

Opportunity offered by the Empowerment ICT: A Survey ICT and Empowerment in the Espigadilla

Miguel Vargas-Lombardo

CIDITIC, Technological University of Panama, Panama

miguel.vargas@utp.ac.pa

Abstract– ICT could redesign the health service environment in a more representative way. Replacing structures and models centered in the patient, achieving objectives y immediate goals of active participation through the empowerment of ICT health services. I safe to promote the use of ICT in a context of health in central America could give rise to grave social, ethical and practical problems, especially in relation with the digital gap, meaning the participations of persons without access to technology. Never the less this article plants an empowerment model centered in the patient, supported by ICT, which will demonstrate the reach that can be achieved through the empowerment of ICT in the context of health. On the other hand, a first approach to the model will be presented, through a field study conducted in a rural area of Panama with which the reach of the model is to be measured.

Keywords– ICT, Primary Attention, America Central, Patient and Model

I. INTRODUCTION

According to the Global Information Technology Report 2013 [1], countries in the Centro America region: Panama, Belice, Costa Rica, El Salvador, Guatemala, Honduras y Nicaragua; in information and Communication Technologies (ICT), are significantly distant from the rest of the world, however some advances are highlighted in the America Center region (See Table 1).

Table 1: Central America Internet: Usage and Population Statistics

Central America Internet Usage and Population Statistics			
CENTRAL AMERICA	Population (2011 Est.)	Internet Usage, 31-Dec-2011	% Population (Penetration)
Belize	321,115	35,580.	19.8 %
Costa Rica	4,576,562	2,000,000	43.7 %
El Salvador	6,071,774	1,257,380	20.7 %
Guatemala	13,824,463	2,280,000	16.5 %
Honduras	8,143,564	1,067,560	13.1 %
Nicaragua	5,666,301	663,500.	11.7 %
Panama	3,460,462	1,503,441	43.4 %

Miniwatts Marketing Group. Source 2011

In [1], Latin America and the Caribbean suffer a grave lag which prevents from achieving the maximum potential of the information technologies to increase regional productivity. It stills to be a priority the technological correlation in Central America in aspects such as mobile networks, industrial use of internet, access to digital content and mobile broadband. The ICT have a considerable potential with its tools (blogs, forums, chat, emails amongst others) for the support of health in millions of patients. It has been widely demonstrated that the capacity to access mobile devices, personal computers, manage and manipulate data.

However, technological illiteracy exteriorized in diverse forms in teaching and learning structures makes difficult the progressive use of ICT by the patients. From the perspective of an important number of experts [2], [3], [4], [5], [6], [7] who through year have exteriorized the impact of empowerment in the context of health, of new technologies and the achievement made by patients. The empowerment of patients about ICT and centering the patient is a measure to extend the field of viable actions from the personal resources point of view (facilities and abilities to communication, control and leadership) as the environment of new technologies (access to adequate services of livelihood, care, education and better health). These aspects command the development of an empowerment ICT model centered on the patient, with which a new road is opened toward more and better development of ICT with the advantage of a participatory environment for the patient who hardly manages to obtain access to health services in rural areas.

The starting point of this article is to propitiate the acknowledgment of an innovative approach about the empowerment of ICT centered, on the patient favoring primary clinical attention in Central America. The incorporation of new technologies in the process of development of health systems can be difficult and polemic. It is evident that electronic administration (e-health) is not about putting health services online alone and to improve services. On the contrary it also includes the conglomerate of technologies of mediation process which could improve the global quality of health and decision making, improving interaction between patients and the sanitary personnel.

The development of this model of empowerment for ICT, centered in the patient brings with it the development of a field of study on the field (site) in which a small sample of the patients in a community of 1675 habitants in a rural area

denominated la Espigadilla, located in the province of Los Santos, Republic of Panamá. This article is organized in the following way, section I ICT and health in Central America, followed by section II the opportunities that offers the empowerment of ICT in health and its social impact. In section III the empowerment of ICT centered on patients. In section IV the case study of La Espigadilla a first approach. Section V conclusion and future works.

II. OPPORTUNITIES WHICH THE ICT EMPOWERMENT OFFERS IN HEALTH AND SOCIAL IMPACT

One of the contributions of the ICT and which suppose of the patients (above all for those situations of social exclusion and technology) is a positive value and the reference in the society which it becomes a tool of acknowledgment and mobility for reference groups.

