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Abstract

During the past decade, there has been an explosive growth of online social networks. This proliferation of social media has infiltrated various sectors of social and business communications. Of particular interest is the growth of health related services and websites, and the health care sector's adoption of social media. In this paper, we develop a typology of health 2.0 services and websites.

Keywords

Online social networks, web 2.0, the Internet, virtual communities, health care

JEL Classification: L20

1. Introduction

The proliferation of social media affects all aspects of business and social communications. Considering the growing role of social media, of particular interest is the health care's adoption of the different media. The emergence of the Internet with its myriad health-related websites provides a wealth of information to patients and physicians. This has contributed to a transformation in patient-physician relationships. Today, patients and physician are beginning to find a healthier balance of power through a process of shared decision making (Truog 2012).

According to a research conducted by Pew International Center, 80% of Internet users seek health information online (Fox 2011). Individuals go online to seek health information from blogs, discussion boards, health virtual communities, and other sources of health information. Additionally, they tend discuss health topics and often contribute their knowledge and

experiences in discussion threads, in order to provide other users with helpful information as well as emotional support.

Health social media is facilitated by collaborative tools and interactive features. Thus, it is a form of web 2.0 generation of Internet websites. Web 2.0 was first popularized by O'Reilly in and revolutionized the Internet usage (O'Reilly 2005; Van De Belt, Engelen et al. 2010). The most common features among all web 2.0 instances are collaboration features and tools. Blogs, discussion boards and online social networks such as Facebook and MySpace are examples of web 2.0 (Adams 2010).

Web 2.0, and 2.0 terms such as "enterprise 2.0" (McAfee 2006) and "library 2.0" (Bingsi and Xiaojing 2006) are increasingly referenced and used by practitioners and academicians. Accordingly, various 2.0 terms have been proposed and used in the context of health and wellness. Health 2.0, medicine 2.0, and physician 2.0 are among the most common terms used for health social media (Hughes, Joshi, and Wareham 2008; Van De Belt, Engelen, Berben, and Schoonhoven 2010). For this article, we use the most widely used term, Health 2.0 (Adams 2010). Health 2.0 can be defined as "the use of a specific set of web tools (blogs, podcasts, tagging, search, wikis, etc.) by actors in health care including doctors, patients, and scientists, using principles of open source and generation of content by users, and the power of networks in order to personalize health care, collaborate, and promote health education." (Hughes et al., P.5)[1]

Over the last few years, the applications of health 2.0 have grown dramatically. According to the results of a research conducted by Pew Research Center, approximately 20% of Internet users seek health information from other Internet users who have similar health issues or medical concerns (Fox 2011). Nonetheless, patients are not the only health consumers who use health 2.0 services. Patients' caregivers also seek health information online in order to help their patients manage their conditions (Eysenbach 2008). Additionally, all other Internet users who are willing to get health and wellness information can use health 2.0 websites in order to communicate with other users and exchange their relevant knowledge and provide support for patients and caregivers.

Health professionals are another group of actors within health 2.0 websites (Eysenbach 2008; Hughes, Joshi et al. 2008). Doctors initiate health blogs (i.e., blogs on KevinMD.org) in order to provide useful information and tips for Internet users. Health virtual communities (i.e., dailystrength.org) also welcome doctors to serve their users by providing health advice and answer questions posted by community members. Furthermore, doctors can join professional online communities (i.e., ozmosis.org) in order to share their professional knowledge with each other and discuss medical cases, treatments and other professional

[1] This definition is proposed for Medicine2.0 in Hughes and Joshi (2008). However, as they have mentioned in their article, Medicine2.0 and Health2.0 have been used interchangeably in the literature. Thus, we adopt this definition for Health 2.0 in this paper.

health topics. The results of a study completed by Manhattan research group revealed that 60% of the surveyed American physicians were interested in using social networks for professional purposes (Keckley 2010). Thus, health 2.0 is also changing the way physicians enhance their professional knowledge through communicating with their colleagues.

Growing Internet users' interests in using health 2.0 tools has lead health organizations to engage actively in social media strategy (Keckley 2010). As of October 9, 2011, more than 1200 hospitals and clinics in the United States had a social media presence including Facebook® fan pages, Twitter® profiles, or YouTube® channels (Bennett 2011). Some health organizations even go beyond that and establish their own health virtual communities. Mayo clinic, for example, has established "Mayo clinic center for social media"[2] to help its patients and caregivers communicate with each other.

