

Mobile App in Health: Improving User Awareness Regarding Own Health

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Abstract

Knowledge is more and more a strategic resource for health organizations while information & communication technology earns an important role for sharing knowledge and information among people in and out organizations. these conditions satisfy specific demands related to the new emerging information needs, asking for a change in relationships and effective communication. so, the medicine apps represent an emerging and rapidly developing framework for health system, able to contribute to its quality and efficiency. The same u.s.

supervisory authority activated in the last years an appropriate study in order to control the medical applications downloaded directly through mobile devices and able to influence health performance. this work - with a mixed approach - presents the results of the exploratory and descriptive studies in order to make clear the general dynamics and functionality of the medicine category apps.

Keywords: Mobile Health Application; Knowledge Society; Knowledge Management.

1. Introduction

Healthcare organizations, from both private and public sectors, have been facing profound changes over the past decades.

On one hand, the changes were activated by national authorities with the introduction of new managerial practices; but, they depend largely by the possibility given by the new role of knowledge in the organizations and by ICT like new tool able to guide change and to improve new performance in health system(Nicolini, 2010; Swan et al., 2016).

In fact, knowledge is more and more a strategic resource for the improvement of health organizations while information & communication technology earns an important role for sharing knowledge and informations among people in and out organizations.

The increasing and frequent use of the new technologies, linked to the use of the web, allowed to satisfy specific and particular needs related to the new emerging information needs, asking for a change in relationships and effective communication.

New demands for healthcare informations raise as a consequence of the impact that new technologies (e.g. mobile applications, cloud computing, etc) have on society and our lives, that are deeply changing oftenun consciously, our rhythms, skills, effects, and social relations.

New liquid society (Bauman)asked for new relationships among individuals and organizations, also in Health System. In these situations, the Apps represent an emerging and rapidly developing framework for healthcare, able to contribute to its quality and efficiency. The same U.S. Supervisory Authority activated in the last years an appropriate study in order to control the Medical Applications downloaded directly through mobile devices, and able to "influence the performance or functionality of currently regulated medical devices" (Sole24Ore, September 2013).

So, the starting point of this contribution is to explore and analyze the dynamics of the phenomenon with an updated picture of the different Apps related to Medicine Category; on these basis it will be interesting to know how applications can support the activities of the practitioners and so the quality of patient care.

2. Objectives and Methods

Healthcare organizations have been facing profound changes over the past decades, both in private and in public sectors.

The same possibility given by information systems can determine new learning processes through Information Technology, and so Health Apps are an emerging and rapidly developing part of healthcare, thanks to the use of smartphones and 3G and 4G networks that permit to provide new health care services (European Commission, 2014).

So, patients are becoming more educated, empowered, informed and involved in decision-making processes related to their own health.

In addition professionals are engaging in designing new “forms” of knowledge structures for healthcare (Martinez and Galdiero, 2013; Martinez and Galdiero, 2015; Reina et.al., 2015). The Juniper Report estimates about 44 million Health Apps are downloaded in 2012 and over than 142 million health Apps are downloaded in 2016. Juniper Report said that smartphones will “greatly expand the capabilities” of Health Apps and today more than 3.4 billion people worldwide have their own smartphone while half of them will be using Health Apps.

Under these conditions, information technology earns an important role for sharing knowledge and information among people in and out organizations (Hsiu-Mei Huang, Shu-Sheng Liaw, 2004), particularly through mobile applications. The same Sole24Ore in 2013 dedicated its Special Health Report on Apps Medicine Category, as a particular tool able to connect and integrate data in order to obtain specific health information.

These Medicine Apps are therefore useful tools for supporting the user’s awareness of his own health needs and for giving her/him the ability to manage them.

This work presents the results of the exploratory and descriptive studies in order to make clear the general dynamics of the phenomenon (Eisenhardt, 1989; Yin, 1994). The approach was mixed, based on two phases: a) on the desk phase explores the existing literature on theme; b) on the job phase analyses the App following these steps 1) Apps’identification (belonging to Medicine Category) on iOS and Android Italian system; 2) focus on specific Apps in order to analyse the aspects related to knowledge creation and diffusion.

3. Theoretical Background

The assumption of the research is the impact of New Information and Communication Technologies in everyday life (ICT). In parallel to the change

of ITC, we are witnessing for a process of progressive qualification of the contents and objectives in the transition from data processing to richer contents such as information and knowledge, coming from, communities of citizens “brought together by a shared interest in a given subject” i.e. the Knowledge Society (David and Foray, 2002).

Knowledge Society is a kind of collective structure in which the ability of humans to innovate the system of things and relationships become a key instrument for the promotion of social and individual welfare, through the interconnection of people for learning and intelligence (Volonté, 2010).

