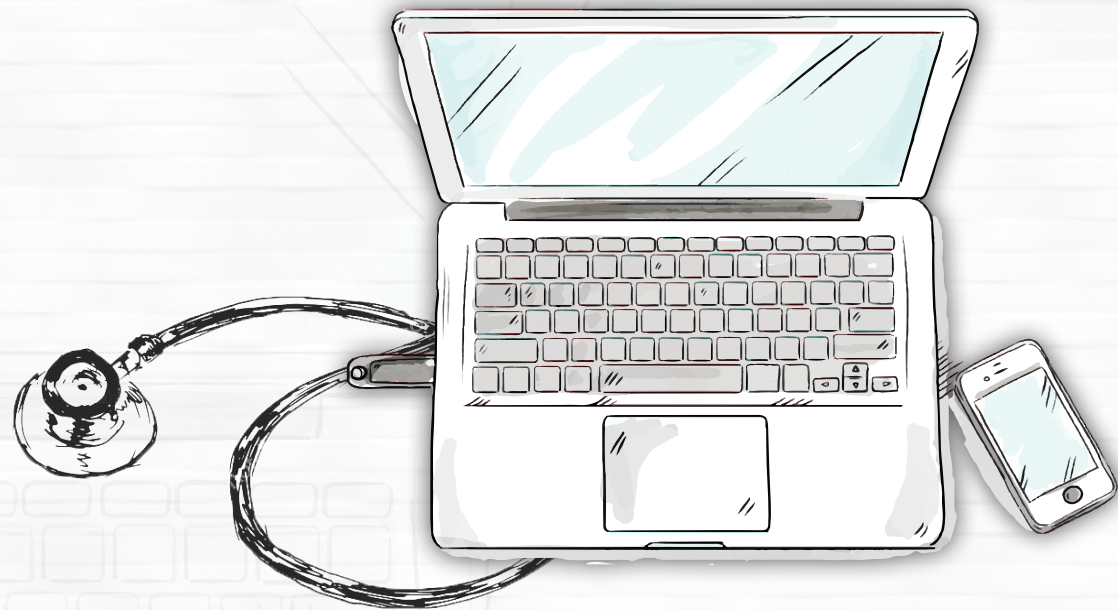


Collaborative work and eHealth in Colombia

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ABSTRACT

This study analyzes the profiles of professionals and students from the health sector in Colombia, and describes how their socio-demographic characteristics and their technological skills affect the use of Information and Communication Technologies —ICT— in their professional and collaborative work. The study applied a correlational-explanatory research with a random population of 420 individuals, a margin of error of +/- 4.8, and a confidence level of 95 %. The results allow establishing a context of low promotion of collaborative work mediated by technology within the studied population, as well as the low level of harnessing of the opportunities offered by the different technological devices and resources for the purposes related to the topic proposed in this work.

keywords: eHealth, digital literacy, collaboration, social networks.

Trabajo colaborativo y eSalud en Colombia

RESUMEN

Este estudio analiza los perfiles de profesionales y estudiantes del sector salud en Colombia y describe cómo sus características sociodemográficas y sus habilidades tecnológicas afectan el uso de las Tecnologías de la Información y las Comunicaciones —TIC— en su trabajo profesional y colaborativo. El estudio utilizó una investigación correlacional-explicativa con una población random de 420 individuos, con un margen de error de $\pm 4,8$ y un nivel de confianza del 95 %. Los resultados permiten establecer un contexto de baja promoción del trabajo colaborativo mediado por la tecnología dentro de la población estudiada, así como el bajo nivel de aprovechamiento de las oportunidades que ofrecen los diferentes dispositivos y recursos tecnológicos para los fines relacionados con el tema propuesto en este trabajo.

Palabras clave: eSalud, alfabetización digital, colaboración, redes sociales.

Travail collaboratif et e-Santé en Colombie

RÉSUMÉ

Cette étude analyse les profils des professionnels et étudiants colombiens du secteur de la santé et décrit de quelles manières les caractéristiques socio-démographiques et les compétences technologiques de cette population affectent l'utilisation des Technologies de l'Information et de la Communication —TIC— dans leur environnement professionnel et collaboratif.

