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Web Tools 2.0 for Health Promotion in Mexico

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ABSTRACT
Web Tools 2.0 are potential allies for health promotion, since they can provide the population with information in order to improve their health; they are an effective way to share knowledge within the health sector institutions. In Mexico, these tools are used by public and private organizations. We explain what Web Tools 2.0 are and which the ones mostly used in the health field are. For this, a documentary research project was carried out and scientific virtual libraries were consulted; the information was collected and analyzed, with the following results: the ones that are mostly used are the social networks, followed by the content management platforms and, finally, by the knowledge management systems. Mexico faces the challenge of increasing access to these tools for most of the population as well as extending digital literacy.

Keywords: health promotion, e-health, Web Tools 2.0, information and communication technologies, Mexico.

RESUMEN

Las herramientas Web 2.0 tienen un gran potencial en el campo de la promoción de la salud, porque pueden hacer llegar información a la población con el fin de capacitarla para mejorar su salud, y constituyen un medio eficaz para difundir y compartir conocimientos al interior de las instituciones del sector salud. En México, en la promoción de la salud apoyada con estas herramientas concurren instituciones públicas, privadas y organizaciones no gubernamentales. En el presente trabajo se da a conocer qué son las herramientas Web 2.0 y cuáles son las más usadas en la promoción de la salud. Para ello se realizó una investigación documental y se consultaron bibliotecas virtuales científicas; se recuperó y analizó la información, con los siguientes resultados: las más utilizadas son las redes sociales, seguidas de los administradores de contenidos y, por último, los gestores de conocimiento. México enfrenta el reto de aumentar el acceso a éstas para la mayoría de la población y extender la alfabetización digital.

1. Introduction

Web Tools 2.0 are dynamic Internet applications. These permit the creation of personal websites, sharing of files or making comments in real time, and provide contents for other users' sites, without having advanced computer knowledge.[1] The arrival of these tools led to significant changes in the capacity for interaction between developers and users of Internet pages. The accelerated growth of information and applications in different fields of knowledge[2] generated a democratization process in the net because it allowed society to make it theirs. By this we understand "the forms by which a user makes technology hers and incorporates it creatively into her daily activities."[3] Likewise, considering that health promotion implies the coordinated work of all social sectors and the population, in their personal, family and community environments, so that people can be trained and thus, "increase their control over their health and improve it,"[4] Web Tools 2.0 are a good ally to develop personal abilities that will lead to a healthier life.

The aim of this work is to explain what Web Tools 2.0 are and how they are being applied to health promotion and the prevention of diseases.

In Mexico, urban and rural populations demand information to care for their health and adopt healthy lifestyles. Health providing institutions, which generate and concentrate the information, make it flow slowly towards the central decision-making levels and towards the operational areas. This is partly due to the heterogeneity of the institutional health information systems and to their demands for

a process through which data are translated into information to provide feedback to the health programs. To this respect, Web Tools 2.0 have the potential to make the information reach the population and are an effective means to share information within the health sector's institutions.

Nowadays, the delivery of healthcare services in Mexico encounters barriers, such as the lack of infrastructure, the distance between users and services and the scarcity of human resources, which makes a large part of the population vulnerable. To deal with this problem, the World Health Organization (WHO) established the *cyberhealth* strategy, also known as *e*Health.[5] This proposal was adopted at the 58th World Health Assembly, in 2005. Also, the People's Open Access Education Initiative makes it possible to identify free educational materials related to the competences required to tackle public health problems.[6] In May, 2012, article 32, Chapter II of the General Health Law is reformed in Mexico. This article mentions that healthcare will be able to get support from electronic means, to protect, promote and restore the health of individuals.[7] Hence, Web Tools 2.0 give meaning to the operationalization of the *e*Health concept, since with information and communication technologies (ICTs) applied to the health field, the user may have access to contents related to self-healthcare and the healthcare providers will find means for training and getting involved in continuing education.

