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ABSTRACT

During the past decade, the proliferation of social media has infiltrated various sectors of social and business communications. Of particular interest is the growth of health related websites and the healthcare sector's adoption of social media. In this paper, we develop a typology of health 2.0 collaboration platforms and websites. According to the proposed typology, two major types of actors within health 2.0 websites are health professionals (P) and health consumers (C). Each type of user can serve as either support provider or support recipient. Thus, we define the main types of health 2.0 platforms and websites as professional-to-professional (P2P), professional-to-consumer (P2C), consumer-to-consumer (C2C), and consumer-to-professional (C2P). We describe each type and utilize the typology to investigate 16 popular health 2.0 websites and the collaboration platforms they provide. Our typology can be used as a basis for the future research on health social media.

Keywords

Health 2.0, medicine 2.0, health social media, virtual communities, online social networks, typology, collaboration platform.

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 different social 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, 2011a). Individuals go online to seek health information from blogs, discussion boards, health virtual communities, and other sources of health information. Additionally, they tend to 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 and revolutionized the Internet usage (O'Reilly, 2005; Van De Belt, Engelen, Berben, and Schoonhoven, 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, et al., 2010). For this article, we use one of the most widely used terms, 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, Joshi, and Wareham, 2008, 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 18% of Internet users seek health information from other Internet users

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

who have similar health issues or medical concerns (Fox, 2011b). 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. Within the context of health 2.0, we define health consumers as *the Internet users including patients and caregivers who go online in order to exchange health knowledge and experience as well as emotional support through health 2.0 websites.*

Health professionals are another group of actors within health 2.0 websites (Eysenbach, 2008; Hughes, et al., 2008). This group of health 2.0 users include medical practitioners, dental practitioners, pharmacists, ophthalmic opticians, and veterinarians (Schoon, 2001). Health professionals initiate health blogs (e.g., blogs on KevinMD.org) in order to provide useful information and tips for Internet users. Health virtual communities (e.g., DailyStrength.org) also welcome health professionals to serve their users by providing health advice and answer the questions posted by community members. Furthermore, they can join professional online communities (e.g., ozmosis.org) in order to share their knowledge and discuss medical cases, treatments and other professional 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 communication platforms have emerged in different forms and for different types of users. 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 collaboration platforms and websites. General typologies of virtual communities (Porter, 2004) and specific typologies for specific instances of web 2.0 (Messinger, Stroulia and Lyons, 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 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, health 2.0 categories will be analyzed and described. Fourth, we demonstrate the application of the typology in action by listing 16 popular health 2.0 websites in terms of the categories of health 2.0 platforms they are built upon. Last, we conclude by summarizing and discussing areas for future research using this typology.

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

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 (2004) 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 (2004) 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

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

established. Place shows the extent to which the interactions among the members of a virtual community is mediated by technology. Platform pertains to the collaboration structure of the community that falls into three categories: synchronous, asynchronous, and hybrid. Population interaction structure refers to the group shape and architecture (e.g., small group or public communities) and the types of social ties (strong, weak, stressful). The last attribute proposed 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 Porter's classification (establishment and relationship orientation), 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 utilized by 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-Slabeva and Schmid (2001) described and labeled the categories in a distinct manner. They also sub-categorized each main category of virtual communities and discussed the supporting collaboration platforms for each type of community.

According to Stanoevska-Slabeva and Schmid (2001), discussion communities fall into four categories: 1) discussion communities with direct person-to-person communication, 2) topic-oriented communities, 3) communities of practice, and 4) indirect discussion communities with indirect communications 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-Slabeva and Schmid (2001) were later expanded on by other researchers. Dubé, Bourhis, and Jacob (2006) proposed a comprehensive typology of virtual communities of practice. 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 different characteristics 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 services. 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 toward 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.

THE PROPOSED TYPOLOGY

The main purpose of health 2.0 websites is to facilitate sharing health-related knowledge and experience as well as providing emotional aids through collaboration platforms. The major actors within health 2.0 websites are health consumers such as patients and caregivers, and health professionals such as medical practitioners and dentists. Within the context of health 2.0, we define collaboration platform as *any computer-mediated communication environment used for contribution of health-related digital content (e.g., articles, messages, emoticons, videos).* For instance, blogs are a type of health 2.0 platforms utilized by health professionals to provide wellness and health information for consumers; whereas, discussion boards are typically intended to be used by health consumers to communicate with each other and share their health knowledge and experience.

Both health consumers (C) and health professionals (P) can serve as either support provider or support recipient while interacting with other health 2.0 users. Accordingly, collaboration platforms and the health 2.0 websites encompassing the platforms can be categorized into four major types as P2P, P2C, C2C, and C2P. In our typology, we distinguish platforms and websites because each type of website can provide the same type of collaboration platform (e.g., C2C websites providing

C2C platform) and also utilize a combinations of other types of platforms (e.g., C2C websites providing P2C platforms). Figure 1. presents the four major types of health 2.0 websites and the examples for each type.

