Association for Information Systems
AIS Electronic Library (AISeL)

ECIS 2015 Completed Research Papers

ECIS 2015 Proceedings

Social Media Enabled Interactions in Healthcare: Towards a Typology

Edin Smailhodzic
University of Groningen, e.smailhodzic@rug.nl

Albert Boonstra
University of Groningen, albert.boonstra@rug.nl

David Langley
TNO, david.langley@tno.nl

Follow this and additional works at: http://aisel.aisnet.org/ecis2015_cr

SOCIAL MEDIA ENABLED INTERACTIONS IN HEALTHCARE: TOWARDS A TYPOLOGY

Complete Research

Smailhodzic, Edin, University of Groningen, Groningen, The Netherlands, e.smailhodzic@rug.nl

Boonstra, Albert, University of Groningen, Groningen, The Netherlands, albert.boonstra@rug.nl

Langley, David, TNO, Groningen, The Netherlands, david.langley@tno.nl

Abstract

Social media is increasingly used by healthcare users and providers to connect and communicate with each other. Such use is changing the interactions in healthcare and it is not clear what effects this may have for healthcare provision. Although it could be beneficial to both parties, it could also bring threats for healthcare providers and disrupt the healthcare system. Therefore, it is important to understand who interacts, about what and how these interactions can be categorized into a typology. In this way, we can attain a better grasp of the potential benefits and threats social media could have for healthcare providers and healthcare in general. We employ qualitative content analysis to six contrasting categories of social media and study interactions between healthcare users and with healthcare providers. We identify nine topics, propose six archetypical interactions on social media in the healthcare domain and propose how these archetypical interactions can be categorized in a typology. In this way, we answer a call for research within the information systems (IS) field in healthcare on who is using social media and in what ways. Thus, we provide a foundation for future research on the effects of social media in healthcare.

Keywords: social networks, internet, content analysis, disruption.

1   Introduction

The prevalent business model in healthcare is that of the "solution shop", such as applied by general hospitals and general practitioners (Hwang and Christensen, 2008). Solution shops refer to institutions that are created to diagnose and solve patient problems. In this system, communication between patients and doctors traditionally entails face-to-face interactions. This communication takes place in a real-time physical setting in which patients and doctors meet. However, emerging social media in healthcare enable both healthcare providers and healthcare users to interact in an online environment and an increasing number of users are looking for health-related information online. According to recent Pew Research study, in 2012, 72% of the Internet users in the USA searched online for health information (Fox and Duggan, 2013). Social media offer patients an opportunity to engage more in their own health-related issues by connecting with one another, but also with healthcare providers. In this new way, social media enable healthcare users to receive information from other users (Eysenbach, 2008). Furthermore, social media make it possible for healthcare providers to reach more patients and easily provide information on various conditions (Hawn, 2009).

However, this increasing use of social media may affect offline interactions between healthcare users and providers, with users increasingly able to make better informed choices and easily tap into the in-

formation and experiences of others (KPMG, 2011). On the one hand, healthcare users may fulfil some of their needs online, reducing their reliance on offline contact with their doctors. On the other hand, they may develop different needs and pose different questions, thereby placing new demands on the healthcare system. Therefore, social media may pose a threat to the traditional business model, as the change in interaction with healthcare providers could potentially result in altering the way the providers fulfil their role in the healthcare system (Andersen, Medaglia and Henriksen 2012). In particular, social media may play a role in functioning as a facilitated user network, which, according to Hwang and Christensen (2008), may disrupt the healthcare system for chronic disease management. Such networks enable the exchange of information and care advice between patients, thus equipping them with knowledge by learning from each other.

Healthcare providers and policy makers are faced with ambiguity about the effects of social media enabled interactions and the way they should deal with them. In particular, leading scholars in IS have raised the question how large providers should respond to these social media platforms and whether they should actively encourage participation of their staff and patients (Fichman, Kohli and Krishnan 2011). Agarwal et al. (2010) raise questions on how patients are using social media for health-related purposes and how this is changing the relationship between doctors and patients. To answer these calls for research and to understand potential effects of social media in the healthcare domain, it is important to understand *who* interacts with *whom*, *about what* and *which types* of interactions take place. Typologies are organized systems of types and represent an important form to understand complex causal-effect relationships (Fiss, 2011). In the context of social media in the healthcare domain, a typology of social media enabled interactions is a first step towards understanding the potential effects and disruptiveness of increasing social media utilization. Therefore, we pose and answer the following questions:

- *What types of topics are discussed among healthcare users and between healthcare users and healthcare providers?*

- *How and why the topics differ across categories of social media?*

- *How can we categorize the interactions and place them in a typology?*

Hence, this paper aims to provide a categorization of social media enabled interactions as a first step to further understand potentially disruptive effects of social media utilization in healthcare. In this way, we contribute to both theory and practice on this emerging topic. Theoretically, we add to the literature by addressing how social media features are utilized by users, which has been identified as an important topic for future research (Aral, Dellarocas and Godes, 2013). Furthermore, we contribute to the literature on information systems in healthcare, in particular on social media use in healthcare (Agarwal et al. 2010). Finally, we provoke discussion on potential disruptiveness of social media enabled facilitated user networks in the healthcare provision (Hwang and Christensen, 2008). In this way, we provide a foundation for research on how social media use can lead to a change in interactions between healthcare users and providers, and how that can affect healthcare providers in terms of their roles and business models.

Furthermore, social media platform managers, healthcare providers and policy makers could all benefit from this research. The managers of social media platforms can learn more about the ways in which healthcare users utilize social media and improve their platforms accordingly. Being familiar with the different types of interactions that are available and knowing how to use social media makes it possible for healthcare providers to communicate with their healthcare users more effectively. Both policy makers and healthcare providers would be able to better target their public health interventions and become more effective, which is in line with priorities in terms of healthcare interventions via social media identified by Chou et al. (2013). Given the disruptive potential of social media in terms how the healthcare users communicate with each other and with healthcare providers (Hawn, 2009), the re-

search can assist healthcare providers and the healthcare industry in defining their strategies to adequately address these important changes and potential disruptions.