These interconnections promote the creation of a global knowledge society with the exchange of information and data on individual and social level, while the technological infrastructure of the network makes this exchange effective and real (Moreno-Jiménez et al., 2012).

The four key elements of Knowledge Society are 1. the increasing value of intangible aspects; 2. the de-territorialisation of knowledge and power; 3. the interconnection between the actors involved in the decision making processes and 4. the importance of the human factor, particularly regarding continuous learning and education (Moreno-Jiménez and Polasek, 2005). In this new changing context, a particular role plays the Apps (on mobile devices), like a new technological systems able to transmit, create and share of knowledge.

If this is true in general terms, the implementation of specific Apps in the health sector - available for download on mobile devices (like smartphones and tablets) - spurred particular interest to investigate this phenomenon. In particular, these Apps allow to create and to improve an open innovation model (Chesborough, 2003) where it is important the involvement of people to enhance co-creation of knowledge and inquiry thinking, therefore, its capability can become a pre-condition for generating new approaches to healthcare. In the following figure is represented the knowledge flow among actors in the complex health context, where it's possible to assist to several reciprocal interdependences; ICT experts and doctors that combine their knowledge with the aim to produce innovative and easy-to-use Apps, patients - as device users - that can learn new information on how prevent and cure their disease, even if the App isn't connected with healthcare operators

Figure n°1: The knowledge flow using mhealth apps.

In this way App can be considered an interactive tool among patients and doctors, able to facilitate the monitoring and the highlighting of alerts and to develop combinations of know-how among the nodes of healthcare networks.

4. Results and Considerations

Actually, new web-based technologies have profoundly changed the way with which people communicate and many users have access to data and information in ways never seen before. Different objectives are linked to mApps, covering a variety of areas that support users in assuming a pro-active approach to health care in association with self-monitoring programs.

Infact, Medicine Category Applications are designed to interact directly with users in order to allow them to better manage their own health, with or without the presence of an healthcare professional (Parsons, 2011). This makes the Medicine Apps ideal tools for supporting health care by improving the participation and the capacity of patients regarding their health self-management.

The total number of mobile applications in Android operating system on smartphone was n°4525 in 2014 and n°4560 in 2016, while in the IOS operating system there was n°6009 in 2014 and n°6700 in the 2016. Successively, the research focused in specific way only on fee mApp, on the belief that the paid App are more reliable than the others; so, in the tables n°1 and n°2 are given the number of fee apps available for the medicine category and other categories in the years 2014 and 2016.

This research was carried out using as a tool the smartphone with the Android and IOS operating systems. See Table n°1 :Fee Apps on Android operating system. See Table n°2: Fee Apps on IOS operating system.

By analyzing the data, it is clear that with regard to the Medicine Category, for the Android system the keywords that have changed in the period are "cancer" that in 2014 had only n°4 app, while in 2016 it obtained n°28; and the keyword "Heart attack" which in 2014 had n°4 apps that become n°35 in 2016. With reference to the operating system IOS keywords that have undergone changes are "Drugs", which in 2014 had n°20 apps that become n°35 in 2016, and "Diabetes" which in 2014 had n°70 apps which fell in 2016 to n°23.

In addition another aspect investigated was the presence of some informations exchanged overtime through the use of specific App; in order to find this, the analysis focus on the presence of the comments in the App, without considering the technical but only the qualitative comments. Infact, through the comments the user can leave a piece of information freely available for the developer on one hand and on the other hand for different users. In addition the comments are free, therefore, by depending on the users' availability and their will; for this reason – on our opinion - the comment gives more strength and pushes better the development of informations and knowledge among users. In this way maybe it would be possible to contribute to exchange information and create new knowledge for the whole networks.

So, by recalling the figure presented before, it's possible to observe the relationship among developer and different users of mApps, who download and use the medical application.

The table n° 3: Comments– Android & Ios, below identifies for the different keywords the number of comments present in the Apps.

The total number of comments obtained by the research was n°74 in Android System and n°132 in IoS System. The following figures (see Figures n° 2 and n° 3) shows the presence of comments divided in two main form: technical comments and the others.

The feedback from the Developers go to enhance trust in users/patients who download the application, becoming a new way to attract customers by themselves.

The user through the feedback is aware of being connected anytime he wants with the developer and this helps to increase the level of participation and involvement and to make him always feel attended.

So, through the Apps the relationships among people (user) becomes more direct and personalized and for this way it's possible to improve the level of reliability and confidence regarding this new electronical tool and in parallel to raise the level of self-care for all users involved.

5. First Conclusions

This work wants to highlight how the use of Applications (Medicine Category) can create new learning processes and new knowledge by interactions among different users. Under these reflections the Medicine Apps can support the users in their health care by increasing the awareness of own state of health and, therefore, their ability to self-management.