Not to dispose of a work, not counting education according to time, not to have family ties who support in health care, no access to basic health services, not counting with ICT services which support in care, these leave the patient in a place with no social value. In this sense the ICT must return in different ways this forgotten place back into society. For the return of the patient in the use of ICT involves the acquisition of new experiences and learning, for other to open to a new relation system. Others are link even further to familiars or even it simply allows them to keep a connection to "reality" important aspect important to the link empowerment of ICT. This link must be translated to acceptance of substantial improvements in the environment of the patient. For the patient this implies to adhere to the ICT and improve the quality of its healthcare.

In the sanitary personnel on which lays the organization, should conduct to represent a progressive role in regards advantages and opportunity the ICT such as facilitators and mediators for a positive change in the relation with the two environments both for the patients as for the sanitary personnel. Achieving a display of ICT which contributes to self-care of patients and within their own environment and its displays what happens to the development of software applications which attend the need of patients as is the case of the model concentrated in the context of patients and sanitary personnel with a focus towards preventive care.

The model denominated "sofias" Integration software for Ubiquitous adaptive integration" form part of one of the efforts to integration of diverse platforms of hardware and software the need for information, collaboration and care of those patients in the Republic of Panamá who what or require the information about care and attention of patients in terminal conditions. On the other hand, the "sofias" model (see Figure 1 and Figure 2), organize and allow the access to information individual and share it between the sanitary personnel (medics, nurses, technicians of health) the diverse geographical areas of the country. Facilitation of the display of ICT in a world of relations for the health of patient in terminal state which with draws persons from isolation, and integrates them socially, reinforcing communication and collaboration in the familiar environment of the patient.

The screenshot shows the 'Sofias' software interface for 'Red Social de Cuidados Paliativos Panamá'. The main window is titled 'Sistema Único de Referencia y Contrareferencia'. It features a sidebar with navigation options like 'Registro de visitas domiciliaria', 'Capturar datos', and 'Registro de actividades diarias'. The main content area contains a form for patient data and referral information. The form includes fields for 'Nombre', 'Apellido', 'Fecha de Nacimiento', 'Sexo', and 'Tipo de Sangre'. There is also a section for 'Datos de Contacto/Dirección' and a calendar for tracking visits. The interface is clean and professional, with a blue header and a green footer.

Fig. 1: Development schematic of Software "Sofias"

The screenshot shows the 'Sofias' software interface for 'Red Social de Cuidados Paliativos Panamá'. The main window is titled 'Capturar Datos'. It features a sidebar with navigation options like 'Registro de visitas domiciliaria', 'Capturar datos', and 'Registro de actividades diarias'. The main content area contains a form for capturing patient data. The form is divided into sections for 'Datos de Identificación', 'Datos Personales del Paciente', and 'Datos de Contacto/Dirección'. The 'Datos de Identificación' section includes fields for 'N° Tarjeta de Seguramiento', 'Número de Cédula', 'Nacionalidad', and 'Tipo de Paciente'. The 'Datos Personales del Paciente' section includes fields for 'Nombre', 'Apellido', 'Fecha de Nacimiento', 'Sexo', and 'Tipo de Sangre'. The 'Datos de Contacto/Dirección' section includes fields for 'Provincia', 'Distrito', 'Correimiento', and 'Dirección Detallada'. The interface is clean and professional, with a blue header and a green footer.

Fig. 2: Development schematic of software "Sofias", Home Care

In the last years the subject of Health and ICT has become an ever growing subject each time more dominated by debate because to the increase in the costs of health systems and the need to improve the efficiency and quality of presentation in sanitary assistance. In the last years the concepts of telemedicine and electronic health have transform in a significant way in developed countries, achieving large levels of importance in the promotion, attention, and care of population. This is due to the rapid development of communication networks and ICT.

However, this unquestionable advance is put in injection between regions and countries, both in rural and urban areas of Latin America and the Caribbean [8]. In 2011 [8] propose to develop a strategic plan using as main axis electronic health and the progressive improvement of attention access by patients and basic services of health in Central America and the Caribbean.

This proposal manifest an undeniable reality which is the urgent need to integrate ICT not only among patient populations, but also amongst doctors, nurses, and the rest of the actors involved in the day to day operations, attending a population which demands more and better health services. It is because of this that different government organism and professionals as well as scientific societies has begun to systematize this knowledge to establish protocols for its use and regulation, as instruments of validations its effects. Because of this, the use of ICT for health, implanted in a personal act between sanitary personnel and the environment of patients in which the attitude, aptitude, motivation and satisfaction and the decisions of the patient and its environment, amongst others, are responsible for the exit of this technology.

In the development of ICT components in health is imperative to know the aspects and reach the necessary competencies to promote them, is a challenge for the professional of the ICT, conducting the process which will favor the daily activity in the environment of sanitary personnel and patients, recognize the need to build new instrument and scenarios to facilitate the care, attention and equity in health, using an effective use of ICT.