2   Theoretical Background

Hwang and Christensen (2008) suggest that healthcare systems can function through three business models. These are adapted from Stabell and Fjeldstad (1998) and refer to solution shops, value-adding process business and facilitated user networks. In the context of healthcare, the solution shops business model is used by general hospitals, in which doctors act as experts and solve complex problems for patients. As such, it is a dominant business model in the current healthcare system. The second type of business model, value-adding process business, focuses on transforming resources into higher value outputs. This is becoming more popular in healthcare, and some providers are working on matching their resources and processes with their value propositions, thus reducing healthcare costs and making the healthcare provision more efficient. Hwang and Christensen (2008) suggest that the third type of business model, facilitated user networks, can radically change the healthcare system, especially for the chronic disease management. These business models are still underdeveloped. Facilitated user networks facilitate exchange of information and care advice among users.

Christensen and Hwang (2008) draw on disruptive innovation theory to explain potential disruption via facilitated user networks. Disruptive innovation theory (Christensen, 1997; Christensen and Raynor, 2003) explains how incumbents get disrupted by entrants. Entrants introduce products, services or business models that are simpler, cheaper and more convenient, initially having lower performance than those offered by incumbents or targeting previously unaddressed customers and thus creating a new market (Christensen, 1997; Christensen and Raynor, 2003; Markides, 2006). Govindarajan and Koppale (2006) define a disruptive innovation as an innovation that offers a different set of characteristics and performance attributes, which is an unattractive combination for mainstream customers at the time the innovation is introduced. In particular, Govindarajan and Kopalle (2006) suggest that disruptive innovation should be a) inferior on the attributes that mainstream customers value b) offer new value propositions to attract new customer segment c) be sold at lower price and d) penetrate the market from niche to mainstream.

Social media is neither a product nor service, but a set of Internet applications that offer value through connecting users together who can share information. Still, it satisfies the conditions of being a disruptive innovation as it is a) inferior on the attributes that mainstream patients value (e.g. physical contact with doctor), b) it offers new value propositions (e.g. online contact with peers and doctors) and c) is often free. Therefore, social media offer patients with an opportunity to use it as an alternative solution compared to offline interactions with the healthcare providers. In this way, their relationship with healthcare providers may change and impact the roles and responsibilities of healthcare providers. In particular, social media represent a great opportunity to build and operate facilitated user networks, and provide patients with an opportunity to communicate and ask questions in a convenient and efficient way without time constraints or geographical limitations. This offers healthcare users advantages compared to traditional interactions with healthcare providers. However, to further understand such potential effects on healthcare, there is a need for better understanding of social media enabled interactions in the healthcare. Hence, our motivation is to provide a foundation by identifying what kinds of interactions are enabled by social media in the healthcare and how they can be categorized. To do this, we first provide a review of earlier research into social media in healthcare focusing on two literature streams, namely medical journals and IS journals.

Recent period has been characterized by increasing research into social media in the healthcare domain. The research indicates that social media are used by both healthcare providers (Van de Belt et al. 2012) and users (Greene et al. 2011). It covers many different topics, such as the features of health groups (Bender et al. 2012) and specific diseases (Shaw and Johnson, 2011). Many studies focus on

social networking sites such as Facebook (Greene et al. 2011), Twitter (Thackeray et al. 2013) and those built exclusively for healthcare users to share their experiences (Wicks et al. 2010) or review healthcare providers (Reimann and Strech, 2010). Additionally, the research covers blogs (Shah and Robinson, 2011) and content communities such as Youtube (Prybutok, 2013). Studies on digital initiatives in healthcare have been mostly published in the medical research area with a small, but growing number of papers in IS journals (Agarwal et al. 2010). Therefore, we start with the review of papers from the medical research area that shed light on the topic of social media in healthcare by synthesizing current findings from the literature (Ziebland and Wyke, 2012; Chou et al. 2013; Hamm et al. 2013; Moorhead et al. 2013).

Ziebland and Wyke (2012) identify seven domains as a result of online patient experience, namely finding information, feeling supported, maintaining relationships with others, affecting behaviour, experiencing health services, learning to tell the story, and visualizing disease. To identify these, they combine a literature review and a public user panel on how sharing of experiences online between the users may affect their health. Whereas some of the concepts they outline were already known from the literature, Ziebland and Wyke (ibid.) suggest that learning to tell the story and visualizing disease are experiences which had not been identified before, but that these also constitute important features for healthcare users. This is significant as hearing about how others experience their health-related issues and illustrating this through pictures and videos constitutes a powerful form of communication. In refining the results of the study, they also propose a results matrix illustrating different Internet applications and their use. The study examines this from the perspective of the source of information and does not consider with whom the interactions take place.

Chou et al. (2013) focus on the use of Web 2.0 for health-related purposes. They classify the reviewed literature under commentaries, descriptive studies and intervention studies. Whereas commentaries highlight the use of social media for the promotion of healthy behaviour, and the low costs of such use, descriptive studies focus on both promotion and prevention related to health issues. In addition to the promotion of healthy behaviour, intervention studies focus on the educational aspect. Overall, Chou et al. (2013) conclude that Web 2.0 has mostly been used for health promotion and education, underlining that the educational use is more often based on sharing personal advice than the official medical knowledge and guidance.

Hamm et al. (2013) conducted a review to examine the use of social media by healthcare providers and users. Drawing on a sample of more than two hundred studies, they provide a review of social media tools and interactions within social media. The review shows that most of the published studies, over 60%, examine discussion forums, followed by social networking sites, and only a few of those focus on blogs. Whereas discussion forums were employed predominantly to facilitate self-care in relation to conditions such as diabetes and cancer, the other types of social media platforms were used to share personal experiences. Although social media have been reported to be used for a variety of health conditions, most studies addressed the groups that concerned lifestyle and weight loss topics. One of the limitations of the review is that it fails to clearly explain the difference in the utilization by healthcare providers as compared to the utilization by healthcare users. In particular, they do not indicate who the actors in social media platforms are and how they interact with each other.