Health 2.0 tools and services have emerged in different forms and for different types of users. Each health 2.0 service has specific features, benefits and challenges. Although studies have been conducted within the context of health 2.0 and health social media over the past few years, still there is a lack of consensus among the researchers on different categories of health 2.0 services and websites. General typologies of virtual communities (Porter 2004) and specific typologies for specific instances of web 2.0 (Messinger, Stroulia et al. 2008) have been proposed by extant literature. However, to the best of our knowledge, there is no typology that specifically targets health 2.0 or health social media. We believe that our development of a health 2.0 typology can help to clarify this environment and contribute to future research efforts in this area.

The remainder of the paper is structured as follows. First, we present a review of literature on Web 2.0 and health 2.0 typologies and implications. Second, we present our typology and discuss its specifications. Third, the health 2.0 categories will be analyzed and described. Fourth, we demonstrate the application of the typology in action by listing 14 popular health 2.0 websites in terms of the categories of health 2.0 services. Last, we conclude by summarizing and discussing areas for future research using this typology.

2. Literature Review

In accordance with the emergence of web 2.0 services and virtual communities, researchers in various disciplines have directed their research efforts towards this phenomenon. In this vein, several scholars have taken a primary but valuable step in developing classification frameworks and typologies of social media and associated services and tools. Some typologies are proposed for classification of online communities in general (see Porter 2004).

[2] Http://www.connect.mayoclinic.org

Other typologies have targeted social media in specific contexts (see Messinger et al. 2008; Hara, Shachaf and Stoerger 2009).

Porter (2004) developed a generic typology of virtual communities that is intended to be used by scholars in different disciplines. He argues that the previous categorizations of virtual communities were all one-dimensional; hence, applicable to a single disciplinary perspective. Accordingly, Porter developed a general-use typology based upon two broad dimensions: establishment and relationship orientation. Regarding the establishment factor, virtual communities are classified into two main categories: member-initiated and organization-sponsored. Based upon relationship orientation, Porter categorized member-initiated virtual communities into social and professional categories. In a similar vein, he divided organization-sponsored communities into commercial, non-profit, and government virtual communities.

Porter (2004) discussed five p-initiated attributes of virtual communities including purpose, place, platform, population interaction structure, and profit model. Purpose denotes the content of interaction or the reason a virtual community has been established. Place shows the extent to which the interactions among the members of a virtual community is mediated by technology. Platform pertains to the interaction structure of the community that falls into three categories: synchronous, asynchronous, and hybrid. Population refers to the group structure (i.e. small group or public communities) and the types of social ties (strong, weak, stressful). The last attribute proposed by in this article is profit model that describes the way a virtual community generates revenue. Porter (2004) justified and validated his typology based upon the criteria proposed by (Hunt 1991).

Porter's generic typology was, afterwards, extended by researchers in various disciplines and applied to more specific contexts. Messinger et al. (2008), for example, adapted the Porter's typology in his classification of virtual worlds. Although Messinger et al. (2008) did not consider the first two levels of classification, establishment and relationship orientation, developed by Porter (2004). They applied the five p-initiated attributes in the context of virtual worlds. They also customized the attributes to be more relevant and applicable in the context of virtual worlds. Finally, Messinger et al. (2008) followed the evaluation procedure that Porter (2004) to validate their typology.

Stanoevska-Slabeva and Schmid (2001) distinguished two broad categories of virtual communities: discussion communities and task-and-goal oriented communities. According to their typology, discussion communities are intended to provide a communication platform for the user to exchange information related to a specific topic, whereas task-and-goal oriented communities are established for the user to accomplish a task cooperatively. In contrast to Porter (2004), Stanoevska et al. (2001) described and labeled the categories in a distinct manner. They also sub-categorized each main category of virtual communities and discussed community supporting platforms for each type of community.

According to Stanoevska et al. (2001), discussion communities fall into four categories: 1) discussion communities with direct person-to-person communication, 2) topic-oriented communities, 3) communities of practices, and 4) indirect discussion communities with indirect communication between members. The first category afterwards was defined and widely accepted as online social networks by the literature (see Ellison (2007).

