

Web 2.0: A Movement Within The Health Community

Dr Iain Doherty

*Director, Learning Technology Unit
Faculty Medical and Health Sciences
The University of Auckland*

Abstract

Web 2.0 technologies provide members of the health community - health professionals, health consumers, health carers and medical and health science students - with new and innovative ways to create, disseminate and share information both individually and collaboratively. This phenomenon has been termed Health 2.0. However, Health 2.0 is more than the application of these technologies in the health community; it is a movement that is beginning to transform the nature of health care, particularly in the US.

In this paper we present and explain four Web 2.0 technologies - blogs, wikis, podcasts, and social networks - and look at how these technologies are currently being used by health professionals. We consider the use of Web 2.0 technologies by health consumers to find and share information and to form support communities and then we explore a Web 2.0 pedagogical model that would connect medical and health science students - tomorrow's health care professionals - with today's health professionals and health consumers in order to enhance student education through providing collaborative learning opportunities together with ready access to multiple sources of information and expertise.

We conclude with some comments on what Web 2.0 might mean for the future of health care.

1. From 1.0 to 2.0

It is reasonable to expect the second version of something to be an improvement upon the first version. This, of course, begs the question of what constitutes improvement. In the case of health care we would suggest that improvement needs to be constituted by improved health outcomes for patients and that when considering the technologies discussed below, we must be thinking in these terms.

1.1. Web 1.0

Web 1.0 - a term coined in the Web 2.0 era to differentiate the two manifestations of the Web - was the first iteration of the World Wide Web. Despite the intention to create the web as a collaborative work space [1] - and to some degree Web 1.0 did connect people through email, chat rooms and discussion boards [2] - Web 1.0 essentially consisted of static web pages providing content for consumption by "end users" or "consumers" of information. For clinicians and health professionals this meant accessing medical information in the form of web pages, online journals and trusted databases [3].

1.2. Web 2.0

The term Web 2.0 emerged in 2004¹ and whilst defining Web 2.0 has proved difficult to define [4], the widely recognised authoritative description of Web 2.0 was written by Tim O'Reilly in 2005 [5]. The term has since been trademarked, a fact that is not without controversy with a cease and desist issue being ordered against one company attempting to use the term for a conference [6]. Although difficult to define, Web 2.0 is essentially a set of technologies and the range of affordances made possible by those technologies [1]. These affordances

include, but are not limited to, user generated web content, information sharing, multimedia sharing, online collaboration and social networking.

Web 2.0 has engendered the use of terminology such as "prosumer" to describe the fact that the traditional Web 1.0 "consumers" of information are now Web 2.0 producers of information. Other common Web 2.0 terms include "architecture of participation" and "people-centric Web" indicating the involvement of users in the production of web content and the collaborative nature of the Web 2.0 environment [7]. Finally, the term "collaborationware" [8] has been applied to the range of Web 2.0 technologies to express their potential for enabling people to work together online.

The following video presentation clearly outlines the distinct differences between Web 1.0 and Web 2.0. http://www.youtube.com/v/NLIgopyXT_g

1.3. Health 2.0

Health 2.0 has been defined in a number of different ways [9,10,11,12] and there is as yet no authoritative definition of the term. However, the various definitions together with usage on the web itself point to three distinct understandings of the term. With this point in mind, Health 2.0 can be understood as the use of Web 2.0 technologies within health care to affect health care for the better, particularly in terms of increased consumer participation in health provision [10].

Health 2.0 can also refer to the transformation of the traditional Web 1.0 sites to include Web 2.0 tools and the provision of up-to-date personalised health care information for health consumers [13]. Finally, Health 2.0 can refer to a fundamental change in the way in which health care is delivered and conveyed [12]. We see the same trademark phenomenon with Health 2.0 with Matthew Holt, author of the Health Care Blog, taking out the trademark for Health 2.0. However, according to Holt, the term can still be freely used; his concern is to protect the term from misuse [14].

Whilst not employing the term Health 2.0, Boulos conceives of Web 2.0 tools in terms of their affordances for the members of the healthcare community, a term which includes organizations, clinicians, patients, laypersons and students [7,8]. For the sake of conceptual clarity we will, therefore, use the term Health 2.0 to refer to the affordances of Web 2.0 technologies for the healthcare community whilst recognising that these affordances are manifest in a variety of ways. Web 2.0 can, therefore, be understood as a verb rather than as a noun [10]. That is, it is more of a movement that may lead to a fundamental transformation in health care leading to improved outcomes for patients [12].