Lors de cette étude, nous avons mis en place une investigation de type corrélationnelle-explicative sur une population de 420 individus avec une marge d'erreur de +/- 4,8 et un niveau de confiance de 95 %. Les résultats obtenus permettent d'établir un contexte de promotion du travail collaboratif relativement faible au sein de la population étudiée.

Finalement, le niveau d'utilisation des opportunités offertes par les différents dispositifs technologiques et les ressources proposées dans cette étude se trouvent à des niveaux relativement bas.

Mots clés: e-santé, alphabétisation numérique, collaboration, réseaux sociaux.

Trabalho colaborativo e eSalud na Colômbia

RESUMO

Este estudo analisa os perfis de profissionais e estudantes do setor saúde na Colômbia e descreve como suas características sociodemográficas e suas habilidades tecnológicas afetam o uso das Tecnologias da Informação e das Comunicações —TIC— em seu trabalho profissional e colaborativo. O estudo utilizou uma pesquisa correlacional-explicativa com uma população random de 420 indivíduos, com uma margem de erro de +/- 4,8 e um nível de confiança de 95 %. Os resultados permitem estabelecer um contexto de baixa promoção do trabalho colaborativo mediado pela tecnologia dentro da população estudada, bem como o baixo nível de aproveitamento das oportunidades que oferecem os diferentes dispositivos e recursos tecnológicos para os fins relacionados com o tema proposto neste trabalho.

Palavras-chave: eSalud, alfabetização digital, colaboração, redes sociais.

1. Introducción

From the beginning of the XXI century, different conceptual approximations of the meaning of eHealth have been described in the literature (Oh, Rizo, Enkin, & Jadad, 2005), depending on the type of study: either from the technological viewpoint concerning the use of Information and Communications Technology (ICT) in activities related to the health sector, or from the viewpoint of the collaborative possibilities and use of data through different technological advances to develop sanitary systems.

The eHealth is understood as an emergent area in which academic professionals from different disciplines converge to develop different medical information services based on advances made in ICT (Eysenbach, 2001) in which new health sector programs are generated in the following service areas: sanitary, education, knowledge, and research (Pan American Health Organization, 2011).

Concepts linked to the term eHealth —i.e., Health 2.0— demonstrate how Web 2.0 is used in the health area and gives new purposes for the Internet content (O'Reilly, 2007; Anderson, 2007). These concepts increase the prosumer condition of the users (Toffler, 1980; García-Galera & Valdivia, 2014) by improving their new roles due to a greater number of opportunities, and they allow the exchange of information and joint collaboration opportunities. Social networks play an important role being linked in Health 2.0 because as a digital environment, they tend to strengthen the capacities of people or entities related to the health area through the dynamic exchange of information, and they can provide new knowledge to address specific necessities and sanitary problems (Tajer, 2009; Hewitt-Taylor, & Bond, 2012; Gualtieri, Javetsky, & Corless, 2012).

Through the use of Web 2.0, public health programs favour health promotion through the devices and ICT tools currently used, such as the development of mechanisms to diagnose and control illnesses, the promotion of new educative contexts for sanitary education —i.e., focused on patients and professionals in charge of the health system—, and the best organisation of sanitary services and the development of social networks, as well as helping improve illness prevention and the over-utilisation of the actual sanitary system (Prieto, 2010).

Hans (2005) has compiled 51 definitions of Health 2.0. Researchers define Health 2.0 as the different behaviours and attitudes that exist regarding the use of 2.0 tools that are available on the Internet and mobile devices in the health field (Hughes, Joshi, & Wareham, 2008; Prieto, 2010; Van De Belt, Engelen, Berben, & Schoonhoven, 2010; Fernández, 2013; Pérez-Machón, 2014).