The different categories of virtual communities introduced by Stanoevska et al. (2001) were later expanded on by other researchers. Dubé, Bourhis, and Jacob (2006) proposed a comprehensive typology of virtual communities of practices. The main dimensions of their typology included demographics, organizational context, membership characteristics, and technological environment. They specified each category in terms of several attributes. For example, technological environment was specified in terms of degree of reliance on information communications technology (ICT) from low to high and ICT availability, from high to low. Dube et al.'s (2006) typology, however, was only applicable to organizational virtual communities of practices. Hara et al (2009) extended their typology to non-organizational contexts.

Recent research efforts have focused on developing typologies of virtual communities within the context of health and wellness. Beijnum,Pawar, Dulawan, and Hermens (2009) emphasized mobile virtual communities for telemedicine and discussed the different attributes and implications of this type of health 2.0 service. They adopted Porter's (2004) five attributes to characterize virtual communities for telemedicine. They also discussed the typology developed by El Moor and Kawash (2007) for mobile virtual communities and the implications of this typology within the context of telemedicine.

Despite considerable attention directed towards developing typologies of virtual communities in different contexts and at different levels, there still is not enough research that focuses on the categorization of health 2.0 services and health-related virtual communities. In this paper, we develop a typology specifically applicable to health 2.0. In the following section, we describe our typology.

3. Typology

The base concept of the proposed typology is health 2.0 services. In the context of health 2.0, we define service as any collaborative platform established for contribution of digital content (articles, messages, emoticons, videos, etc.) that carry useful health information for health professionals/providers or provide social support (emotional or informational) for health consumers. Health consumers in this context include patients, caregivers, and Internet users who are willing to seek health information or provide other users with relevant knowledge and experience. Accordingly, services that health 2.0 websites provide for their users depend on the role of the health care providers and consumers, who provide or receive health

information. For example, health blogs are types of health 2.0 services that are facilitated by Internet websites to assist health providers to provide wellness and health information to consumers, whereas health discussion boards are typically intended to be used by consumers to communicate with each other and share their relevant knowledge and experience. Thus, our typology classifies health 2.0 services based on the role of the information providers and recipients.

In our framework, two main types of actors have been identified and emphasized: health care providers and consumers. Consumers (C) includes patients, caregivers, and other health information seekers while. Health care providers (P) are individuals or institutions that provides preventive, curative, promotional or rehabilitative services to individuals, families, or communities (http://en.wikipedia.org/wiki/Health_care_provider 2012). They include physicians (primary care and specialists), physician assistants, nurses, dentists, and other allied health professionals including pharmacists, physical therapists, and other health professionals.

In figure 1, we classify four major types of health 2.0 services and include examples of health 2.0 websites that provide these services.

		Service Recipient	
		Provider	**Consumer**
Service Provider	**Provider**	**P2P** Health Communities of Practice *E.g., http://www.sermo.com* *https://ozmosis.org*	**P2C** Health Blogs/ Newsgroups *E.g., http://www.kevinmd.com*

	Consumer	**C2P** Health Communities of Practice / Health Virtual Communities *E.g., https://iwantgreatcare.org*	**C2C** Health Virtual Communities *E.g., http://www.dailystrength.org* *http://www.webmd.com*

Figure 1. Health 2.0 Typology

3.1. Provider-To-Provider

The first category of health 2.0 services is called Provider-To-Provider (P2P) and pertains to community platforms provided by websites for health care providers in order for them to communicate with each other and share their knowledge and experience. Providers join these communities to discuss diseases, treatments, medical cases and other topics that help them answer specific questions and enhance their professional knowledge (Parboosingh 2002). In general, communities that are intended to be used for professional discussions are called communities of practice (Wasko and Faraj 2005; Dubé, et al. 2006; Hara et al. 2009). We refer to these P2P communities as "health communities of practice". Sermo.com, with more than 120,000 members, and Ozmosis.org are among the most popular Health 2.0 communities of practice in the U.S.

3.2. Provider-to-Consumer

Provider-to-Consumer (P2C) is the second category of health 2.0 services. Important and popular P2C health 2.0 services are health blogs, newsgroups and forums that are used and authored by physicians and health professionals to provide useful health information for their users. The users of these services consist of health 2.0 consumers including patients, caregivers, and individuals who are willing to learn about wellness and health topics. The readers of health blogs and forums can post their comments and questions after reading each topic. Other users and blog writers can afterwards answer the questions posted to the blog or forum. Although, users of the blog-based websites that provide P2C services can have discussions with each other on the various topics or blogs, the main purpose of these websites are to convey health information from health professional to health 2.0 consumers. KevinMD.com is one of the most popular health blogs with more than 100,000 users.

