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Web-Based Asynchronous Teleconsulting for Consumers in Colombia: A 2-year Follow Up

José Ignacio Valenzuela, Catalina López, Yuli Guzmán, Roosevelt Fajardo

Centro de Educación Virtual y Simulación e-Health, División de Educación, Fundación Santa Fe de Bogotá, Bogotá, Colombia

Abstract

Background: Remote consultation was implemented in 2006 in our institution, through an open-access Web-based Teleconsulting service: Doctor Chat. This tool was created with the aim of improving access to health care services in Colombia, especially in underserved areas. Objective: The aim of this paper is to report our experience with the free Web-based application for teleconsultation. Methods: After validating the tool, we analyzed the queries submitted between May 2007 and June 2009. Requests were classified into three axes: purpose of the query, specialty, and geographic area of origin. Descriptive statistics were gathered for each category (name, email, city, country, age, gender). Results: We received 1624 consultations, with an average of 59 requests per month. 52.7% of the users were aged 18 to 29 years. Users asked mainly about sexual and reproductive health issues. 79.2% of consultations came from Colombia and 32.91% of the users were students. Conclusions: Doctor Chat is an innovative tool to deliver health care information, but advertising, preventive and technical strategies must be implemented to improve its impact on Colombia's health system.

Keywords:

Colombia, Remote consultation, e-Health, Teleconsultation, Telemedicine.

Introduction

Among technological applications available today, teleconsulting services stand out as significant means to improve access to healthcare information [1]. Many concerns about health issues can be answered by a medical guidance through the Internet [2]. Due to high worldwide impact of these services, the Center for Virtual Education and Simulation (Centro de Educación Virtual y Simulación e-Salud, Fundación Santa Fe de Bogota [3]), offers a noncommercial, free web-based teleconsulting service in Spanish, called Doctor Chat [4]. This application was developed in 2006 with the aim of providing a tool that could serve as a basis to improve access to health care services in Colombia, especially for populations in-need located in underserved areas of the country. In 2007, we presented the first results of our experience with Doctor Chat [5]: During the first six months of operations, 270 teleconsultations were received. At the time, Internet penetration was already showing a steep rise, ascending from 2.1% in 2000 to 12.9% in 2006 and 44% in 2009 [6, 7]. This evolution is shown in Figure 1. Additionally, the number of internet subscribers raised 54% between June 2008 and June 2009 [7]. This information allowed us to expect fewer barriers in terms of Internet connectivity, more access in underserved areas, and therefore a progressive increase in the number of teleconsultations, which could translate into a continuously growing impact tool towards community health information empowerment. These facts served as strong motivators to continue with the program on a subsidized basis with a social sense. Three years after Doctor Chat´s launch, we analyze the follow up experience with the use of web-based asynchronous teleconsulting for consumers in Colombia and Latin America.

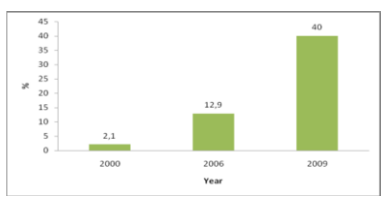


Figure 1- Evolution of Internet Penetration in Colombia

Materials and Methods

Doctor Chat´s Nature and Upgrades

Since its conception, Doctor Chat has followed a user-centered approach to allow anonymous virtual health consultations openly available to any Spanish-speaking person in the world via Internet. Compared to its first version described [5], in March 2009 structural changes were introduced:

(1) The formats for asynchronous teleconsultation and response were redesigned, allowing us to retrieve and analyze digitally more information about the requests, i.e. the purpose of the queries, the Specialty they corresponded to, and the Profession/Occupation of the consulter. To that date, this information was retrieved and stored manually, and for this reason, the data in those last categories analyzed in this paper were only retrieved since that date (see Results); the first data field ("Name") was replaced by ("Name or alias") to further protect user´s confidentiality. Also, the interface was modified to increase its dynamicity. (2) the supporting platform migrated

from a Web-based application structured as a series of HTML pages with e-mail feedback to one that is managed through a tailor "home-made" XHTML scalable application for Contents Management Systems (i.e. Joomla 1.5.X), which allows web-control for information capture and results generation, with transactional reporting via web, anti spamming security (Captcha) and Security Sockets (SSL), created by a Web server (Red Hat Enterprise Linux 4, Apache/2.0.63 Unix) to store and retrieve data in a relational database (MySql 5 – MySqli 5, PHP 5).