According to Eysenbach (2008), Health 2.0 is not only the introduction of the existing characteristics in Web 2.0 in the sanitary area but also the inclusion of collaboration, which is generally open and participative in the health sector. However, based on the research of Weinstein and Lopez (2014), with the prominence of eHealth and Health 2.0, the reality is that the increased complexity of different decisions related to the sanitary system demands more understanding of the different communication processes in the actual digital scenarios.

Weiss (2007) and other researchers have demonstrated that the alphabetisation of health, for either patients or health professionals, is a key factor in the movement to predict

what happens with health at the social level; indeed, it is more important than other indicators, such as educational level and socioeconomic status.

Health literacy implies to know how to access adequate information, understand that information, decides either is correct or not, and to take advantage of it in order to take decisions well supported with our health and our community (Romero & Ruiz-Cabello, 2012). There are two factors that are relevant to the implementation of health alphabetisation at the social level and the strengthening of the abilities of the professionals in charge of treating patients: a) strengthening of the communication capacities, and b) promotion of the collaborative work for each sanitary system. As proposed by Norman and Skinner (2006), decisions that affect the acquisition of different capabilities or competences should guarantee the skillsets or analytical competences i.e., —traditional digital literacy, informative literacy, and the meaning of literacy— and specific contexts health, —technological or digital literacy, and scientific literacy that help 2.0 optimise eHealth and Health—, as well as the departments of health aimed to investigate the sociodemographic and technological characteristics that are necessary to establish the profiles of the professionals and students in the health sector in Colombia, and to determine how the use of ICT can influence collaborative work at the professional practice level.

2. Methods

This article is based on a correlational-explanatory study that gathered information between November 2013 and February 2014. The study population included professionals and stu-

dents —i.e., residents— from the nursing and/or medical fields in Colombia.

According to Ruiz, Matallana, Amaya, Vásquez, and Parada (2008), health professionals in Colombia, either doctors or nurses, for 2011 were 72,671 and 38,781, respectively. In 2006, there were a total of 161 Higher Education Institutions —HEI— that offered health-related programs, and medicine, nursing, and therapy are the most offered programs at the higher educational level in the country.

The final sample design was built following a random design. According to the above mentioned, the poll was estimated based on the following equation:

$$n = \frac{Z_{\alpha}^2 * p * q}{i^2}$$

Thus, it was determined that approximately 420 health care professionals and students should be polled, with a 95 % confidence level — $1-\alpha=0.05$ —, and $ee=+/-4.8$, which was distributed as follows: 190 professional and 230 students of programs linked to the sanitary sector —nursing and medicine—.

The coefficients for the statistical validation of the instrument that was used for the quantitative measurement of the work supporting this paper are shown in table 1:

Table 1. Statistical data of reliability in blocks of questions that were part of the survey

Questions related to the use of ICT —Q16 to Q2	
Cronbach's alpha	N° of elements
.750	59
Questions related to Web 2.0 —Q28 to Q32—	
Cronbach's alpha	N° of elements
.931	28
Questions related to the specialized virtual communities —Q33 to Q39—	
Cronbach's alpha	N° of elements
.912	12
Questions related to the institutional context of the use of ICT by health professionals in Colombia —P40 to P51—	
Cronbach's alpha	N° of elements
.866	65

Source. Prepared by the authors.

3. Results and discussion

The sociodemographic profile of the study participants was as follows: a) most participants were women; b) most were childless; c) most were unmarried; d) in terms of their socioeconomic strata, and in accordance with the current classification used in Colombia, most participants were at the average level—middle class—; e) they achieved their highest job titles between 6 and 10 years ago; 6) on average, they had 6 years— $\mu=5.9$ years— of education at the nearby health institutions; 7) they had an average of 10 years— $\mu=10.55$ years— experience

working in the health sector; and 8) their average age was 28 years— $\mu=28.4$ years—.

From a socioeconomic viewpoint, the results of the study show important similarities with the research of Ruiz et al. (2008) and the findings in terms of the averages (μ) in areas such as the distribution of gender, age range, and income level, according to the social distribution of socioeconomic status in Colombia (Ministry of Health and Social Protection of Colombia, 2012).