Another recent paper by Moorhead et al. (2013) provides an overview of the social media interactions between different actors. It focuses on the benefits and limitations of social media in terms of health communication. The review indicates that health- related communication takes place between patients, healthcare providers and the general public. Moorhead et al. (ibid.) also find that patients use social media to share and obtain health-related information from one another and from healthcare professionals. Furthermore, they outline some of the benefits that the patients experience, such as increasing interaction with others and emotional support. They also consider different categories of social media. Whereas Hamm et al. (2013) report that the most publications were focused on the discussion forums, Moorhead et al. (2013) found that about one third of the papers analysed popular social networking

sites such as Facebook and Twitter. This difference may stem from different inclusion criteria of their reviews and classification of social media applications. However, the reviews do not discuss the similarities and differences between different categories of social media. Yet, this is important as different categories may be suitable for only certain types of interactions.

In the IS literature, early work on online health communities by Maloney-Krichmar and Preece (2005) shows that users engage in providing informational and emotional support, but also share their personal health experiences. This shows that people are willing to share their personal health experiences when they believe it can help others (Anderson and Agarwal, 2011). Miller and Tucker (2013) show that the way social media platforms are managed influences the type of users who generate such content. In particular, active management of social media platform by leads to more content being generated by providers than by their patients. In addition, Yan and Tan (2014) have shown that the different types of online support may lead to different mental health outcomes. These differences emphasize the need to improve our understanding of who is using social media, and in what ways, for health-related purposes. Both Agarwal et al. (2010) and Fichman et al. (2011) point to a need for further research on social media in healthcare.

Taken together, this literature does not, as yet, offer a clear picture of the nature of social media enabled interactions in the healthcare. One step forward in this regard is an empirically based typology of the interactions taking place via social media where healthcare users communicate together, and with providers. Such a typology is necessary to help us gain further structured insights into this potentially important change brought about by social media. We expect that different types of interactions will have different effects on the users, will offer different benefits, and pose different challenges. As such, different types of interactions may have different potential disruptiveness on healthcare provision. This paper contributes to the IS literature by taking steps to help fill this gap, in particular by creating just such a typology based on a content analysis from a diverse range of twenty social media applications. First we collect information and assess what the topics of discussion are, and whether healthcare users or providers take part. Second, we evaluate the extent to which each topic occurs in different sorts of social media applications, such as social networking sites or content communities. Finally, we identify archetypical interactions and propose a categorization, and place the different types in a typology. Following this, we discuss potential disruptiveness of the archetypical interactions. In this way, we provide a foundation for future studies, in particular how social media enabled interactions can contribute to the transition towards facilitated user networks in healthcare provision.

3 Methodology

We adopt qualitative approach to answer our research questions on social media enabled interactions in the healthcare domain and propose a typology. Our research questions aim to provide a better grasp and explore phenomena which are poorly understood and we raise *how* research question. Hence, qualitative approach is appropriate (Maxwell, 2005; Yin, 1994). Furthermore, a key social media feature is the creation and exchange of user generated content (Kaplan and Haenlein, 2010). Hence, qualitative content analysis is appropriate and it has been applied in earlier social media studies (Water et al. 2009) as well as in the health-related context (Greene et al. 2011; Zhang, He and Sang, 2013). A content analysis is a process meant to summarize raw data (Wildemuth, 2009), and relies on inductive reasoning with themes and categories emerging from data, which constitutes a qualitative content analysis (Hsieh and Shannon, 2005). In this way, we follow an inductive approach for developing a typology in the IS field (Nickerson, Varshney and Muntermann, 2013).

To select our cases, we rely on purposive sampling. The purposive sampling techniques involve selecting units or cases on the basis of specific purpose rather than randomly (Tashakkori and Teddlie, 2010). We chose cases from contrasting categories of social media taken from the social media typology proposed by Kaplan and Haenlein (2010) and select six contrasting cases. Social media health

communities are often focused on a single health condition (Greene et al. 2011). Furthermore, in provider initiated communities, content is often generated by healthcare providers to a higher extent than by healthcare users (Miller and Tucker, 2013). Therefore, we create further variation within our cases and extend the sample in relation to purpose (general health versus condition specific) and in terms of how they are initiated (healthcare user versus provider initiated). In selection of the cases, we select those that are popular according to our knowledge as well as by searching for the renowned cases in lists of social media healthcare platforms on different sites. In this way, we contribute to selecting appropriate cases. Although an attempt is made to analyse four social media platforms per category, we are not able to locate provider initiated collaborative projects on a specific health condition. Furthermore, we are also only able to locate a single virtual world health game in which we can observe what the users can do. Therefore, the total number of the social media platforms we select amounts to 20 as shown in Appendix 1.

We observe and collect the data from our cases by selecting posts and/or comments from the blogs, social networking sites, content communities and collaborative projects. Within each of these categories, we collect 400 posts and/or comments. We are not able to collect the content for the virtual game world and virtual social worlds. This is due to the fact that the there is no content available that participants exchanged that is public. Therefore, we observe these categories. In order to do so, we register and create avatars in the STBBI clinic of Vitalis Island – Game for science and the IMVU. We use these avatars to make observations. We observe the virtual rooms and possibilities that users can perform with their avatars. To analyse data, we select and code parts or entire posts and comments. In this way, we arrive at 1727 quotes subsequently assigned with a thematic code and a code for the nature of communication. In this process, we follow the principle of theoretical saturation (Glaser and Strauss, 1967; Eisenhardt, 1989; Strauss and Corbin, 1998). This means that more quotes did not lead to new thematic codes and codes for nature of communication. In addition, to ensure reliability of our coding, we randomly select the sample of 85 quotes, which is independently coded between all three authors. We then calculate inter-rater reliability (IRR) applying the approach for reliability of qualitative data proposed by Rust and Cooil (1994). IRR was calculated for the nature of interactions, namely social-emotional versus instrumental (0.91), general versus personal (0.90), and expressing versus asking (1.00). Given the fact that the Rust and Cooil (1994) approach is limited to five categories, for the nine thematic codes, we calculated IRR for the five most frequent thematic codes in the sample, which led us to reduce it to 80 quotes. The thematic codes in question are health condition, online social grooming, lifestyle, non-health and product recommendation. IRR value is 0.98. IRR acceptable levels are above 0.7 (Neuendorf, 2002), suggesting that our coding scheme is reliable. Furthermore, in order to assess if the participating actors are healthcare users or providers, we check their social media profiles and make a deduction based on the content of posts and comments.