The new platform has allowed response automation: whereas previously each user query was directed to a centralized Doctor Chat email account to which only the medical team had access and responses were given by simply replying to the message, now the queries are stored in a web accessible data base, and the responses are given directly through the web-based application. This has significantly facilitated data analysis by allowing computerized data mining, while assuring all the data fields that are important for the analysis are collected.

All queries are received and filtered by a coordinating physician, who responds to primary-level health questions and redirects those specialized to the corresponding Department of our fourth level University Hospital.

(3) The user's satisfaction survey was extended and automated. Before March 2009, a single-question informal survey of user's satisfaction was sent along with the response ("Are you satisfied with Doctor Chat's service? Please send us your comments to improve the service"). Now, the new satisfaction survey includes 5 mandatory question fields (QF) with drop-down menus for each answer (A): (1) QF: "Did the answer provided by Doctor Chat meet your expectations?" / A: "Yes – No"; (2) QF: "Was Doctor Chat´s answer to your question clear?" / A: "Yes-No"; (3) QF: "What´s your general opinion on Doctor Chat´s response according to the following criteria" / A: "Insufficient – Indifferent- Acceptable – Good – Excellent"; (4) QF: "Given that the standard response time of Doctor Chat is 48 hours, what is your overall satisfaction with the response time?" / A: "Completely satisfied – Satisfied – Unsatisfied – Completely unsatisfied"; (5) QF: "Comments and suggestions" /A: Blank field.

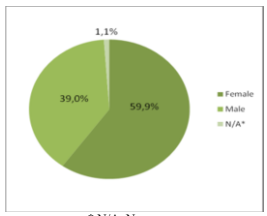
Data Analysis

Content analysis was performed according to three classifications: (1) the purpose of the query, (2) the specialty, and (3) the geographic area of the query. Kravitz et al [8] "taxonomy of patient requests" was used to categorize the purpose of the query, and each request was classified according to the topic into one of the 31 specialties available at our institution.
Descriptive statistics were gathered for each of the data categories (name, email, city, country, age, gender and the newly included profession/occupation) and the location from which each query was submitted was determined by the response to the "country" and "city" cells.

Results

Gender and Age Ranges

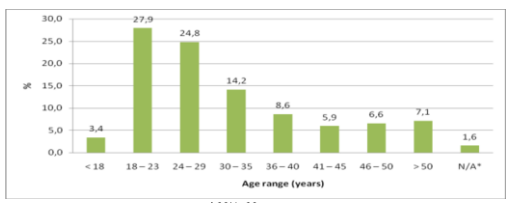
Between September 15th 2006 and July 8th 2009, we received a total of 1624 remote consultations, 973 were submitted by women and 633 by men, which represent the percentages shown in Figure 2.



* N/A: No answer

Figure 2- Distribution of consultations by gender

The monthly average of remote consultations was 59, whereas a mean of 2.3 were received per day. This average practically doubles that of 1.4 consultations per day, found from September 2006 to march 2007 [5]. Regarding the age groups, most of the users were aged 18 to 29 years (52.7%), as shown in Figure 3. This result is very similar to the one we reported in 2007, in which 54% of the users belonged to this same age range [5].



* N/A: No answer

Figure 3- Distribution of consultations by age range

Purpose of the requests

By taxonomical category (as described by Kravitz et al [8]), the majority of teleconsultations were requests for information (n=1482; 91.3%), and particularly about symptoms, problems or diseases (n=991; 66.8%). Inquiries for medications/treatments accounted for 22.2% (n=330) of the Request for Information category.

Requests for Action accounted for 7.2% (n=117) of all consultations, and among these, 70.9% (n=81) belonged to the Medication/treatments, 15.3% (n=17) and 12.6 % (n=14) to the "Referral to other physician" and "Laboratory test, x-rays, or other study" subcategories, respectively. These results are shown in Table 1.