Within the ICTs applied to the health in Mexico today, we identify the following:[5]

1. Electronic clinical record. All patients' information is kept, to support decision-making applied to their management and treatment. Mexico's experience with the "Colima-Administrative Electronic Health Record System" (SAECCOL, in Spanish)[8] is a clear example of the progress that has been made with this tool. As to its standardization and interoperability[9], it allows for an exchange of information among diverse teams and software from different places, according to the official health norms, as well as electronic data interchange (EDI)[10] and the standards that regulate them, in order to obtain safe and trustworthy information. It is a challenge in Mexico, because there is no interoperability, and we still need to overcome political barriers for its implementation.
2. Telemedicine. Facilitates service providing (medical consultation) using the ICTs and shortens distances. Mexico Telehealth Observatory[11] has been developed; 15 out of 32 states of the Mexican Republic have been integrated.
3. *mHealth*. It can be used for monitoring and recording vital functions and giving alerts for disease control. These applications may be downloaded from the net to smartphones and other wireless equipment.[12] Most of them are commercial devices. In health sector, Mexico has not developed these applications for the population, since their use has not been included in the legislation. This is a window of opportunity for health promotion after the amendments to the General Health Law come into effect.
4. *eLearning.* It includes distance learning and training, and facilitates the quality of education and the delivery of educational services.[13] National Institute of Public Health at Mexico (NIPH) has a Web site for the School of Public Health of Mexico ESPM 2.0, through which online graduate programs are offered.[14]
5. Continuing Education. This refers to training in health themes using Web Tools 2.0, including the exchange of scientific knowledge through social networks and free electronic publications. ESPM 2.0 has activities such as online Higher Learning Courses, Working Days for Teacher Training and Professional Updating.[14]

The use of Web Tools 2.0 in specific themes brings with it technological, sanitary and socioeconomic benefits, because it promotes participation that is committed to society, boosts collaborative work for health education, encourages the use of social networks to face collective challenges such as sanitary emergencies, and places values, principles and possibilities for teamwork, face to face with individual work.[15]

2. Origins, types and functions of Web Tools 2.0

Users of the World Wide Web started to demand the possibility for interacting with others and with those who generate information, through the Internet. The term Web 2.0 was born in 2004

during a brainstorming session at O'Reilly Media and MediaLive International companies, to refer to the appearance of new computer applications based on the use of Internet, among which were Wikipedia, YouTube and Facebook.[16]

In contrast with the previous stage, the Web 2.0 is faster, more dynamic, participative and inclusive. This is possible thanks to technological advances, like wideband and multifunctional electronic devices that incorporate Internet services and videocameras. This allows an exchange of videos, photographs, music, applications, data and information.

There are three types of Web Tools 2.0 used for health promotion in Mexico: social networks, content management platform and knowledge management systems (Table I).

2.1. Social networks

These tools can be used to support the management of contact networks and the exchange of all kinds of information with third parties or with any cybernaut.[17] The most successful social networks, and the ones that are best known, are Facebook, Twitter and Youtube. They are very useful in increasing the visibility of networks specialized in *eHealth*.

Social networks have multiple uses and allow people to integrate music files, blogs, videos and photos. This type of network is already used, mainly by private companies, in order to form communities of experts or communities of people who are interested in different thematic areas, to promote events, congresses and disseminate information on health promotion. Some are specialized and others are created by an organization for a specific means, for example, community of practice. Particularly, the Network for Latin America and the Caribbean in Health Information Systems (RELACSIS) promotes the development of Health Information Systems (HIS) through the cooperation between professionals in the area, training of human resources in the countries of the Region, generating common actions and the compilation and dissemination of good practices to strengthen the HIS.[18]

Other examples of social networks related to health promotion are:

- Maternal Mortality Observatory in Mexico.[19] The Observatory has a system of indicators through which it is possible to analyze, evaluate, monitor and carry out systematic surveillance of the processes and results of policies, strategies, programs and services focused on reducing maternal mortality. It also has a forum and a section for community members wanting to debate a related theme.