The video below provides an overview of Health 2.0: <http://www.youtube.com/v/eAUH1IX54z8&rel=0>

1.4. Web 2.0 and Health 2.0 Summary

The following summary table is provided to orient readers to the Web 2.0 technologies that we will be considering. In each case the technology is explained. Examples are provided of the ways in which the web community and the health community are using these technologies. Readers should be aware that the examples from the web community and the health community are limited in nature and intended to be indicative. We would suggest a web search for readers interested in the full range of ways in which these technologies are being used.

Table 1: Web 2.0 and Health 2.0

Categorisation	Explanation	Web Community	Health Community
Blog	An online personal journal or web log	Personal journals for self expression or discourse on a particular subject	Personal journal with a health focus
Wiki	A collaboratively authored website	Encyclopedias such as Wikipedia, community wikis, education wikis	A collaborative website authored by a group of patients or by medical professionals

Podcast	An audio file on the web to which users can subscribe	Personal audio broadcasts on any topic imaginable	Audio broadcasts by patients or by health professionals on health related topics
Social networking	Online networking sites for meeting people	Networking with friends, sharing information and media such as photographs and video, communication via internal email and chat	Sites where patients can network with one another, health professionals can network with one another, and where patients and health professionals can network together

2. Health 2.0 and Health Professionals

In the first instance we will describe four Web 2.0 technologies - blogs, wikis, podcasts and social networks - whilst providing examples of their use by health professionals for information creation, information sharing, collaborative working and social networking.

2.1. Blogs

The term Blog refers to a publicly accessible web log which takes the form of a web page [15]. Blogs are used for posting information, opinions and for personal diary entries [1]. Once the blog post has been published on the Web - appearing on screen usually in reverse chronological order - readers can comment on the postings and the author can respond to the comments. Blogger at (<http://www.blogger.com>) is a well-known blog hosting service. A blog can literally be created in five minutes as this video on Blogger demonstrates: <http://www.youtube.com/v/bU4gXHkejMo>

It has been estimated that there are over 50 million blogs worldwide with over 100,000 blogs created every day. These blogs vary hugely in terms of both subject matter and quality of content [7]. Therefore, finding a blog in an appropriate subject area and of the appropriate quality requires the use of blog search engines such as Technorati (<http://www.technorati.com>).

Table 2: Medical Blogs

Blog	Description	URL
Drugscope	Minimising drug related harm	http://drugscope.wordpress.com/
DLnet	For health librarians and trainers	http://dlnet.blogspot.com
TRIP database	Answering clinical questions	http://tripdatabase.blogspot.com
Clinical cases	Case based medical curriculum	http://clinicalcases.blogspot.com
Health Care	Health Care System US	http://www.thehealthcareblog.com/
Health Informatics	Health Informatics	http://healthinformaticsblog.com

2.2. Wikis

A Wiki is a collaborative website comprising the perpetual work of many authors. It is created online with an easy to use editor [16]. Wikis can be either open access or restricted access [1]. If the wiki is restricted, a user has to be granted access before being able to edit the wiki.

Previous versions of wiki pages are stored in a history and users can "roll back" to a previous version in the case of an inappropriate major edit or in the case of deliberate vandalism. Wikis allow contributors to comment on the edits that they have made which provides for more meaningful collaborative knowledge construction since other contributors can see the reasoning behind the revisions that have been made [7].

Pbwiki (<http://www.pbwiki.com>) is a well-known wiki service provider and the reader can watch the video below for an overview of the main features of a wiki: <http://www.youtube.com/v/A204JcGQiY0>

Table 3: Medical Wikis

Wiki	Description	URL
Ganfyd	Medical encyclopedia	http://ganfyd.org
Wiki Surgery	Surgical encyclopedia	http://wikisurgery.com
Healtheva	Professional knowledge sharing	http://www.healtheva.com
Ask Dr Wiki	Professional knowledge sharing	http://www.askdrwiki.com

2.3. Podcasts

Podcasting - a term that is a combination of the brand name iPod and the word broadcasting [17] - consists of recording an audio file in MP3 format and uploading the MP3 file to a server along with a Real Simple Syndication (RSS) file that contains information about the location of the audio file and about the author and content. The final step is to provide a link on a web page that points to the podcast feed location.

Users can subscribe to the podcast and each time a new audio file is made available subscribers are alerted via their podcast reader. This makes podcasting a "push service" [1]. The choice of podcast readers is extensive [18] but iTunes is probably the most well known. Podcasts can be listened to either on a computer using software such as iTunes, or they can be synchronised to an MP3 player.

Podcasts can be created using either freeware or commercially available software [19] and the University of Missouri provides a "how to" for podcasting and vodcasting [20].