III. EMPOWERMENT OF PATIENT-CENTERED ICT, THE MODEL

The proposal of an ICT model concentrated in the context of patients brings the development of a strategy of collaboration and integration focused on active participation, see Figure 3.

The model appropriates of an important group of concepts with which the first part of the proposal is developed, which then is validated in diverse scenarios taking into consideration the model proposed. The exposed model, "Empowerment of patient-centered ICT, the model", engulf the concept of patients with which is try to option a ubiquitous participation through diverse dispositive of ICT achieving collaboration with subject with enforces empowerment of the ICT for health. The model will have a platform of collaborative network, linking and participative. On the other hand the ICT (software) service are made available from diverse communication gadgets (Tablet, Smartphone, and amongst others). The main service of ICT which offers a model to facilitate the integration of the communication El (audio, video y real time text) generating process which will favor the attention of patients through the correlation between empowerment and the process which the patient must reach in order to empower themselves in the ICT, instructions, diligence, training, success.

With the instruction of the patient should receive the initial knowledge about the care of the illness, understanding that the patient receives support to be diligent in its care, on top of this it should receive information about how to conduct in a discipline way in regards its illness, being trained in the use of ICT available, favoring the notion that it will feedback its discipline in the care of its health, reaching success if it empowers the stages and technologies available to him. The empowerment should conduct to synergy among various components of the system.

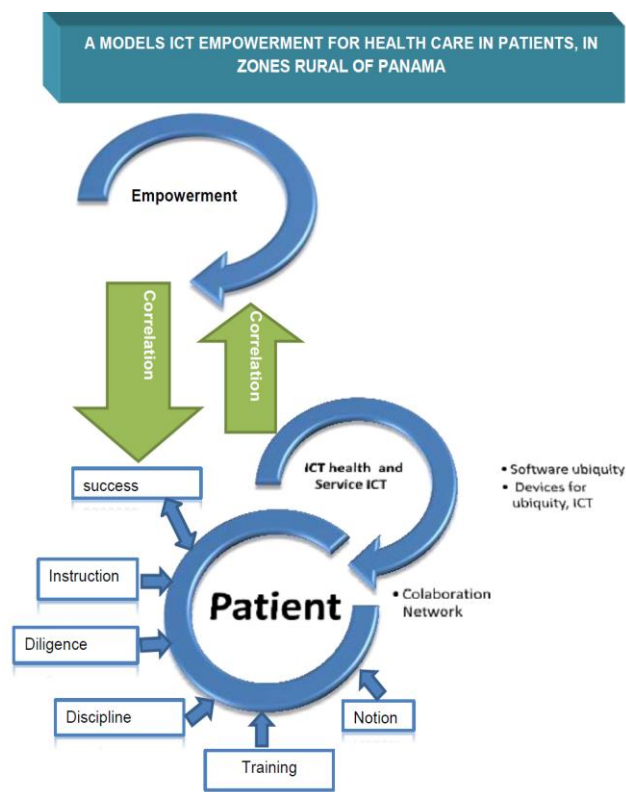


Fig. 3: ICT Empowerment for Health Care in patients, in zones rural of panama

IV. LA ESPIGADILLA CASE STUDY: A FIRST APPROXIMATION TO AN ICT EMPOWERING MODEL

La Espigadilla is a small town (political division) located in Los Santos district in the province of Los Santos. In 2010 it counted with a population of 1675 inhabitants and a population density of 59.7 persons per km² [9] (Figure 4 to Figure 5).

The hypothesis of the research is to recognize the possibilities to develop an ICT in heath in rural area, basing it in the empowerment as a strategy for sustainability which facilitates the link between the context and the patient. The research is focused on patients in rural areas taking into consideration men and women, from a sample of 61 patients divided in three subgroups with ages between 40-49, 50-59 and older than 60 years, see Table 2.



Fig. 4: Application process in the Espigadilla interviews



Fig. 5: Interviews using the Espigadilla

Table 2: Overview of research: “La Espigadilla”

Patients	Groups	Sum	40-49	50-59	60 ^
Overview	Sex Female (F)	31	7	9	15
	Sexo Male (M)	30	8	10	12
	Nothing Schooling	8	1	3	4
	Elementary School	42	6	13	23
	High School	7	5	2	0
	University	4	3	1	0

On top of this, four subgroups are obtained to present aspect of education of the persons completing the interview concerning identifying the groups of patients and its potential to use devices as (Smartphone, Tablets and other devices). Besides participating in the modeling of different software components for alarm systems health patient, patient help

online, network collaboration, control systems y diabetes care, high pressure and any other type of chronic disease such as lung diseases, cancer and even tropical diseases. The analysis of data gathered from a group of 61 patients in this rural area, only the 11% knows of has used a computer, as a tool to extract information about health care. Meanwhile 89% has never used a computer. The reach of these responses allows identifying the existences of a mark digital breach in rural areas.