- Network of Mexican Association for the Fight against Cancer[20] is a non-profit, non-governmental organization whose objective is the fight against cancer in Mexico. Its purpose is to help decrease the rates of cancer mortality and to approach private organizations that have the same objective.

Web Tools 2.0 used for Health Promotion	
Social Networks	
General	Specific
Facebook	Relacsis
Twitter	Maternal Mortality Observatory in Mexico
Youtube	Mexican Association for the Fight against Cancer
Content Management Systems	
Virtual Campus in Health	Supported by Blackboard and Moodle Applications
Mexico Virtual Library in Health (BVS-Mexico)	General
Digital Library in Health Information Systems (BDSIS)	Thematic
HIV/AIDS Virtual Library in Health	Thematic
Virtual Library of the Geriatrics Institute (BV-INGER)	Thematic
Knowledge Management Systems	
National	State
Comprehensive System for Dengue Surveillance	Comprehensive Health Information System of Puebla Health Services
Comprehensive Quality System	State Population Council in Morelos

Table I. Web Tools 2.0 used for health promotion in Mexico, 2012.

2.2. *Content management platforms*

These are applications used to create, edit, manage and publish digital multimedia content in diverse formats. These are widely used in different sectors of society, such as those for education or health, since they combine the use of several tools (presentations with audio and text, multimedia, individual or group messages, chat) within the same site.

NIPH already has a virtual campus in health, supported by applications like Blackboard™ and Moodle™. This is a real and updated example of the great potential existing in these systems for training health professionals. Also, virtual health libraries are applications in content management platforms and repositories. Some are general, such as Virtual Library in Health (BVS-Mexico),[1] and thematic ones, like Digital Library in Health Information Systems (BDSIS),[2] HIV/AIDS Virtual Library in Health[3] and Virtual Library of Geriatrics Institute (BV-INGER)[4] managed by the Information Center for Public Health Decisions (CENIDSP).

2.3 Knowledge Management Systems

These systems can be used to collect information in real time and support decision-making. Among their most important functions is the capability for data mining.[21] This is a set of techniques and technologies used to explore large data bases in order to find repetitive patterns, trends or rules that may explain the behavior of data in a certain context. This lets us understand and take advantage of the content of the datawarehouse, use statistical practices and, in some cases, search algorithms. Working with this technology implies taking care of a great number of details, since we must not forget that the final product involves "decision-making".

Data mining examples of national information systems:

- Comprehensive Dengue Surveillance System.[5] This is a geographic information system based on Web applications that provides support for the control of this disease.
- Comprehensive Quality System.[6] Used to measure and improve the quality of health units and to generate indicators and regulations for quality control.

Data mining examples of statewide information systems:

- Comprehensive Health Information System of Puebla Health Services,[7] brings together information from official sources and presents it through indicators that follow the WHO's recommendations closely, as well as PAHO's.[22]
- State Population Council in Morelos.[8] This system has informative population materials (statistics, projections, marginalization indexes, human development, municipal breviaries and population research) for public and private organizations, and institutions.

Some of these systems handle data that have restricted access –only specialized staff members have access to them–, and feeding the system requires trained personnel committed to the objective for which it was designed.

In Mexico, according to the National Institute for Statistics and Geography, in 2010 the proportion of homes in urban and rural localities with access to Internet was 26% and 10%, respectively;[23] these were our target population since they had the basic elements needed to take advantage of the contents generated by the diverse applications of Web Tools 2.0 (Figure 1). However, their potential for health promotion and healthy lifestyles has been used in a differentiated way. Recently, social networks are the ones with greatest popularity; in second place are the content management platforms and, finally, the less known applications are the knowledge management systems.