Following the data coding and the analyses per categories of social media, we conduct a cross category analysis to reveal the differences and similarities across the categories of social media. At this stage, we identify the relationships and organize our categories in a meaningful way by exploring the properties of the categories and uncovering the patterns. Based on the results of individual category analyses and the cross case analysis, we propose a typology. We apply the contrastive categorization as we define our archetypes in terms of types that emphasize the contrast with the alternative options. In this way, archetypical interactions are identified representing the typical examples of the particular types of the social media enabled interactions in healthcare. Following this, we propose the categorization of archetypical interactions in a two dimension typology. We derive at the dimensions of our typology through an inductive analysis as described as well as through joint discussion of authors throughout the process. At all stages of the analyses, we constantly return to the raw data and compare them with our categories in order to arrive at the identified relationships.

4 Results

4.1 Topics, Nature of Communication and Participating Actors

We start by providing a general review of the identified topics, the nature of communication and participating actors. Overall, we distinguish between nine main topics. 1) a health condition, due to illness, injury or other physical or mental problem. As such, it can be an acute or a chronic health condition. 2) a healthcare provider, such as physicians, hospitals, insurance companies and others. 3) health products, such as drugs, health insurance packages or dietary products/substances, and their effects. 4) health policy/procedures, concerning government healthcare policy and discussions about the decisions, initiatives and procedures aimed at achieving society's healthcare goals. 5) suggesting offline contact, in which healthcare providers or users suggest to those asking questions that they have offline contact with a healthcare provider. 6) product recommendations, including promotions of certain products or services to others. 7) lifestyle, such as discussions about healthy living, exercising, eating and weight loss, skin/hair treatments, etc. 8) online social grooming, including interpersonal bonding, recognition of the importance of a person and his/her personal experiences. 9) non-health, including all interactions on other topics.

Besides the specific nine categories of topic, described above, we also make a distinction between three dimensions by which the style, or nature, of the interaction may be described, and these are: 1) social-emotional versus instrumental, 2) general versus personal and 3) asking versus expressing. The social-emotional versus instrumental dimension was created to differentiate between the contents that represent the mental state of individuals and, as such, includes the feelings of happiness, anger, etc. from the content wherein the intention is to transfer information in an objective and explicit way. The general versus personal was used to make the distinction between the content that relates to somebody's personal situation, such as their health experiences, as opposed to general discussions on particular health-related topics. Finally, we also introduced the distinction between asking others for information or opinion, and expressing one's own content or opinion. Table 1 provides an overview of the prevalence of each topic and each of the three dimensions of the nature of the interactions for the four categories in which we have analysed the content.

Dimension	Platform				
Topic	*Overall*	*Blogs*	*Social networking sites*	*Collaborative projects*	*Content communities*
1) Health condition	31%	22%	23%	45%	33%
2) Healthcare Provider	2%	2%	4%	0%	1%
3) Health product	14%	20%	8%	27%	2%
4) Health policy /procedures	4%	8%	2%	8%	0%
5) Suggestion for offline contact	1%	0%	3%	0%	0%
6) Product recommendation	4%	5%	2%	0%	9%
7) Lifestyle	16%	12%	13%	20%	18%
8) Online social grooming	20%	21%	36%	0%	23%
9) Non-health	8%	10%	9%	0%	14%
Nature of	*Overall*	*Blogs*	*Social network-*	*Collaborative*	*Content*

communication			ing sites	projects	communities
A1 Social-emotional	32%	38%	47%	0%	44%
A2 Instrumental	68%	62%	53%	100%	56%
B1 General	59%	67%	35%	100%	35%
B2 Personal	41%	33%	65%	0%	65%
C1 Asking	7%	6%	8%	0%	12%
C2 Expressing	93%	94%	92%	100%	88%
Actors	*Overall*	*Blogs*	*Social network-ing sites*	*Collaborative projects*	*Content communities*
Healthcare user	81%	93%	71%	78%	83%
Healthcare provider	19%	7%	29%	22%	17%

Table 1.   Review of Topics, Nature of Communication and Participating Actors

4.2   Similarities and Differences Among Social Media Categories

An interesting similarity between the categories observed is that social networking sites and content communities have a high share of the topics concerning the interlocutors' personal health conditions. In these categories, discussions over these topics were notable among the healthcare users but also between healthcare users and healthcare providers. The two categories were similar also in terms of the healthcare users posing questions to healthcare providers and the sort of questions that most commonly had to do with their personal health conditions. This stems from the fact that in both of these categories the healthcare users actively participated in discussions with the healthcare providers. The same reasoning applies to another of their similarities, namely a high share of asking and answering questions. This was particularly evident in the cases of communication with healthcare providers wherein they provided the answers to health condition-specific questions but, by contrast, not found with blogs. Although we were unable to observe the content of the virtual social worlds, they reflect a similar pattern as they also enable direct and specific communication with healthcare providers about health conditions, as well as discussions on personal health-related issues. This is because healthcare providers are present in their virtual rooms and can communicate with users.

Collaborative projects were found to be different from all other social media categories including virtual game worlds and virtual social worlds. Whereas the other categories enable and exhibit different topics and nature of communication, collaborative projects focus on the instrumental, general and expressing only. It also stands out from the other categories in the sense that it involves fewer participants. As opposed to the other categories, participation in expert medical collaborative projects may require advanced knowledge and an effort from the participants. On the other hand, it is similar to the provider-user discussed topics in blogs that are also characterized by the instrumental and general which serve to educate the wider public on health-related topics. A similar pattern is reflected in the nature of communication regarding social-emotional versus instrumental across all categories except for collaborative projects.