The results of the study help to create a profile of the sanitary medical personnel in Colombia: they are women—for the most part—with limited abilities to acquire technological devices due to the existing framework of social stratification in Colombia, and they have much experience in the sanitary sector in this country. These findings do not consider the psychosocial development related to the cycle of life identified by Erikson (1998) as an adult—20 to 30 years old—who is characterised by: a) the capacity to establish agreements with other people, b) the ability to recognise ethical conflicts in the social standards existing in their surroundings, and c) the ability

to establish an adult working identity that extends from learning activities and games in the labour area and converges in a central activity related to psychosocial stability, among other characteristics.

From the technological point of view, and taking into account the comments of the participants, they have the self-perception of being frequent Internet users, with an average (μ) of 4.7 hours of daily use or consumption, either from home or mobile devices—30.8 % and 31.8 %, respectively—.

Table 2. Self-perception about the Internet

	N	Minimum	Maximum	Average**	Typical Deviation
Considered to be a frequent Internet user*	399	1	2	1.12	.323
Daily consumption—Internet hours—	412	0	24	4.71238	4.159544

Note: N=420, n=399, 1- $\alpha=95$ %, ee= ± 4.8 * 1) Yes / 2) No ** Statistical Mode= 1

Source. Prepared by the authors.

In terms of the use of the ICT resources and equipment, 59.3 % of the study participants said that most of the time, they were used for professional work. This finding demonstrates a technological “half-full” approach in terms of the proper professional practice of the study participants.

Referring to the technological devices used by the polled health professionals and students, in or out of the contexts of labour action and formation oriented to this sector, the provided information reveals low use of technological equipment— $\mu=8.3$ % use of technological devices, either inside or outside

of the sanitary institutions—; the use of “traditional” devices indicates devices with high levels of social penetration and the use of intelligent mobile phones —smartphones—, the principal piece of equipment used by these individuals, without reaching 20 % of the responses related to this topic. The results of the study indicate a low level of technology use on the part of the study group, despite the high levels of computer use and the prevalence of mobile devices in the country (Ministry of Information Technology and Communications of Colombia, 2013).

Based on the results shown in table 3, in which people was asked about the use of ICT resources in their profession, the study results indicate that some health sector professionals and students report low use of the programs and platforms develo-

ped to establish contact between partners and patients, as well as the use of programs that strengthen collaborative professional work; in general terms, none of the options presented in table 3 exceeded 20 % for the use of ICT by the health sector professionals and students who were polled. This finding reveals an absence in the use of the inherent potentialities of the current technological advances, including the Internet and the development of a new generation of equipment and available resources that favour the establishment of communication with other partners —professionals and/or students and patients—, as well as the access to information and/or knowledge, and the strengthening of patterns or habits that promote cooperation and professional collaboration to ensure better patient treatment.

Table 3. Use of ICT resources by professional workers —question with options and several answers—

ICT resources	Frequency	Percentage
Skype —Free calls through Internet—	86	6.1 %
Chat —Messenger, Whatsapp—	232	16.5 %
Virtual forum discussions	67	4.8 %
Wikis —Collaborative web page that can be edited by users—	97	6.9 %
Web browsers —i.e., Google, Yahoo, Bing—	239	17.0 %
Blogs —digital platform in which an author publishes posts and/or articles	86	6.1 %
Mobile applications	139	9.9 %
Repository of videos —YouTube—	129	9.1 %
Specialised software —i.e., digital clinical history, information systems—	139	9.9 %
Social networks —i.e., Facebook, LinkedIn, Google Plus, Twitter—	196	13.9 %

Note: N=420, 1- α =95 %, ee= +/- 4.8

Source. Prepared by the authors.

Despite the low use of ICT devices and hardware by the health sector professionals and students, there was generally unanimous agreement about the importance of technological advances in improving existing labour conditions in the country — $\mu=4.48$ —.

