherlands called SndBites.

The central idea behind Mark My Words is to use markers in order to detect the number and type of interpersonal communication in web-based communication interventions and social media. One could discuss whether the use of (predefined) markers is necessary, for text mining techniques can also be applied on web-based interventions around specific topics (such as safe sex practices) without using markers. The use of special markers (such as in the SndBites intervention) has an added value due to the fact that finding causal inferences on intervention effects in social media is possible. If, for example, online conversations around safe sex practices use unique predefined markers, such as *Crispy Hot*, there is a strong likelihood that such use can be attributed to the specific (in this case SndBites) intervention.

There are several advantages of using text mining methodologies such as those embedded in MMW to conduct research on web and social media-based interventions: (1) They are considerably less expensive and less time-consuming compared to existing methodologies (i.e., cohort studies, interviewing); (2) data are available at any time, and results can be assessed almost without delay; (3) data is collected nonintrusively, thus avoiding bias due to nonresponse rates or social desirability; (4) data can be collected

retrospectively without the bias of social desirability or memory and interpretation bias that comes with this, as Internet data remain accessible over time; and (5) longitudinal research is feasible and relatively easy as new samples can repeatedly be taken without much effort.

It is important to note that collecting and analyzing Internet data comes with a set of ethical challenges. MMW deals with spontaneous and unstructured conversations of teens and young adults on the web and in social media. A major challenge is the blurring of the public and private sphere (Eysenbach & Till, 2001; Rizk, 2005). In this MMW research project, only open, publicly accessible Internet forums and online social communities are used for data collection. Furthermore, there is the issue of anonymity. Data are tied to online user names. The research participants are generally unknown and can construct alternative identities. Spontaneity and openness prevent researchers from taking every necessary precaution since in this dynamic environment it is impossible to predict what every precaution will be. Nonetheless, because data can be collected nonintrusively and retrospectively, there is a certain flexibility of time and space in averting undesirable ethical issues situations.

Because this methodology is new, in addition to the ethical challenges just noted, MMW's continuous improvement is fueled by method-related questions that arise in practice. Online conversations and the Internet behavior of teens and young adults cannot be controlled or steered due to the autonomy of users of the open web. This is an open-field experiment with its own risks. So for example, when not enough data are collected (spontaneous online conversations), what does this mean? Does it mean that the SndBites series is not attractive and entertaining enough to watch? Or do teens and young adults watch and appreciate it but not start spontaneous online conversations? In the case that teens and young adults enlist themselves as members of the SndBites Hyves group but they do not respond to polls or blogs posted within the SndBites Hyves community, does that mean they are not interested? Van den Beemt et al. (2009) differentiate the Dutch Netgeneration into four user types: Traditionalists, Gamers, Networkers, and Active Creators (p. 9). The majority of Dutch teens and young adults belong to the group of Traditionalists (40%) and Networkers (42%) (Van den Beemt et al., 2009, p. 13). The Traditionalists mainly consume social media content in terms of browsing, surfing, and searching for information. The Networkers preliminarily focus on the interchange of information on social media platforms and are busier with their own profiles on social media, instead of actively posting, exchanging and commenting on others' content. We know that teens and young adults in the 15–18 years old group with a lower educational level tend to be overrepresented in the Traditionalists user group; they tend to have a more passive attitude and are not very actively creating content (Van den Beemt et al., 2009; Pijpers 2012). Therefore, we do not know, at this time, whether it is realistic to expect them to post comments and start conversations.

The MMW methodology operates under the complexity of the Internet and social interactions. In its initial stages, it shows potential to go deeper than other tools. And its focus on "markers" makes it a unique and promising methodology to monitor effects of web-based health communication interventions.

NOTE

1. SndBites is a project of the Center for Media & Health, designed in collaboration with Trimbos-institute (alocohol issue) and Soa Aids Netherlands (STD issue) and creative producer De Filmwinkel and Interactive Design Bureau IDVision in the Netherlands.

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