As far as the topics are concerned, discussing health conditions was prevalent in collaborative projects and content communities. Moreover, in terms of the health conditions, the communication in all categories of social media that we analysed was focused on chronic conditions, diabetes and cancer in particular. Suggestion for offline contact with healthcare provider was extremely poorly represented or not represented at all across the categories, its highest share being that of 3% in the social networking sites. Interestingly, suggestion for offline contact was highly specific to one particular case of a user initiated social networking site with a heavy involvement of healthcare providers. In this case, the topic concerning personal health conditions was very appropriate as the communication reflects deep discussions and trust towards recommendations of healthcare providers. Another striking finding was that a similar share of topics regarding product promotion was calculated for both content communities and blogs. However, whereas with blogs the product promotion was an integral part of the discussions on

certain health conditions, in content communities it mostly took the form of spam messages disrupting the communication between participants and, at times, being off-topic. A high share of social grooming in social networking sites sets them apart from the other categories and was present both among healthcare users and providers. The type of social grooming, however, was no different than that found in other categories and included providing social and emotional support, as well as attempted inspiration to others.

4.3   Archetypical Interactions and Typology

Following analysis of the topics, nature of communication and participating actors, we are guided by our content analysis results and we identify relationships between the analysed content to arrive at distinctive archetypical interactions. We describe the six archetypical interactions that emerged, and illustrate them with examples. We conclude with Table 2 summarizing the main characteristics of these archetypes.

Grooming fellow sufferers: This occurs between healthcare users. It is usually initiated by a healthcare user who talks about his/her own health condition and lifestyle. Other healthcare users engage in the interaction by grooming the original user and expressing their emotional support. Such interactions are focused on the personal conditions of the healthcare users who initiate them. The content is usually expressed in social-emotional way with the healthcare users, thus, showing solidarity and raising the status of the healthcare user who initiated the discussion. Interactions are broad and focused on both preventive and corrective way of dealing with one's own health. The interactions of this type are found with most categories of social media but prevalent in social networking sites and content communities focusing on lifestyle. The following example illustrates the archetype:

Post (user): *This is so me! Sharing photo: "I work out because it is good for me. Also, because I like to eat. A lot.* (Healthcare user, Lose Weight Jo)

Comment (user): *Yep I'm with ya sista!! :)* (Healthcare user, Lose Weight Jo)

Personal health condition resolving: This archetypical interaction is initiated by healthcare users and directed towards healthcare providers. The healthcare users describe their symptoms in detail and pose very specific questions to the providers. The interactions of this type always focus on personal health conditions. What is characteristic of this type of interaction is that the communication between the healthcare users and providers goes on until the healthcare users are satisfied with its outcome. Therefore, they are deep and have corrective character. Even though the interaction is mainly about the exchange between a particular healthcare user and healthcare provider, other healthcare users also engage and provide specific comments/suggestions to the healthcare user who had initiated it. These interactions involve both expressing and asking done in instrumental way. This type of communication was especially associated with a particular social networking sites studied but also present in content communities and social virtual worlds. A classic example of the archetypical interaction is provided below:

Post (user): ….*now ive been experiencing heart palpitations , weakness , fatigue , dizziness , and very rarely shortness of breath , loss of appetite im afraid…. why do I have all these other symptoms?* (Healthcare user, Medhelp)

Comment (provider): *I might recommend checking your pulse whenever you have these spells to see whether you have a fast or irregular heart rate….*(Healthcare provider, Medhelp)

Teaching users with occasional debating: This archetypical interaction reflects a teaching role of healthcare providers. Healthcare providers post educational content on the symptoms and treatments of health conditions, as well as on lifestyle. The content is addressed to healthcare users who react to it grooming the providers by showing appreciation for the content. In addition, the healthcare users provide their opinions on the subject and debate among themselves and with the healthcare providers. The interactions of this sort focus on a range of medical conditions and lifestyles but most frequently pertain to the symptoms and management of chronic diseases. The providers always address healthcare users in an instrumental way, attempting to address health topics in a general way. Therefore, interac-

tions remain broad and are directed towards both corrective and preventive dealing with one's own health. What characterizes this type of interaction is that the healthcare providers seldom engage in further discussions/interactions with the healthcare users and remain distant. This archetype may be found with different social media categories but is the most predominant in blogs and content communities. Here is an example of the type of interaction:

Provider (post): ….*That name is dermatographia urticaria, usually just called dermatographia or dermographism (literally "writing on the skin"). It's a type of "trauma-induced urticaria," but the trauma in this case can be* ... (Healthcare provider, James Hamblin blog)

User (comment): …*Very interesting article and it is kinda interesting that these allergy related textures can be created on skin with mild scratching*… (Healthcare user, James Hamblin blog)

Specialized and expert knowledge building: This archetypical interaction takes place between healthcare users and healthcare providers, but also among healthcare users only. The providers and users communicate in order to build knowledge and provide information on health conditions, lifestyle, health policies and health products. Usually, the participation in these types of interactions requires a high level of expertise. Interactions are deep and go into details on certain topic. They reflect corrective nature of dealing with one's own health. Be they of the provider-user or the user-user variety, these interactions often involve a limited number of actors. This type of interactions is present in collaborative projects only, which require that the contributing users have an account and possess advanced medical knowledge. That may be a limitation to wider participation in this type of interaction.