Table 1 – Distribution of consultation per taxonomical category

Taxonomical category	n	% of the category	% of total
Request for Information	**1482**	**100**	**91,3**
Symptoms, problems, or diseases	991	66,8	61,0
Medications/treatments	330	22,2	20,3
Other administrative issues	44	3,0	2,7
Test or diagnostic investigations	48	3,2	3,0
Other request for information	44	2,9	2,7
Prevention	17	1,2	1,1
Other physicians	7	0,5	0,4
3rd party payer or managed care issues	0	0,0	0,0
Index physician-patient relationship	0	0,0	0,0
The physical examination	0	0,0	0,0
Psychosocial problems	2	0,1	0,1
Request for Action	**117**	**100**	**7,2**
Medication/treatments	81	70,9	5,0
Laboratory test, x-rays, or other study	14	12,6	0,9
Referral to other physician	17	15,3	1,1
Other administrative action	2	1,8	0,1
Referral to nonphysician	1	0,9	0,1
Administrative action: 3rd party payer	1	0,9	0,1
Physical examination	0	0,0	0,0
Other request for action	81	70,9	0,0
N/A* (Information or Action)	**25**	**100**	**1.5**
Consolidated Total	**1624**	**100**	**100**

*N/A: No Answer

Requests by Specialty

As shown in Figure 4, most of the teleconsultations fell into the Gynecology and Obstetrics (GO) (n=414; 25.5%) and Urology (n=178; 11.0%) areas. These requests corresponded to sexual and reproductive health issues, i.e. Sexually Transmitted Infections (STIs) including HIV/AIDS (65.2%), and contraceptive methods (30%). Among the remaining questions related to GO, 20% concerned pregnancy, 6% infertility and 6% vaginal infections. Requests for information on Dermatology accounted for 9.8% (n=133) of all teleconsultations. In this area, most of the questions asked for information regarding removal of moles, scars, striae or tattoos (40%) and allergic reactions (30%). Other questions on Dermatology included topics such as treatment of acne and skin cancer.

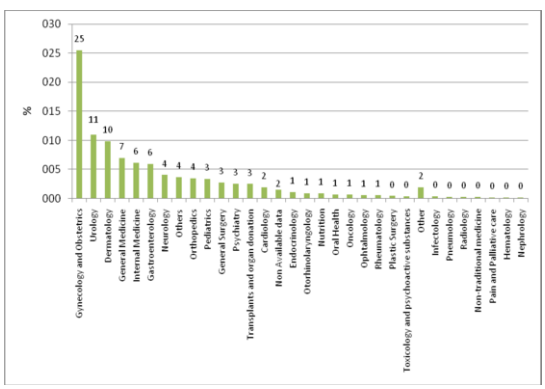


Figure 4- Requests by specialty

Origin of the Requests

79.2% (n=1286) of the consultations were originated in Colombia. However, as shown in Figure 5, we received inquiries from all around the world, especially Hispanic countries like Mexico (n=87; 5.3%) and Spain (n=63; 3.8%).

In Figure 6 we can see that most consultations from Colombia were originated in Bogota (n=690; 55.4%), Medellin (n=89; 7.1%) and Cali (n=66; 5.3%), the three main cities of the country. 22.7% (n=283) came from intermediate cities (State capitals except those described above), and 9.4% (n=118) from remote or underserved areas.

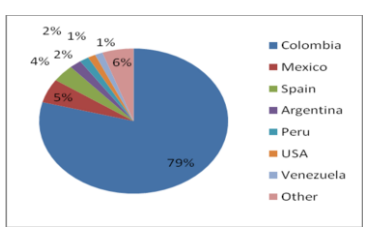


Figure 5- Requests by country of origin

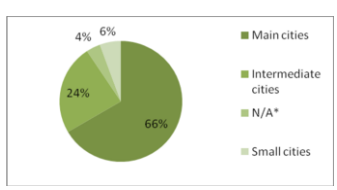


Figure 6- Requests by city of origin (Colombia)

In Table 2 we can see that in comparison to the 2007 results [5], the percentage of consultations originated in intermediate and small cities presented an important increase, whereas the percentage of requests from the main cities varied only slightly.

Table 2 – Comparison of distribution by city of origin between 2007 and 2009

Group	n (%) 2007	n (%) 2009
Main cities	137 (67.2)	693 (66.5)
Intermediate cities	40 (19.7)	251 (24.1)
Small cities	2 (0.7)	58 (5.6)

Requests by Profession/Occupation

From March 16th (date in which the "Profession/Occupation" field was added) to July 8th 2009, we received 237 teleconsultations. Among these users, the majority were students, followed by "other" types of Professions/Occupations, housewives and Merchants. The results are shown in Table 3.