In order to determine the factors that affect the use of technology in collaborative work in the health sector in Colombia, correlations related to the proposed target were examined, and a new correlation was considered: the “level of exploitation of the ICT for the collaborative work” of the study participants. This new variable was based on the survey questions, in terms of the level of agreement by the participants in evaluating self-perceptions related to ICT promotion in collaborative work developed at the interior of the Health sector. The values were based on the reference variable —dependent— and were described as follows (table 4):

Figure 1. Level of use of ICT in the collaborative work

$$= \begin{cases} 1 & \text{if located before Q1} \\ 2 & \text{if located between Q1 y el Q2} \\ 3 & \text{if located between Q2 and el Q3} \\ 4 & \text{other case} \end{cases}$$

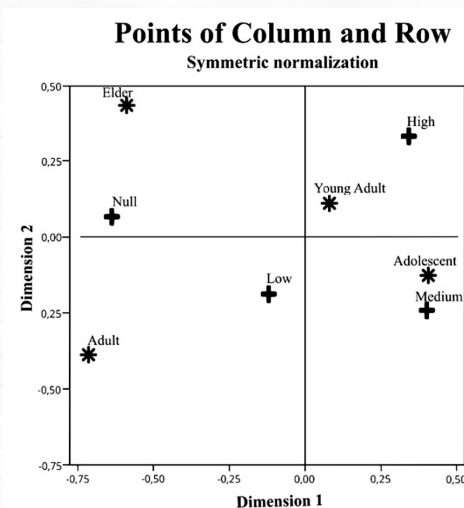
Fuente. Prepared by the authors.

Then, the created variable took real values (ranging from 1 to 4), assigned in accordance with quartiles, which represented a level of ICT use for the collaborative work: 1=null level, 2=low level, 3=average level, and 4=high level. The participant’s age, responsibility for children —according to the age

range of the children—, socioeconomic status, job title, and responsibility were all statistically related to the use of ICT in collaborative work.

There was a major relationship between the use of ICT for collaborative work and older age — $\text{Sig.} \leq 0.000$ —. Figure 1 demonstrates this relationship; young adults —20 to 30 years of age— tended to use ICT more for collaborative work:

Figure 2. Relationship between the level of ICT use for the collaborative work and the age of the study participants.



Note: +=Web 2.0 use level. *=Age of the study participants

Fuente. Prepared by the authors

For the polled adolescents —younger than 20 years of age— the results are affected by the fact that these individuals lack professional experience using collaborative strategies to develop skills related to sanitary patient treatment.

The results obtained for the study participants older than 50 years of age were related to age, in alignment with the Erikson study (Weinstein & López, 2014), which demonstrated that the conviction of one's own ethical values and the "to know to do", as well as the established work patterns affected their patient treatment under traditional models. This group is unaffected by the potential improvements that technology could provide to the exercise of their job functions and labour rules.

Among the study participants, another variable that affects the use of ICT in collaborative work is their number of children—expert—, particularly if the children were up to 18 years of age or older than 26 years of age—Sig. ≤ 0.05 —. Related to this finding, it would be interesting to know if children help their parents with the use of technology, thereby improving both their personal and professional relationships. Being parents appears to motivate the search for mechanisms that provide the most effective use of the time, and of the ICT devices and resources that are available in order to perform the different roles in their lives (Barrios 2009; Chew, LaRose, Steinfield, & Velasquez, 2011). This motivation may provide a more favourable environment for the collaborative work used in their professional lives.

Another aspect that directly affected the use of ICT in collaborative work was the socioeconomic status of the participants—Sig. ≤ 0.007 —: individuals with lower socioeconomic levels demonstrated greater use of technology for the purposes that are outlined in this paper. However, considering the digital breach in society at present, which is understood as yet another declaration of social inequality (Ballesta & Cerezo, 2012; Bautista, 2010), the study results allow us to observe how the

opportunities that are offered at present by the ICT favour or enrich the interpersonal contexts of learning and collaboration between health sector partners in Colombia (Kollöffel, Eysink, & Jong, 2011; Gómez, Puigvert, & Flecha, 2011; Salmerón, Rodríguez, & Gutiérrez, 2010) and, in this work, they concentrate on low socioeconomic workers.