Another type of health 2.0 service that is provided by health care providers for health consumers is typically called "ask-a-doctor" by the websites that provide these services. These P2C services are focused on consumers that seek health information from health professionals through the health 2.0 websites. A user can ask a question and receive a response from providers who are participants on the website, and can provide useful information and tips to the consumers. These services are free on many of the websites (i.e., Dailystrength.org). Other websites charge users each time they ask a questions from providers (i.e. Healthboards.com).

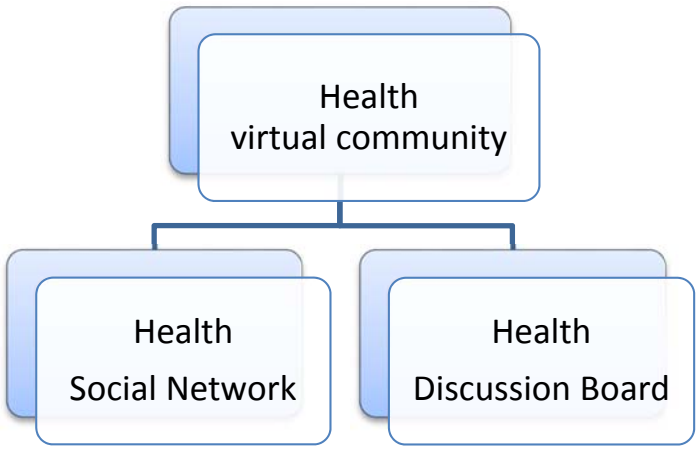
3.3. Consumer-to-Consumer

Consumer-to-Consumer (C2C) services consist of communication platforms that help people get connected, provide social support for each other, and discuss health topics and concerns. Unlike P2P and P2C services, in C2C services, health consumers are the main participants. We use the term “health virtual community" for the health 2.0 websites that provide C2C services for health consumers. This term is consistent with the general definition of a virtual community provided by Chiu, Hsu, and Wang (2006) as " online social networks in which people with common interests, goals, or practices interact to share information and knowledge, and engage in social interactions" (P. 2). WebMD.com and Dailystrength.org are two prominent examples of health virtual communities.

Although the main premise of health virtual communities is connecting people with similar health interests, experience, knowledge, or concerns, they vary on the functionalities and C2C interaction platform they provide for the users. Some communities are built upon user profiles. People create their profile pages, put personal information such as demographic and health status, and make connections with each other by adding their individuals to their friends lists. This structure is very similar to the typical structure of general online social networks such as Facebook and MySpace (Ellison 2007). Accordingly, we refer to these health-focused C2C services as "health social networks". In addition to health social networks, users of health virtual communities can typically take advantage of another C2C service called "health discussion boards" (Figure. 2). Within each discussion board, different discussion threads relevant to the main topic of the board are initiated by users and other community members who can contribute their ideas and comments to each discussion thread, even if the contributors are not included in the thread initiator's friend list.

Figure 2. Health Virtual Communities and Underlying C2C Services

Health social networks differ from health discussion boards in terms of their collaboration structure and the social support exchanged via these two mechanisms. Health social networks and the interactions based on them are basically user-oriented (Ellison 2007). Consequently, social ties between users who interact based on these services are strong, emotional-based and long-term, whereas, the interactions that occur within discussion boards are topic-oriented (Stanoevska-Slabeva and Schmid 2001; Ellison 2007). This fact leads to making transaction-based ties between users who engage in discussion threads. It leads typically to short-term relationships between those who participate in any discussion threads and support each other merely through these discussion threads. The main advantage of discussion boards is users can take advantage of each other's knowledge and experience, regardless of their friendship status. This leads to an extensive knowledge base available to any user, compared to situations where users seek information only from their friends within the community. Additionally, discussion boards provide a more structured platform that users can initiate, follow, or contribute to the topics that are of more need or interest to them.