Podcast search engines include - amongst others - Podscope (<http://www.podscope.com>) and Odeo (<http://www.odeo.com>) and, of course, iTunes can be searched for Podcasts if you have an account.

Table 4: Medical Podcasts

Podcast	Description	URL
CVMD.Org	Cardiovascular Podcasts	http://www.cvmd.org/
Health Edge	Medical Information	http://www.clevelandclinic.org/healthedge/
McGraw Hill Books	Audio Information	http://books.mcgraw-hill.com/podcast/acm/
US Health	News	http://www.getapodcast.com/podcast2386.aspx

2.4. Social Networks

An online social network consists of a group of individuals or a community with a common interest or a common purpose. Popular social networking sites with users running into the millions [21] include MySpace (<http://www.myspace.com/>), FaceBook (<http://www.facebook.com/>), Bebo (<http://www.bebo.com/>), and Friendster (<http://www.friendster.com/>).

A social networking space provides for a variety of ways for users to interact with one another including: instant messaging; email; voice chat; blogging; picture sharing; and file sharing. These sorts of social networks are available to all users and joining requires registration and the creation of a profile for the community. Other

social networking sites are open only to members of a particular group such as a company, a particular profession or an educational establishment.

Table 5: Health Related Social Networks

Site	Description	URL
Sermo	Physicians' Network	http://www.sermo.com/
Dr Networking	Doctors' Network	http://www.doctornetworking.com/
Nurselinkup	Nurses' Network	http://nurselinkup.com/
Biomedexperts	Researchers' Network	http://www.biomedexperts.com/
Connected Health	Professional Network	http://www.communityforconnectedhealth.org/about/aboutus.aspx

3. Health 2.0 and Health Consumers

Whilst the Health 2.0 Conference blog conceives of Health 2.0 in terms of user generated content that does not connect to the mainstream health care system [22], the examples that we will provide below make it clear that whilst user generated content and social networking are key components of Health 2.0, health consumers and health professionals are connecting through Web 1.0 websites augmented by Web 2.0 technologies.

3.1. Health Advice and Information

Following the broader understanding of Health 2.0 as including the transformation of Web 1.0 sites to provide healthcare information, personalised health advice and Web 2.0 technologies, a Web 1.0 website on mental health has been augmented by Web 2.0 technologies thereby providing consumers with mental health information whilst allowing them to contribute to the site and to join online communities and to take part in weekly chat sessions (<http://psychcentral.com/>).

The "Healthfinder" website (<http://www.healthfinder.gov/>) provides services for online checkups whilst "Ask A Doctor" (<http://www.doctorslounge.com/>) is an extensive online network of doctors, nurses and health professionals working together to answer consumer medical questions and to contribute health related articles to the network.

Medworm functions as a forum for discussion between health professionals and consumers whilst also providing health related information for both professionals and consumers (<http://www.medworm.com>). The author of the site has coined the term MedHealth 2.0 to reflect the fact that both health professionals and health consumers use the site [23].

Patient Opinion in the UK gives consumers the ability to provide feedback to health providers concerning the standard of care that they have received (<http://patientopinion.org.uk>). An American site run by health consumers allows visitors to rate doctors from the US, Canada, Australia and the UK (<http://ratemds.com/social/>) whilst incorporating Web 2.0 blog technology to allow consumers to comment on their doctors.

3.2. Health Prosumers

Individual health consumers are using Web 2.0 technologies to share their own health experiences in order to support and encourage others. This blog written by a diabetic for people living with diabetes provides an example (<http://www.diabetesmine.com/>). The video below - listed on the "Health 2.0 Connecting Consumers and Providers" conference site (<http://www.health2con.com/>) - provides another example of a health consumer sharing information about his medical condition: <http://www.youtube.com/v/6nkSieQ2aFw&hl=en>

3.3. Health Communities

There are numerous examples of social networking sites for health consumers. "Patients like me" allows health consumers to come together to share their experiences and to learn from one another (<http://www.patientslikeme.com/>). "Inspire" provides health consumers with a health and wellness groups for practical and emotional support (<http://www.inspire.com/>). "Revolution Health" has an extensive range of communities for a variety of medical conditions (<http://www.revolutionhealth.com/>). "Care Pages" allows health consumers to create websites and to blog within a community (<http://www.carepages.com/>).

Whilst there are concerns about the quality of information being generated by consumers [7] there is evidence to suggest that user generated information is accurate [24]. Furthermore, the claim that health consumers often trust other health consumers more than their doctors [10] is given credence by a survey in which 40 percent of respondents said that they accessed medical information on the internet because their doctors could not answer their questions [24]. However, as we have seen with the necessary use of specialised search engines, there is an overabundance of information on the web and looking for information is time consuming even when one is clear concerning the criteria for what constitutes "good" information.