Provider (post):. …*For these problems to be diagnosed as ADHD, they must be out of the normal range for a child's age and development*….(Healthcare provider, WikiDoc)

User (comment): ...*[[ADHD]] is a long-term, chronic condition. If it is not treated appropriately, ADHD may lead to...* (Healthcare user, WikiDoc)

Lifestyle guru advisors: This archetypical interaction is of educational character reflected through the detailed showing of how to do, for example, certain exercises and how the exercises would affect one's weight and healthy lifestyle. It reflects communication amongst healthcare users as well as between users and providers. The healthcare users attempt to guide others and promote healthy lifestyle by provoking discussion about it. In doing so, they talk and present their own experiences as well as general topics. Also, they both express and ask questions on the topics. The healthcare providers promote healthy lifestyle through fitness and food related topics. Both users and providers do it in a broad way and focus on topics that are directed towards prevention of one's own health. The interactions of this type entail both the social-emotional and instrumental way of expressing. They are found in social networking sites and content communities. Here's an example of the archetype:

Post (user): *https://www.youtube.com/watch?v=TFssp4kG_8M* – video showing exercises for arms. (Healthcare provider, Everydayhealth)

Comment (user): *Thank you Holly! Yes, this is helping me to tone my arms* (Healthcare user, Everyday health)

Reviewing healthcare products and providers: This archetypical interaction takes place among healthcare users. The healthcare users express personal medical conditions and/or ask for recommendations with regard to healthcare providers or products (frequently the medications for treatment of certain diseases). Such interactions often take place in instrumental way but, at times, also social-emotional with the users expressing anger toward particular healthcare providers and/or health products. Interactions are sometimes broad with just a mention of certain provider or product and sometimes they go into details discussing certain product. What is characteristic of this type of interactions is that it is commonly embedded in discussions on health conditions. As such, they reflect corrective character in dealing with one's own health. This type of interaction is found with social networking sites, blogs and content communities.

Comment (user):… *It was done at Stanford by Dr. Steinberg also. They were great there*…(Healthcare user, Patient Power)

Comment (user):… *You can tell that Dr Jeff In Oregon is very concerned and focused on helping his patients...* (Healthcare user, Patient Power)

Interaction type	*Grooming fellow sufferers*	*Personal health condition resolving*	*Teaching users with occasional debating*	*Specialized and expert knowledge building*	*Lifestyle guru advisors*	*Reviewing healthcare products and providers*
Focus	Providing social and emotional support.	Personal conditions and getting advice from providers.	Teaching users on the range of conditions.	Building knowledge on different medical issues.	Guiding and promoting healthy lifestyles.	Reviewing healthcare products and providers.
Actors	User-to-user	Provider-to-user; user-to-user	Provider-to-user; user-to-user	Provider-to-user; user-to-user	Provider-to-user; User-to-user	User-to-user
Nature of interactions	Social-emotional and personal.	Instrumental and personal.	Instrumental and general	Instrumental and general	Both social-emotional and instrumental, personal	Personal and general; social-emotional and instrumental.
Social Media categories	SNS, content communities and blogs	SNS and content communities	Blogs and content communities	Collaborative projects	SNS and content communities	SNS, content communities and blogs
Purpose of interactions	Corrective/ preventive	Corrective	Preventive/ corrective	Corrective	Preventive	Corrective

Table 2.   Review of Archetypical Interactions

In order to develop a typology of healthcare users' social media interactions, we categorize archetypes along two dimensions, namely control and scope of interactions, see Figure 1. By control, we refer to way of communication that is present amongst actors. In this way, we differentiate between formal and informal control. In formal, actors address each other in official and formal way with strong hierarchy in the communication. On the other hand, informal is characterized by free and equal participation of all actors who freely express themselves and communicate with others. As such, it reflects communication in which hierarchy is not so strong in the relationship between actors and they freely address each other. Our second dimension is scope of interactions. In this dimension, we distinguish between broad and deep interactions. Broad interactions are characterized by discussing issue in a general way and do not touch upon details of the topics discussed by neither of the parties involved in the communication. Deep interactions focus on discussing certain topics in very detailed way. The categorization along these dimensions enable further understanding on how can these different types of interactions affect or even replace traditional offline communication characterized by focused interactions and rather formal type of control.

		Type of Control	
		Informal	Formal
Scope of Interactions	Broad	**Grooming fellow sufferers** **Life style guru advisors**	**Teaching users with occasional debating**
	Deep	**Reviewing healthcare products/providers** **Personal health condition resolving**	**Personal health condition resolving** **Specialized knowledge building**

Figure 1.   Typology of Social Media Enabled Interactions

5   Discussion and Conclusion

Aim of our paper was to provide further insights and propose categorization of social media enabled interactions in the healthcare. To do so, we have analysed six contrasting categories of social media and identified nine topics, six archetypical interactions and categorized them in the typology. Although our intention is not to study the effects that social media has on the relationship between healthcare users and providers, we provoke discussion on these issues. We discuss potential disruptiveness of the identified archetypes on offline interactions between healthcare users and providers. First of all, in the solution shop model, the traditional role of doctors entailed them being experts who provide knowledge to patients and interpret the patients' symptoms for them, which was a result of the information asymmetry between healthcare providers and users (Arrow, 1963). However, we find that social media enable users to take this communication to a new level in which not only users, but also healthcare providers discuss and recommend solutions to users in an online communication. In this way, we can suggest that it represents user facilitated network and may shift parts of the healthcare towards facilitated user networks. Furthermore, we take into account the fact that offline interactions must necessarily involve a healthcare provider and a healthcare user.

We find that the "personal health condition resolving" tend to decrease information asymmetry between providers and users. In this archetypical interaction, healthcare users are getting opinions/analyses of their conditions directly from specialists, so there is a risk that they skip general physicians altogether and refer directly to specialists in the offline interactions as well. Therefore, this archetype may have high effects on offline interactions, especially with general practitioners. "Teaching

users of occasional debating" also decreases the information asymmetry as the healthcare users are able to read on health topics posted by health professionals. Healthcare users do not discuss their own health condition and although they can increase their knowledge, it may not replace their offline interaction with provider. It is the similar situation with "specialized and expert knowledge building". It can significantly reduce information asymmetry between healthcare users and providers. However, not being able to ask direct question on personal health condition to healthcare provider may reduce the opportunity to replace a visit to doctor. Archetypical interaction "reviewing healthcare products and providers" significantly reduces the information asymmetry between providers and users. Healthcare users are able to learn about the experiences of others with certain healthcare products/providers. Although it cannot completely replace contact with provider, it may have impact on offline interactions with the providers who are subject of these reviews. Taken together, we propose that these archetypes may have medium effect on offline interactions. Finally, archetypical interaction "grooming fellow sufferers" does not contribute to providing knowledge on medical issues and it does not provide any specific information on health conditions. In addition, it cannot easily replace offline interactions with healthcare providers as it mainly involves healthcare users. The same applies to archetypical interaction "lifestyle guru advisors", which may to certain extent reduce information asymmetry, but not as high as some other interactions. This archetypical interaction usually has preventive purpose and focus on lifestyle. Hence, we propose that these two types of interactions may have low effects on offline interactions.