Most of the health virtual communities established provide both C2C services for their users. On Dailystrength.org, for example, people can join support groups (i.e., depression, ADD/ADHD) and engage in the discussion threads that are initiated within each support group. Some communities, however, revolves more around discussion boards (i.e. Askapatient.com, Breastcancer.org) and some others rely more heavily on exchanging social support via social networks (i.e. Dailystrength.org). Health virtual communities can also provide P2C services for their users. In this vein, they aggregate various types of services into their community so their users can take advantage of different information sources and interaction mechanisms and also ask their questions from the health professionals who are hired by the website.

3.4. Consumer-to-Provider

The consumer-to-provider (C2P) services are far more implicit than the other services in our typology. We could not identify any explicit websites that focus on consumers providing information to providers that may be of benefit to the providers. Providers sometimes visit C2C websites and glean information from the discussions and blogs, which may help them in their professional practices. There are, however, some websites that come close to providing this service.

4. Typology in Action

In order to make the proposed typology clearer we apply our typology to a list of 14 popular health 2.0 websites. Considering different types of services and websites introduced in our typology, we compare the services these websites provide for their users. We extracted this list from ranking websites, health news pages, reports, as well as the previous health social media literature. The results are summarized in table.1 as follows.

		P2P	P2C		C2C		C2P
Website Name	**Type of website**		**Blog/News group**	**Ask-A-Doctor**	**Social Network**	**Discussion Board**	
Dailystrength.org	Virtual community	-	✔	✔	✔	✔	
WebMD.com	Virtual community	-	✔	-	–	✔	
Connect.MayoClinic.org	Virtual community	-	-	-	✔	✔	
Drugs.com	Virtual community	-	-	-	✔	✔	
Askapatient.com	Virtual community	-	–	-	-	✔	
Healthboards.com	Virtual community	-	–	✔	✔	✔	
KevinMD.com	Blog	-	✔	-	-	-	
Patientslikeme.com	Virtual community	-	-	-	✔	✔	
MedHelp.com	Virtual community	-	✔	✔	✔	✔	
Inspire.com	Virtual community	-		-	✔	✔	
Cancerforums.net	Virtual community	-	-	-	✔	✔	
Breastcancer.org	Virtual community	-	✔	✔	✔ (Limited features)	✔	
Sermo.com	Community of practice	✔	-	-	-	-	
Ozmosis.org	Community of practice	✔	-	-	-	-	
iwantgreatcare.org							✔

Table1. Health 2.0 Websites and Health 2.0 services

Comparing the services that different health 2.0 websites provide for their users, we can draw three conclusions that can help us understand the structure of these websites from a service-oriented perspective. These conclusions, however, are only based on 14 popular health 2.0 websites that are listed in table 1, and can be regarded as a basis for further investigations.

The conclusions include:

- Health virtual communities typically provide a combination of C2C and P2C services for their users.
- While health virtual communities provide P2C and C2C services for health consumers, health communities of practices focus primarily on P2P services.
- Health discussion boards are the most frequent type of health 2.0 services provided by health virtual communities for their users.

5. Conclusion

In this paper, we developed a typology for categorization of health 2.0 services and the websites that provide these services. Accordingly, the main types of health 2.0 services include P2P, P2C, C2C, and C2P. P2P services are basically provided by health communities of practices for health professionals so they can share their knowledge and experience and discuss about medical cases and topics. P2C services fall into two major types of services including blogs/newsgroups and ask-a-doctor services. Health blogs/newsgroups are intended for doctors to provide health consumers with interesting and helpful health information and tips. Ask-a-doctor is a P2C service in which health consumers initiate their collaboration with a provider through the health 2.0 website, and ask their questions regarding health issues and concerns. Doctors provide answers and appropriate information for information seekers. C2C services include health social networks and health discussion boards. Health social networks and the collaborations through them are typically user-oriented, whereas, health discussion boards contain topic-oriented discussion threads. C2P are often implicit an can similar services as C2C.

We discussed five main attributes of virtual communities within the context of health 2.0 websites. Moreover, we applied the proposed typology in action by analyzing the health 2.0 services that are provided by 14 popular health 2.0 websites. At the end of this section we provided some preliminary conclusions drawn from the sample websites.

The typology proposed in this paper can be utilized by researchers who want to investigate different aspects of health 2.0 websites and communities. Future researchers can explore various structural and social facets of each type of health 2.0 website. Users' perceptions, intentions, and behaviors can also be investigated within the context of each health 2.0 website and while using each type of health 2.0 services. Moreover, a larger sample of health 2.0 websites can be analyzed in detail in order to draw further conclusions.

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