Having observed the relationship between the use of ICT for the collaborative work among the study population and their education levels, the data demonstrates how a lower level of education is associated with lower use of ICT—Sig. ≤ 0.000 —.

Except in the case of the polled students, who demonstrated low levels of ICT use for collaborative work, as motivated by little or non-existent experience inside the sanitary sector at a professional level, the results of the remaining study participants allow us to identify a horizon in which an increase in the educational level of health professionals appear to affect not only the compliance of the different cases or functions of the sanitary system that there is in our country, but also the acquisition of a set of technical, intellectual, social, and ethical competencies that are necessary to effectively interact in a critical and autonomous manner with the wide diversity of devices and technological resources that are presently available (Area & Pessoa 2012; Gutiérrez-Martín & Tyner, 2012).

Despite the findings that are detailed in the previous paragraphs, with the results that were obtained it is not possible to establish what level of education would be necessary to ensure competency in health sector workers due to the lower level nature of the position, and the lower use of ICT in collaborative work—Sig. ≤ 0.000 —. This finding indicates that doctors are the professionals with the lowest level of collaborative work,

compared with other similar positions related to the sanitary treatment of the patients. In the case of other health sector professionals —i.e., a psychologist, odontologist, or auditor— and technicians —i.e., odontology lab assistants—, their collaboration patterns —promoted during their educative years— and different professional, technical, or administrative work could motivate the development of collaborative dynamic labours between partners for patient treatment.

4. Conclusions

Despite the limitations of the study, and as a result of the sample taken for the development of this paper, the data allow us to indicate low promotion of technological collaborative work among doctors and sanitary personnel in Colombia, as indicated by a low level of use of the opportunities offered by the different ICT devices and resources that are presently available at the social level.

In spite of the high expectations that professionals and students have about the potential of ICT in medicine and sanitary practice in Colombia, as demonstrated by Cobo and Pardo (2007), Prieto (2010), Hewitt-Taylor and Bond (2012), or Gualtieri, Javetsky, and Corless (2012), the use of new technology is still distant in this country, particularly if we consider the results of technology use among the study participants, and if we view the findings from the perspective of eHealth and Health 2.0 —i.e., the increasing technological advances of Web 2.0 generally favour collaborative, open, and participatory work in the health sector—, which were proposed by Eysenbach (2008) and the Pan American Health Organization (2011).

Despite the contributions that ICT and the enthusiasm that social networks can provide in promoting increased quality and safety in the set of labour activities linked to the existing sanitary system at a global scale, as emphasised by Weiss (2007), Gallant, Irizarry, Boone, & Kreps (2011), Buijink, Visser, and Marshall (2013), and Tomlinson, Rotheram-Borus, Swartz, and Tsai (2013), the information provided and analysed here supports a sanitary context in Colombia that generally finds that the professionals and students in the current study do not adhere to the ICT guidelines that are detailed in this paper.

In the analysed population, the factors that affect the use of technology in the promotion of collaborative work can help us develop a profile of the sanitary health care workers in Colombia; this profile indicates that they might be more inclined to lead the process of transformation needed in the above mentioned sector to make use of the advances that have been mentioned in this paper.

In order to effectively optimise eHealth and Health 2.0 in Colombia, the process of literacy or the acquisition of the different competencies or skills proposed by Norman and Skinner (2006) should take into account the design of programs or actions that are oriented to encourage the participation of young adult sanitary workers with children, and with lower socioeconomic —low and medium— and educational levels. Considering the results of the study, collaborative work using technology among the sanitary Colombian sector could be led by professionals with technical profiles, not by existing doctors in the above mentioned system. This fact would mark an implementation route at the state level and the organisations linked with the mentioned sector —hospitals or private related enti-

ties—, with the target to encourage political and organisational rules that help to increase the visibility and role of the factors that have been identified in this work and to promote the topic proposed in this paper, consequently strengthening eHealth and Health 2.0 programs.

It is clear that the results shown and analyzed in this paper address a topic that requires further progress in its approach, especially in the case of Colombia, where the proposed theme remains poorly addressed so far, something that, the study on which this work is based, contributes to the increase of its debate.

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