Readers interested in exploring Health 2.0 further can visit an online directory providing links to what we are referring to as Health 2.0 sites and services (<http://medical20.com/>).

4. Pedagogy 2.0 and Health Education

Medical and Health Science students are now utilising Web 2.0 tools. For example, undergraduate students in health, medicine and nursing have used a wiki to develop a guide on available support services for parents of intellectually disabled children [26]. The education of nurses [27] and psychology students [28] has been enhanced by the provision of podcasts of course content and discussions. Vodcasts have been supplied to medical students to learn new procedures and to review core medical procedures before seeing patients [29]. A medical student is blogging on Genetics, Web 2.0 and Medicine (<http://sciencerooll.com>).

These examples represent the beginnings of what might be achieved in education with Web 2.0 technologies; these technologies have the potential to bring together students, health professionals and health consumers in order to enhance learning and to increase collaboration amongst the three distinct yet related groups [8]. The pedagogical model presented below represents one way in which this might be achieved.

4.1. Pedagogy 2.0

According to McLoughlin and Lee we are moving beyond a didactic teaching paradigm of information dissemination into Pedagogy 2.0, which is characterised by learners controlling their own learning whilst actively producing knowledge so that learning is "co-participatory" and social with the result that knowledge is generated through the "wisdom of the crowds" or through "collective intelligence" [2].

In this pedagogical model, students collaboratively engage with the content, with other students, with instructors and with networks all over the world in order to learn through inquiry and discovery. Support for students comes from lecturers, from fellow students, from experts in particular disciplines and from different forms of community [2].

4.2. In With the Old

As McLoughlin and Lee appreciate, the underpinning theories of Pedagogy 2.0 are not new [2]. They include social constructivism emphasising the educational value of socio-culturally defined dialogue and shared activity with peers, inquiry based learning placing responsibility for learning on the learner and collaborative learning providing the learner with the multiple perspectives of other learners.

Learner-centered learning has had a place in medical education for some time [30,31,32]. There is, therefore, a sense in which Konieczny is correct [33]; rather than realising new objectives in education, this model focuses on achieving the well-known objectives of authentic, inquiry-based collaborative learning.

The fact that the educational aims are not new does negate the potential value of Pedagogy 2.0 as a model for improving learning. Pedagogy 2.0 has the potential to connect students with other students, with health professionals and with patients in order to enhance student learning whilst providing the opportunity for students to contribute to the learning of others in a true "architecture of participation".

However, whilst Boulos et al see the need for a technology platform to serve an environment for bringing these technologies together as a basis for the learning experience [8], we would suggest that the real need is to understand how we are going to embed these technologies in the culture of our various learning environments. This will not be an easy task.

4.3. Learning from the Past

The 100-year history of introducing technologies for teaching and learning is a history of relative failure [34,35]. Expectations related to eLearning have not proved to be an exception, particularly in terms of the use - or misuse - of the learning management system as nothing more than a file storage system [36,37]. E-learning has remained marginal in the practices of the majority of academics [38].

The combination of a Pedagogy 2.0 together with the collaborative affordances of Web 2.0 technologies may mark a turning point for technologies in teaching and learning but at this stage we are seeing small scale Web 2.0 implementations in education [2] with little empirical evidence for the effectiveness of these tools for teaching and learning [7]. There is as yet no reason to believe that Web 2.0 technologies will fare any better than other technologies introduced into teaching and learning.

5. Concluding Comments

Boulos et al note suggest that we are witnessing evolution not revolution with Web 2.0 technologies [7]. The same is true with respect to Health 2.0; we are witnessing a gradual shift in which consumer presence in the healthcare community, particularly in the US but also in other countries, is becoming more marked and in which the healthcare system is responding to this presence [12,10]. Health 2.0 is in its infancy and we should be careful not to assume that a revolution has occurred in healthcare as a result of these new technologies and their various affordances. The real impact of these new technologies within the health care community remains to be seen; the same is true concerning whether these new technologies will result in significant improvements in health care and health outcomes for patients.