Another question of the interview was the frequency with which a computer is used, to which the group answered: occasionally 57%, sometimes 14% y all day 29%. Similarly, it was ask if it will be willing to use a USB device or any other device to storage its medical story; 85% agreed, 9% did not agreed, 2% were not interested and 4% did not answered. This demonstrates the level of penetration of ICT in regards the use of information storage devices and the integration of it in personal clinical data history. When consulted, if interested to use a devices to monitor its health from home for diabetes care, hypertension or heart diseases 89% agreed, 5% did not agreed, 2% did not answered, 4% did was not interested. Marking the interest of patients to used ICT for health care penetrating the individual space of the patient.

Another question was the use of mobile phones, to which they answered 91% owns a cell phone meanwhile only 9% did not. Is particularly important, to acknowledge that if the patients have access to a communication asset, it could be possible to create software prototypes capable of modeling the reality of the patient and the care of its health through mobile devices as smart phones and other technologies. Finally the interview concludes asking about the use of the cell phone, to which the group answers: 30% occasionally, 14% once a week and 56% all the time. This shows that the penetration of mobile technologies is considerable, which encourages the development of projects to facilitate and empower a large number of patients. Therefore it is necessary the development of research centered in the new models of assistance (self-care combined patient monitoring), in which ICT will play an essential role.

V. CONCLUSIONS

The results obtained from this research demonstrate that is necessary to start projects to develop ICT in rural areas and that these projects must be basis for patient health care. On top of this is important that the empowerment of ICT is fundamental in models in which the context in which patients participating rural areas are broadly analyzed. The ICT limitations in Central America are clear however it is necessary to continue developing proposal and models oriented toward making easier the day to day healthcare of millions of patients. It is also necessary to conduct more interviews and studies leading to make career choices in the field of tic and health in rural areas of Central America, having reference this investigation. The model that we present in this paper is validated on rural Panama and publications results. The project "sofias" is part of the many investigations that my research group "GISES: Research Group in health

electronic and Supercomputer" develops in the social-and ICT in Panama.

Miguel Vargas-Lombardo is a professor at the Technological University of Panama, PhD awarded by the Polytechnic University of Madrid. His main research lines are grid computing, health-grid, cloud computing and e-health.

ACKNOWLEDGMENTS

To the Centro Regional Universitario de Azuero (CRUA) of the Technological University of Panamá (UTP), in particular to Maritza Cedeño statistics specialist, and the group of students who supported the interview process. In the same way: to Magdalena Duran director of the CRUA.

REFERENCES

- [1] B. Bilbao-Osorio, *et al.*, "Global Information Technology Report 2013," World Economic Forum and INSEAD, Geneva, Suiza 2013.
- [2] E. Avrama and I. Priescub, "Access to information and empowerment perspectives in health services," *J. Procedia - Social and Behavioral Sciences*, vol. 33, pp. 949–953, 2012.
- [3] Y. Amichai-Hamburger, *et al.*, "E-empowerment: Empowerment by the Internet," *J. Computers in Human Behavior*, vol. 24, pp. 1776–1789, 2008.
- [4] R. Allahyaria, *et al.*, "Survey of relationship between the psychological empowerment of employees with organizational learning " *J. Procedia - Social and Behavioral Sciences* vol. 30, pp. 1549 – 1554, 2011.
- [5] T. Lewis, *et al.*, "E-health in low- and middle-income countries: findings from the Center for Health Market Innovations," *J. Bull World Health Organ*, vol. 90, pp. 332–340, 2012.
- [6] M. Christensen and J. Hewitt-Taylor, "Patient empowerment: Does it still occur in the ICU?," *J. Intensive and Critical Care Nursing* vol. 23, pp. 156-161, 2007.
- [7] N. K. Ambujam and K. Venkatalakshmi, "The function of information and technology in Empowerment of women," 2009.
- [8] WHO and PAHO, "eHealth Strategy and Plan of Action (2012-2017)," World Health Organization Pan American Health Organization, Washington DC, 2011.
- [9] Comptroller General of the Republic Panama and Central Statistics Office. (2010). Superficie, Población Y Densidad De Población En La República, Según Provincia, Comarca Indígena, Distrito Y Corregimiento: Censos De 1990 A 2010. Available:
<http://estadisticas.contraloria.gob.pa/Resultados2010/tabulados/Pdf/Cuadro11.pdf>