Table 3 – Distribution by Profession/ Occupation

Profession/Occupation	n	%
Student	78	32.91
Other	56	23.64
Housewife	27	11.39
Merchant	14	5.91
Assistant, manager	10	4.22
Employee	10	4.22
Teacher	8	3.38
Lawyer	7	2.95
Administrative	7	2.95
Engineer	7	2.95
Miscellaneous	7	2.95
Independent	6	2.53
Total	**237**	**100**

Discussion

Since its implementation in 2006 and as seen in Figure 7, Doctor Chat has shown a fluctuating behavior. The peak in May 2008 shows its sensibility to "publicity". Although no marketing has been put in place to promote the tool among potential users, when the service was presented in an interview for Semana [9], a nation-wide spread magazine, a dramatically rapid increase in the number of teleconsultations shown in Figure 7 was accounted, with a total of 240 requests received only during that month. Nevertheless, without ongoing publicity, the use of the service declined as rapidly as the peaking rise, to stabilize at the previous baseline, thereby probably behaving accordingly to Eysenbach´s Law of Attrition [10], which states that e-Health applications "allude to a common problem" consisting of a decrease number of users through time, due to a loss of users over time. It would be interesting to put in place a continuous marketing strategy and evaluate its impact in terms of usage among the community, but because we predict a massive response, we would need financing to support the infrastructure and human capacity to anticipate to that demand. In this scenario, we consider that the tool may behave differently from Eysenbach´s Law trend, but a further follow up in the presence of continuous publicity would be needed to confirm this hypothesis. Another fact that must be considered in this matter is that the number of users of our application varies a great deal over time, with new users entering each day, some of the old users dropping out or consulting one time only, and some others using the application regularly.

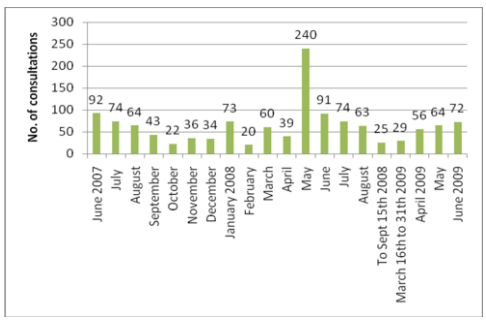


Figure 7- Number of requests per month

Regarding the geographical origin of the requests, few changes have occurred since 2007 [5]. Despite the increase of internet penetration in Colombia, 58.2% of all Internet connections are concentrated in the four main cities of the country [11], probably explaining the fact that most of the requests are still coming from non-distant places. However, it is fortunate that we have also accounted an important increase in the number of consultations coming from smaller cities and underserved areas.

Colombia´s National Plan for IT has established the year 2019 as the cutting point for universal internet coverage among the country [12], and is currently undertaking important efforts to achieving this goal. As internet penetration continues to expand as well as an "IT culture" to incorporate in the daily lives of distantly-located populations, we anticipate an exponential growth of the usage of teleconsulting services such as Doctor Chat as means to obtaining reliable health related information. Another interesting information retrieved from this study is the fact that most of the users of Doctor Chat are young students and housewives and that the majority of consultations were related to sexual and reproductive health issues. This is particularly important in developing countries like Colombia, where unplanned pregnancy is a main cause of school desertion and a major cause of unsafe abortion [13]. The importance and the impact of tools such as Doctor Chat to support sexual and reproductive health prevention and promotion activities and strategies is still to be assessed.

Penetration of mobile phones in Colombia is one of the highest of Latin America, reaching 85.45% [14] (compared to the national 44% internet penetration [6]) with a total of 40.28 million subscribers in the second trimester of 2009 [11]. Additionally, there has been an increase of 56.8% in the number of Internet connections through mobile networks in the last year, with a total of 495.730 users by the end of June 2009 [6]. With these data in mind, in collaboration with Universidad de Los Andes we are currently developing a new application for mobile phone consultations called mobile Doctor Chat ("*Doctor Chat móvil*"), which will be available for all-types of mobile technology users all over the country by the end of the first semester of 2010. With this application, we aim to reach communities with limited or no internet access, especially in underserved areas, as well as that majority of the Colombian population which have incorporated mobile phoning –but not internet- into their daily routines.

Conclusion

Doctor Chat has proven to be an innovative tool to deliver health care information to Spanish-speaking communities. However, strategies like publicity, specific prevention and promotion activities and expansion of the services through mobile telephony should be strongly reinforced in order to effectively reaching underserved areas and achieving population-wide impacts in developing countries like Colombia .

Acknowledgments

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Address for correspondence

División de Educación
Fundación Santa Fe de Bogotá
Cra. 7B No.123-90 Piso 4
Bogotá, Colombia
Phone: (57+1) 603 0303 ext. 5721
Fax: (57+1) 214 6668
e-mail: jose.valenzuela@fsfb.edu.co