6. References

- [1] Anderson P. What is Web 2.0? Ideas, technologies and implications for education: Joint Information Systems Committee, 2007:1-64.
- [2] Atkinson RJ, McBeath C, Soong SKA, Cheers C, editors. Social Software and Participatory Learning: Pedagogical Choices with Technology Affordances in the Web. 24th Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education, ICT: Providing Choices for Learners and Learning; 2007; Centre for Educational Development, Nanyang Technological University, Singapore. ASCILITE.
- [3] McLean R, Richards BH, Wardman JI. The effect of Web 2.0 on the future of medical practice and education: Darwinian evolution or folksonomic revolution? *The Medical Journal of Australia* 2007;187(3):174-177.
- [4] Giustini D. How Web 2.0 is changing medicine. *BMJ* 2006;333(7582):1283-1284.
- [5] O'Reilly T. *What Is Web 2.0*, 2005.
- [6] O'Reilly T. *Web 2.0 Service Mark Controversy* (Tim responding this time), 2006.
- [7] Boulos MNK, Wheeler S. The emerging Web 2.0 social software: an enabling suite of sociable technologies in health and health care education. *Health Information and Libraries Journal* 2007;24(1):2-23.

- [8] Boulos M, Maramba I, Wheeler S. Wikis, blogs and podcasts: a new generation of Web-based tools for virtual collaborative clinical practice and education. *BMC Medical Education* 2006;6(1):41.
- [9] Dolan F. What is Health 2.0 / Medicine 2.0?, 2007.
- [10] Sarasohn-Kahn J. Health 2.0: It's Not a Noun, It's a Verb, a Movement, 2007.
- [11] Shreeve S. Health 2.0 Definition, 2007.
- [12] Shreeve S. The Canonical Health 2.0 Representation, 2007.
- [13] Grohol J. PsychCentral, 2008.
- [14] Holt M. Tech/Health 2.0: The Trademark, 2007.
- [15] Webopedia. Blog, 2008.
- [16] Webopedia. Wiki, 2008.
- [17] Evans C. The effectiveness of m-learning in the form of podcast revision lectures in higher education. *Computers & Education* 2008;50(2):491-498.
- [18] Podcasting News. Podcast Software Clients, 2008.
- [19] Podcasting News. Podcasting Software (Publishing), 2008.
- [20] Weng P. Podcasting and Vodcasting: A White Paper, 2005.
- [21] Kiss J. Facebook Powers Past MySpace. *The Guardian* 2007.
- [22] Health 2.0 Conference Blog. About Health 2.0, 2007.
- [23] Dolan F. MedWorm - Medicine 2.0 or Health 2.0?, 2007.
- [24] The Economist. Health 2.0. *The Economist*, 2007.
- [25] Giustini D. Web 3.0 and medicine. *BMJ* 2007;335(7633):1273-1274.
- [26] Atkinson RJ, McBeath C, Soong SKA, Cheers C, editors. Piloting Social Networking and Web 2.0 software at Deakin University. 24th Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education, ICT: Providing Choices for Learners and Learning; 2007; Centre for Educational Development, Nanyang Technological University, Singapore. ASCILITE.
- [27] iPod, uPod? An emerging mobile learning tool in nursing education and students' satisfaction. 23rd Annual ASCILITE Conference: Who's learning? Who's technology?; 2006; Sydney, Australia.
- [28] Miller DB. Podcasting at the University of Connecticut: Enhancing the educational experience. . *Campus Technology*, 2006.
- [29] Apple Science Profiles. iPods in Bedside Medical Education, 2007.
- [30] Spencer JA, Jordan RK. Learner centred approaches in medical education. *British Medical Journal* 1999;318:1280-1283.
- [31] Jamkar AV, Burdick W, Morahan P, Sarmukadam VYY, Singh G. Proposed model of case based learning for training undergraduate medical student in surgery. *Indian Journal of Surgery* 2007;69(4):176-183.
- [32] Dolmans DHJM, De Grave W, Wolhagen IHAP, van der Vleuten CPM. Problem-based learning: future challenges for educational practice and research. *Medical Education* 2005;39(7):732-741.
- [33] Konieczny P. Wikis and Wikipedia as a Teaching Tool. *International Journal of Instructional Technology and Distance Learning*, 2007.
- [34] Reiser RA. A history of instructional design and technology: Part I: A history of instructional media. *Educational Technology Research and Development* 2001;49(1):53-64.
- [35] Treat AR, Wang Y, Chadha R, Dixon MH. Major Developments in Instructional Technology: During the 20th Century, 2006.
- [36] Zhang D, Nunamaker JF. Powering e-learning in the new millennium: An overview of e-learning and enabling technology. *Information Systems Frontiers* 2003;5(2):2007-218.

- [37] Zemsky R, Massy WF. Thwarted Innovation - What Happened to e-learning and Why. Pennsylvania: The University of Pennsylvania, 2004.
- [38] Joint Information Systems Committee. Embedding Learning Technology Institutionally: Senior Management Briefing Paper: Joint Information Systems Committee (JISC), 2003.