		Support Recipient	
		Health Professional	Health Consumer
Support Provider	Health Professional	P2P Health Communities of Practice E.g., *http://www.Sermo.com* *http://www.Ozmosis.org*	P2C Health Blogs/Newsgroups E.g., *http://www.KevinMD.com*
	Health Consumer	C2P Physician-Rating Websites E.g., *http://www.HealthGrades.com* *http://www.iWantGreatCare.com*	C2C Health Virtual Communities E.g., *http://www.WebMD.com* *http://www.DailyStrength.org*

Figure 1. The Proposed Typology of Health 2.0 Websites

Professional-to-Professional

According to our typology, the first category of health 2.0 websites is referred to as Professional-to-Professional (P2P). P2P websites provide P2P communication platforms such as professional discussion boards and blogs for health professionals so they can exchange their thoughts, knowledge and experiences about diseases, treatments, medical cases, and other topics that can help them enhance their professional knowledge (Parboosingh, 2002). In general, we refer to P2P virtual communities as health communities of practice because it is mainly intended to be used for the purpose of professional discussions and knowledge sharing. This is consistent with the general definition of communities of practice provided by the extant literature (see Dubé, et al., 2006; Hara et al., 2009; Wasko and Faraj, 2005). 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.

Professional-to-Consumer

The second category of health 2.0 platforms is Professional-to-Consumer (P2C). P2C platforms provide a communication channel through which health professionals support consumers by providing health advice and information. To do so, health professionals mainly use one of the two major types of P2C platforms: health blogs/newsgroups and ask-a-doctor. Health blogs have become an important source of online health information for Internet users (Hu and Sundar, 2010). Blogs written by health professionals comprise health-related news, information, and tips that can be beneficial for health consumers. Those who read the blog can then post their comments and questions regarding the topic of each blog. Other blog readers as well as the blog author can afterwards answer the questions posted to the blog or newsgroup. We categorize these types of blogs as a P2C platform because the main purpose of these channels are to convey health information from health professional to health consumers.

Blogs can be utilized as one of the platforms through which a website intends to communicate with its users. However, some health websites merely consist of P2C blogs or newsgroups and do not provide any other collaboration platform. In our typology, we use the generic term health blogs/newsgroups in order to refer to these types of websites. KevinMD.com is one of the most popular health blogs with more than 100,000 users.

Ask-a-doctor is the second type of P2C platform. Using this platform, each user can ask specific questions regarding medications, diseases or any health-related topics. Health professionals then provide the user with an answer that is specifically tailored based on the user's question. Ask-a-doctor is becoming an important feature of popular health 2.0 websites. Some websites provide this service for their users and charge them each time the users ask a question (e.g., DailyStrength.org). Other websites do not charge their users for ask-a-doctor service (e.g., HealthBoards.com).

Consumer-to-Consumer

Consumer-to-Consumer (C2C) is the third category of health 2.0 collaboration platforms. Using C2C platforms, health consumers can communicate with others and exchange health-related information and experiences and provide emotional support for each other. Unlike P2P and P2C platforms, in C2C platforms, health consumers are the main participants and health professionals do not play a major role.

Health 2.0 websites are more and more relying on C2C collaboration platforms. We use the term health virtual community (HVC) for the health 2.0 websites that provide C2C platforms for health consumers. Using this term in this context 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 HVCs.

Although the main purpose of HVCs is connecting people with similar health interests, experience, knowledge, or concerns, they vary on the functionalities and the types of C2C interaction platforms they provide. Some communities are built upon user profiles. In these HVCs, people create their profile pages, put personal information such as demographic and health status, and make connections with each other by adding 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 types of health-focused C2C platforms as health social networks.

Health discussion boards is the second type of C2C platforms (Figure. 2). Health consumers initiate discussion threads on a health-related topic or question. Other users of the website, post their responses to the thread and provide the thread initiator with their thoughts, information, and experiences that specifically address the thread topic.
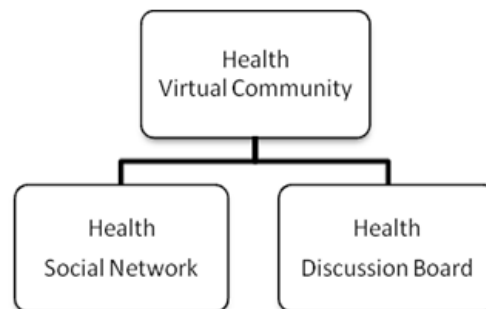

Figure 2. Health Virtual Communities and the Underlying C2C Platforms

Health social networks differ from health discussion boards in different ways. 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 platforms are strong, emotional-based and long-term; whereas, the interactions that occur within discussion boards are inherently topic-oriented (Ellison 2007; Stanoevska-Slabeva and Schmid 2001). Thus, the social ties formed between users who engage in discussion threads are more transaction-based. It leads typically to short-term relationships between those who participate in discussion threads and support each other merely through these channels. The main advantage of discussion boards is that users can take advantage of others' knowledge and experience, regardless of their friendship status. This leads to an extensive knowledge base available to users, 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 of more interest to them.