[1] http://bvs.insp.mx/php/index.php

[2] http://www.bvssis.org.mx/charlotte/index.php

[3] http://bvssida.insp.mx/

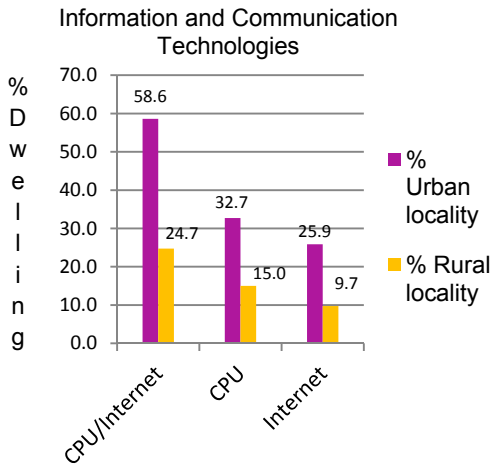
[4] http://www.insp.mx/geriatria/login.php

[5] http://kin.insp.mx/aplicaciones/plataformadengue/

[6] http://www.calidad.salud.gob.mx/calidad/sicalidad.html

[7] http://kaab.insp.mx/puebla/

[8] http://www.coespomor.gob.mx/index.php



Source: INEGI Population and Housing Census 2010: Tabulations of basic questionnaire

Figure 1. Private homes with available information and communication technologies, according to type of locality. Mexico, 2010.

An important part of the potential of Web Tools 2.0, for healthcare and its promotion, is in their low cost of production and maintenance. However, their reach will continue to be limited while the country does not solve the problem of access to the information technologies for the majority of the population, as well as providing digital literacy.

3. Recommendations

The professionalized management of Web Tools 2.0 may be an excellent way to support the dissemination of academic and research activities for health promotion. Some recommendations for those who are interested in the use of these tools are:

- Use the MeSH (Medical Subject Headings) descriptors or DeCS (*Descriptores en Ciencias de la Salud*) to catalog the contents of blogs and social network sites in order to facilitate search and increase visibility of the site.
- Form an editorial committee that will establish the operational guidelines of the site. We recommend having a group of experts that will do an external evaluation of the structure and quality of the site.
- Have experts validate contents before publication. Care must be taken to respect the intellectual property rights of images, audiovisual materials and texts, statistics that are backed by an institution and the correct citation of information sources.
- Update contents at least twice a week.
- Have the site interact with other related sites. The site's visibility may be increased if it is linked to groups that are related to the theme.

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References

[1] West R, Turner LH. Understanding Interpersonal Communication: Making Choices in Changing Times. Boston (MA): Wadsworth Cengage Learning; 2009. Available-from: http://books.google.com.mx/books?id=E19wR7hE EoIC&printsec=frontcover&hl=es&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false.

[2] Kocovic P. Four laws for today and tomorrow. J Appl Res Technol 2008 Dec; 6 (3): 133-46.

[3] Breton P, Proulx S. L'explosion de la communication à l' aube du XXIe siècle. Boréal, Montreal: Dimedia; 2002.

[4] Ottawa Charter for Health Promotion. First International Conference on Health Promotion. The move towards a new public health; 1986 November 21; Ottawa, Ontario, Canada. [2012 May 05]. Available from: http://www.who.int/hpr/NPH/docs/ottawa_charter_hp.pdf.

[5] Organización Panamericana de la Salud/ Organización Mundial de la Salud. 51o Consejo Directivo. 63a Sesión del Comité Regional. Estrategia y Plan de Acción sobre eSalud. Washington, DC, 26 al 30 de septiembre de 2011. Available from: http://new.paho.org/ict4health/index.php?option=com_content&view=article&id=54%3Aestrategia-y-plan-de-accion-sobre-esalud-2012-2017&catid=15%3Aops-wdc&lang=es.

[6] Heller RF, Chongsuvivatwong V, Hailegeorgios S, Dada J, Torun P, Madhok R, et al. Capacity-building for public health: http://peoples-uni.org Bull World Health Organ 2007;85:930-4.

[7] Ley General de Salud. Última reforma publicada DOF 28-05-2012. México, DF: Diario Oficial de la Federación, 28 de mayo de 2012.