By providing a foundation on social media enabled interactions in the healthcare and proposing their categorization into typology, we contribute to ongoing discussion on the role of social media in the healthcare (Agarwal et al., 2010; Fichman et al. 2011). Furthermore, we provoke discussion on potentially disruptive role of the social media in the healthcare through user facilitated networks and also contribute to earlier findings. We enrich the literature by showing what interactions take place in different social media categories, between whom and how they can be categorized. In this way, we built on the earlier literature (Andersen et al. 2012; Antheunis et al. 2012; Ziebland and Wyke, 2012; Chou et al. 2013; Hamm et al. 2013; Moorhead et al. 2013) and provide more clarity. We have shown that some interactions may be specific to certain categories of social media and clearly indicated the actors who participate in these interactions. Moreover, our findings also shed more light on recent call for research on how the knowledge is built within online health communities (Faraj et al. 2014). Overall, our work facilitates better understanding and provides a foundation for future work in regards to the effects on offline interactions and move towards facilitated user networks in the healthcare.

Social media interactions in the field of healthcare also have practical implications. This holds especially in relation to healthcare providers and policy makers who can use our findings to provide a better care and communication with healthcare users. They can learn from our findings on how the healthcare users are using different categories of social media and what types of interactions are suitable for every one of these and refine their strategies. Similarly, having greater insight and comprehension of the online behaviour of healthcare users could serve as the basis for the relevant policy makers to better target different public health interventions.

Our sample of cases is not large and therefore we call for future research to test our typology in quantitative manner and include mobile applications. The future research might also enrich our typology by looking into the interactions that transpire between healthcare providers only. Furthermore, we acknowledge that quality of health social media is very diverse (Sillence et al. 2007). Although this issue is beyond the scope of our research, it may be an important factor that influences potential effects of social media use on healthcare users and providers. Therefore, this aspect can be included in the future research on the topic. Finally, we suggest it is important to further investigate different types of interactions and their effects on the doctor-patient relationship (Agarwal et al. 2010) and potential disruption of the healthcare due to facilitated user networks (Hwang and Christensen, 2008). In particular, future research may focus on the healthcare sectors that are likely to feel the effects such as chronic disease management (Hwang and Christensen, 2008).

References

Agarwal, R., G.G. Gao, C. DesRoches and A.K. Jha (2010). "The digital transformation of healthcare: Current status and the road ahead." *Information Systems Research* 21 (4), 796-809.

Andersen, K.N., R. Medaglia and H.Z. Henriksen (2012). "Social media in public health care: Impact domain propositions." *Government Information Quarterly* 29 (4), 462–469.

Anderson, C.L. and R. Agarwal (2011). "The digitization of healthcare: Boundary risks, emotion, and consumer willingness to disclose personal health information." *Information Systems Research* 22 (3), 469–490.

Antheunis, M.L., K. Tates and T.E. Nieboer (2013). "Patients' and health professionals' use of social media in health care: Motives, barriers and expectations." *Patient Education and Counseling* 92 (3), 426–431.

Aral, S., C. Dellarocas and D. Godes (2013). "Social media and business transformation: A Framework for research." *Information Systems Research* 24 (1), 3–13.

Arrow, K.J. (1963). "Uncertainty and the welfare economics of medical care." *The American Economic Review* 53(5), *941-973.*

Bender, J.L., D. Wiljer, M.J. To, P.L. Bedard, P. Chung, M. S. Jewett, A. Matthew et al. (2012). "Testicular cancer survivors' supportive care needs and use of online support: a cross-sectional survey." *Supportive Care in Cancer* 20 (11), 2737–2746.

Chou, W.Y.S., A. Prestin, C. Lyons and K.Y. Wen (2013). "Web 2.0 for health promotion: Reviewing the current evidence." *American Journal of Public Health* 103 (1), 9-18.

Christensen, C. M. (1997). *The innovator's dilemma.* Boston: Harvard Business School Press.

Christensen, C.M. and M.E. Raynor (2003) *The innovator's solution, creating and sustaining successful growth*. Boston: Harvard Business School Press.

Eisenhardt, K. M. (1989). "Building theories from case study research." *Academy of Management Review* 14 (4), 532-550.

Eysenbach, G. (2008). "Medicine 2.0: Social networking, collaboration, participation, apomediation, and openness." *Journal of Medical Internet Research* 10 (3), 22.

Faraj, S., G. von Krogh, K. Lakhani and E. Monteiro (2014). *Collaboration and Value Creation in Online Communities. Call for Papers*. URL: http://pubsonline.informs.org/page/isre/calls-for-papers (visited on 09/20/2014).

Fichman, R.G., R. Kohli and R. Krishnan (2011). "The role of information systems in healthcare: Current research and future trends." *Information Systems Research* 22 (3), 419–428.

Fiss, P.C. (2011). "Building better causal theories: A fuzzy set approach to typologies in organization research." *Academy of Management Journal* 54 (2), 393–420.

Fox, S. and M. Duggan (2013). *Health online 2013*. Report. PewResearchCenter.

Glaser, B. S. and A. A Strauss (1967). *The discovery of grounded theory*. Chicago: Aldine

Govindarajan, V. and P.K. Kopalle (2006). "The usefulness of measuring disruptiveness of innovations ex post in making ex ante predictions." *Journal of Product Innovation Management* 23(1), 12–18.