Most of the widely-used HVCs provide both C2C platforms for their users. Users of DailyStrength.org, for example, can join support groups (e.g., Depression, ADD/ADHD) and engage in the discussion threads that are initiated within each support group. Some communities, however, revolve more around discussion boards (e.g., Askapatient.com, Breastcancer.org); while others rely more heavily on exchanging informational and emotional support via health social networks (e.g.,

DailyStrength.org). HVCs can also incorporate various types of P2C platforms into their communities so their users can take advantage of different sources of information.

Consumer-to-Professional

Consumer-to-Professional (C2P) is the fourth category of health 2.0 platforms and websites. C2P platforms are the collaboration channels through which health consumers can provide useful health-related information for health professionals. Unlike the previous three types of health 2.0 platforms, C2P is not yet evolved and widely used. At the current stage of C2P health 2.0, health professionals can implicitly take advantage of the information shared by health consumers through P2C and C2C platforms. Doctors can read the comments posted by patients on discussion boards to learn about the patients' experiences regarding diseases and medications.

An important collaboration platform that physicians can use in order to know what their patients think about them is referred to as physician-rating platform and the websites established based on those platforms are called physician-rating websites (Kadry, Chu, Gammas, and Macario, 2011). Two popular physician rating websites are HealthGrades.com and iWantGreatCare.org. Using physician-rating platform, patients post their reviews and evaluations of the clinics, hospitals, and doctors. The reviews are typically based on the patients' experiences of the quality of medical services provided for them. Doctors can read the reviews relevant to them in order to better understand the patients' concerns and opinions. Doctors can improve their support and services, accordingly. In our typology, physician-rating platforms are classified as C2P. These platforms directly address the information needed by health professionals regarding their patients' concerns, experiences, and assessments of the quality of their medical services (e.g., diagnosis, treatments).

Over the last few years, several physician-rating websites have been created; however, still new types of C2P collaboration platforms and websites can be developed and used by health professionals. In this way, they can take a full advantage of learning from patients' experiences in order to enhance their professional knowledge and provide better medical services for their patients.

TYPOLOGY IN ACTION

In order to make the proposed typology clearer we apply our typology to a list of 16 popular health 2.0 websites. Considering different types of platforms and websites introduced in the typology, we compare these websites and the platforms they provide. In order to extract this list we used ranking websites, health news pages, reports, and the extant literature on health social media. The results are summarized in Table.1 as follows.

Website Name	Type of Health 2.0 Website	Type of Health 2.0 Platform					
		P2P	P2C		C2C		C2P
		Professional Discussion Board	Blog/ News group	Ask-A-Doctor	Social Network	Discussion Board	Physician -Rating
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	-	–	✔	✔	✔	-
PatientsLikeMe.com	Virtual community	-	-	-	✔	✔	-
MedHelp.com	Virtual community	-	✔	✔	✔	✔	-
Inspire.com	Virtual community	-		-	✔	✔	-
CancerForums.net	Virtual community	-	-	-	✔	✔	-
Breastcancer.org	Virtual community	-	✔	✔	✔	✔	-
KevinMD.com	Blog	-	✔	-	-	-	-
Sermo.com	Community of practice	✔	-	-	-	-	-
Ozmosis.org	Community of practice	✔	-	-	-	-	-
HealthGrades.com	physician-rating	–	-	-	-	-	✔
iWantGreatCare.org	physician-rating	–	-	-	-	-	✔

Table 1. Health 2.0 Websites and Collaboration Platforms

Comparing the collaboration platforms that different health 2.0 websites provide, we draw three conclusions that can help us understand these platforms and the websites incorporating them better. The conclusions, however, are only based on 16 popular health 2.0 websites listed in Table. 1 and can be regarded as a basis for further investigations. The conclusions include:

- HVCs typically provide a combination of C2C and P2C platforms.
- While HVCs provide P2C and C2C platforms, health communities of practice merely incorporate P2P platforms.
- Health discussion boards are the most frequent type of health 2.0 platforms provided by HVCs.

CONCLUSION

In this paper, we developed a typology of health 2.0 collaboration platforms and the websites. Accordingly, the main types of health 2.0 services include P2P, P2C, C2C, and C2P. Health communities of practice are the major P2P websites. Health professionals join these communities and exchange their professional knowledge and experiences. C2C websites are termed health virtual communities. Health blogs and news groups are the major forms of P2C health 2.0 websites. Professionals provide health advices and tips through these websites. Health blogs/newsgroups can also be used as platforms incorporated in other types of health 2.0 websites. Additionally, ask-a-doctor is a P2C platform provided by health 2.0 websites. Health consumers use this platform in order to ask their questions from health professionals and get an answer. Physician-rating websites are C2P channels through which patients can assess the medical services they receive from their doctors. Doctors then can take advantage of the reviews posted on these websites in order to improve the medical services they provide for their patients.

The researchers who are investigating or going to investigate different aspects of health 2.0 websites and communities can utilize the typology proposed in this study. They can explore various structural and social facets of each type of health 2.0 websites. User participation and motivations for knowledge contribution can also be studied in different types of health 2.0 websites. Moreover, a larger sample of websites can be analyzed in detail in order to draw further conclusions regarding the collaboration platforms those websites provide.

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