[8] Hernandez-Avila JE, Palacio-Mejia LS, Lara-Esqueda A, Agudelo-Botero M, Diana ML, Hotchkiss D et al. Electronic Health Records in Colima. Case study on implementation. Chapel Hill (NC): Measure Evaluation. 2012.

[9] Secretaría de Salud. NORMA Oficial Mexicana NOM-024-SSA3-2010, Que establece los objetivos funcionales y funcionalidades que deberán observar los productos de Sistemas de Expediente Clínico Electrónico para garantizar la interoperabilidad, procesamiento, interpretación, confidencialidad, seguridad y uso de estándares y catálogos de la información de los registros electrónicos en salud. México, DF: Diario Oficial de la Federación, 8 de septiembre de 2010.

[10] United Nations (1993), ISO CD 9735:1993(E), Electronic Data Interchange for Administration Commerce, and Transport (EDIFACT) – Application level syntax rules, 1993.

[11] Centro Nacional de Excelencia Tecnológica en Salud. Observatorio de Telesalud México. [2012 May 3]. Disponible en: http://www.observatorio-telesalud.com.mx/index.html.

[12] Microsoft HealthVault. Apps and devices. [2012 Apr 04]. Available from: http://www.microsoft.com/en-us/healthvault/tools-devices/directory.aspx.

[13] Webinar 2012 Aprendizaje Ubicuo. Dispositivos móviles y contenidos digitales. [2012 Apr 11]. Available from: http://webinar.org.ar/.

[14] Espm 2.0 Escuela de Salud Pública de México. [2012 mayo 05]. Available from: http://www.inspvirtual.mx/.

[15] Trujillo-Torres JM, Cáceres-Reche MP, Hinojosa-Lucena FJ, Aznar-Díaz I. Aprendizaje cooperativo en entornos virtuales. El proyecto Redes Educativas y Organizativas Interuniversitarias. Educar 2011; 47(1):95-119.

[16] O´Reilly T. Qué es Web 2.0. Patrones del diseño y modelos del negocio para la siguiente generación del software. Artículos de la Sociedad de la Información. Fundación Telefónica 2006. Available from: http://sociedadinformacion.fundacion.telefonica.com/DYC/SHI/seccion=1188&idioma=es_ES&id=2009100116300061&activo=4.do?elem=2146.

[17] Odriozola-Celaya J. La empresa en la Web 2.0: el impacto de las redes sociales y las nuevas formas de comunicación online en la estrategia empresarial. Ed. Gestión 2000. 286 páginas. Available from: http://books.google.com.mx/books?id=Zlf7li6AkqkC&dq=editions:RZp9Rn_3xuUC&hl=es&sa=X&ei=QlhqT5_bE-PMiQKTyJmABQ&ved=0CC0Q6AEwAA.

[18] Red Latinoamericana y del Caribe en Sistemas de Información en Salud. Available from: http://www.relacsis.org/login.php.

[19] Observatorio de mortalidad materna en México, 2011. [2012 March 23]. (23/03/2012). Available from: http://www.omm.org.mx/.

[20] Instituto Nacional de Cancerología México, 2012. [2012 March 23]. Available from: http://www.incan.edu.mx/.

[21] Sinnexus Business intelligence + informática estratégica, Datamining (Minería de datos) A Coruña; 2007-2011. Available from: http://www.sinnexus.com/business_intelligence/datamining.aspx.

[22] Román-Pérez S, Santos-Luna R, Hernández-Ávila JE, Sánchez-Castañeda V, Ríos-Salgado VH. Sistema Integral de Información en Salud de los Servicios de Salud del Estado de Puebla. Gaceta Informativa Viva Salud 2011;3(6):36-9. Disponible en: http://www.insp.mx/images/stories/INSP/Docs/gacetas/2011/VIVASALUDNov-Dic.pdf.

[23] Instituto Nacional de Estadística, Geografía e Informática. Censo de Población y Vivienda 2010: Tabulados del Cuestionario Básico. Aguascalientes, México: INEGI; 2011. [2012 May 8] Available from: http://www.inegi.org.mx/Sistemas/temasV2.