Greene, J.A., N.K. Choudhry, E. Kilabuk and W.H. Shrank (2011). "Online social networking by patients with diabetes: A qualitative evaluation of communication with Facebook." *Journal of General Internal Medicine* 26 (3), 287–292.

Hamm, M.P., A. Chisholm, J. Shulhan, A. Milne, S.D. Scott, L.M. Given and L. Hartling (2013). "Social media use among patients and caregivers: a scoping review." *BMJ Open* 3 (5), 1–10.

Hawn, C. (2009). "Report from the field: Take two aspirin and tweet me in the morning: How twitter, facebook, and other social media are reshaping health care." *Health Affairs* 28 (2), 361–368.

Hsieh, H.-F. and S.E. Shannon (2005). "Three approaches to qualitative content analysis." *Qualitative health research* 15 (9), 1277–1288.

Hwang, J. and C.M. Christensen (2008). "Disruptive innovation in health care delivery: a framework for business-model innovation." *Health affairs* 27 (5), 1329–1335.

Kaplan, A.M. and M. Haenlein (2010). "Users of the world, unite! The challenges and opportunities of Social Media." *Business Horizons* 53 (1), 59–68.

KPMG International. (2011). *Increasing importance of social media in healthcare*. URL: http://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/Issues-monitor-healthcare/Documents/im-healthcare-october-2011.pdf (visited on 06/19/2014).

Maloney-Krichmar, D. and J. Preece (2005). "A multilevel analysis of sociability, usability, and community dynamics in an online health community." *ACM Transactions on Computer-Human Interaction* 12 (2), 201-232.

Markides, C. (2006). "Disruptive innovation: in need of better theory." *Journal Of Product Innovation Management* 23(1), 19-25.

Maxwell, J.A. (2005). *Qualitative Research Design: An Interactive Approach.* 2nd Edition. Thousand Oaks: SAGE Publications

Miller, A.R. and C. Tucker (2013). "Active social media management: The case of health care." *Information Systems Research* 24 (1), 52–70.

Moorhead, S.A., D.E. Hazlett, L. Harrison, J.K. Carroll, A. Irwin and C. Hoving (2013). "A new dimension of health care: systematic review of the uses, benefits, and limitations of social media for health communication." *Journal of Medical Internet Research* 15 (4), 85.

Neuendorf, K. A. (2002). *The content analysis guidebook.* Thousand Oaks: Sage Publications.

Prybutok, G. (2013). "Youtube: An effective web 2.0 informing channel for health education to prevent STDs." *Informing Science* 16 (1), 19–36.

Rust, R. T. and B. Cooil (1994). "Reliability measures for qualitative data: Theory and implications." *Journal of Marketing Research*, 1-14.

Shah, S.G.S. and I. Robinson (2011). "Patients' perspectives on self-testing of oral anticoagulation therapy: content analysis of patients' internet blogs." *BMC Health Services Research* 11 (1) 25.

Shaw, R.J. and C.M. Johnson (2011). "Health information seeking and social media use on the internet among people with diabetes." *Journal of Public Health Informatics* 3 (1) 1–10.

Stabell, C.B. and Ø.D. Fjeldstad (1998). "Configuring value for competitive advantage: On chains, shops, and networks." *Strategic Management Journal* 19 (5), 413-437.

Strauss, A. and J. Corbin (1998). *Basics of qualitative research: Procedures and techniques for developing grounded theory*. Thousand Oaks: Sage Publications

Tashakkori, A. and C. Teddlie (2010). *Handbook of Mixed Methods in Social & Behavioral Research.* 2nd Edition. Thousand Oaks: SAGE Publications

Thackeray, R., B.L. Neiger, S.H. Burton and C.R. Thackeray (2013). "Analysis of the purpose of state health departments' tweets: Information sharing, engagement, and action." *Journal of Medical Internet Research* 15 (11). 255.

Van de Belt, T.H., S.A. Berben, M. Samsom, L.J. Engelen and L. Schoonhoven (2012). "Use of social media by western European hospitals: Longitudinal study." *Journal of Medical Internet Research* 14 (3), 61.

Waters, R.D., E. Burnett, A. Lamm and J. Lucas (2009). "Engaging stakeholders through social networking: How nonprofit organizations are using Facebook." *Public Relations Review* 35 (2), 102–106.

Wicks, P., M. Massagli, J. Frost, C. Brownstein, S. Okun, T. Vaughan, R. Bradley et al. (2010). "Sharing health data for better outcomes on Patientslikeme." *Journal of Medical Internet Research*, 12 (2), 19.

Wildemuth, B.M. (2009). *Applications of social research methods to questions in information and library science*. 1st Edition. Westport: Greenwood Publishing.

Zhang, Y., D. He and Y. Sang (2013). "Facebook as a platform for health information and communication: A case study of a diabetes group." *Journal of Medical Systems* 37 (13), 1-12.

Ziebland, S. and S. Wyke (2012). "Health and illness in a connected world: How might sharing experiences on the internet affect people's health?." *Milbank Quarterly* 90 (2), 219-249.

Yan, L. and Y. Tan (2014). "Feeling blue? Go online: an empirical study of social support among patients." *Information Systems Research* (forthcoming).

Yin, R. (1994). *Case study research: Design and methods*. Beverly Hills: Sage Publications

Appendix 1

Platform General/Specific		Initiator	
		Provider initiated	**User initiated**
Blogs			
	General	Harvard medical blog	E-patient Dave
	Specific	James Hamblin	Diabetes mine
Social Networking Sites			
	General	Boston Children's Hospital	Medhelp
	Specific	Dr. Eisenberg	Lose weight Jo!
Content communities			
	General	Everydayhealth	BeautifulBrwnBabyDol
	Specific	Endobariatric	Patient power
Collaborative projects			
	General	WikiDoc	Natural health wiki
	Specific		Street Medic Wikia
Virtual Game Worlds			
	General	Vitalis Island STBBI Clinic	
Virtual Social Worlds			
	General	Lil Angels Maternity	First Health Hospital
	Specific	Krystal's Therapy	G.Y.M. Body & Fitness

Table 1.   List of Cases