But, in literature there isn't sufficient information regarding safety and trust related to the use of these medicine tools by user-patient. Perhaps, the only way could be represented by their score visible in the communities through the number of downloaded present on site and their comments.

So, other important aspects remain to focus and analyse such as reputation and reliability instrumental, security of data processing, privacy.

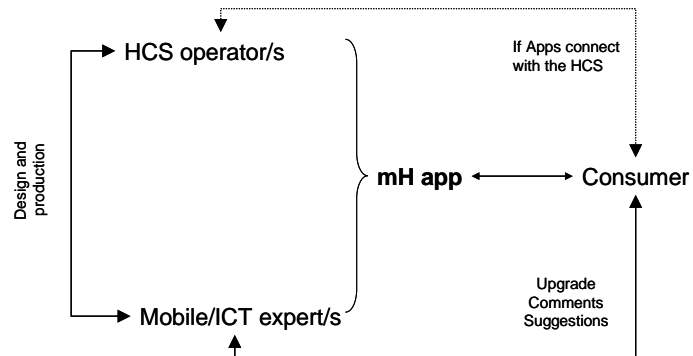
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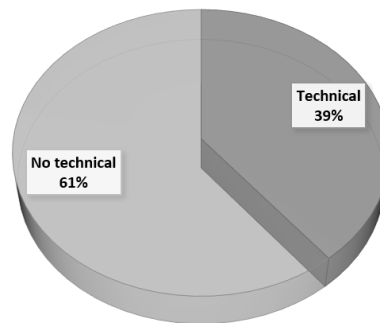
Appendix

Figure n°1 : The knowledge flow using mhealth apps



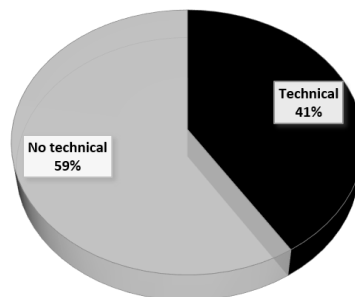
Source: Kogut and Zander (1992)

Figure n°2: Android – % Comments



Source: our elaboration, 2016

Figure n°3: iOS – % Comments



Source: our elaboration, 2016

Table n°1 :Fee Apps on Android operating system

	Medicine		Other	
	Category		Category	
	<i>2014</i>	<i>2016</i>	<i>2014</i>	<i>2016</i>
Psychology	0	2	20	26
Heart	1	1	43	16
Diabetes	2	30	53	21
Flu	0	8	17	15
Heart Attack	4	28	35	22
Obesity	0	8	28	16
Cancer	1	18	14	13
Antioxidants	0	0	51	21
Diet	0	0	26	22
Drugs	7	17	42	4
Genetics	2	6	27	21
Ictus	3	14	33	20
Kids	0	0	9	5
Women	0	0	10	3
DNA	0	0	35	34
Psyche	0	2	30	28
Sports	0	0	4	7
Cancer	3	28	40	8
Skin	0	0	136	65
Total	19	114	653	367

Source: our elaboration, 2016

Table n°2: Fee Apps on IOS operating system

	Medicine		Other	
	Category		Category	
	2014	2016	2014	2016
Psychology	1	4	34	42
Heart	3	3	12	26
Diabetes	70	23	125	29
Flu	3	13	2	20
Heart Attack	5	4	0	2
Obesity	0	0	5	13
Cancer	6	7	9	17
Antioxidants	0	0	0	0
Diet	2	1	110	51
Drugs	20	35	5	16
Genetics	0	11	0	37
Ictus	0	5	6	9
Kids	4	0	0	172
Women	2	14	13	136
DNA	10	20	21	149
Psyche	16	1	90	3
Sports	0	3	306	146
Cancer	4	3	72	2
Skin	2	4	548	50
Total	148	151	1358	920

Source: our elaboration, 2016

Table n°3: Comments– Android & Ios

Keywords	Medicine	Medicine	Number Users	
	category	category	Comment	
	Android	IoS	Android	IoS
	2016	2016	2016	2016
Psychology	2	4	2	4
Heart	1	3	0	0
Diabetes	30	23	4	3
Flu	8	13	4	14
Heart Attack	28	4	6	0
Obesity	8	0	0	0
Cancer	18	7	0	4
Antioxidants	0	0	0	0
Diet	0	1	0	0
Drugs	17	35	57	72
Genetics	6	11	0	12
Ictus	14	5	1	0
Kids	0	0	0	0
Women	0	14	0	11
DNA	0	20	0	1
Psyche	2	1	0	10
Sports	0	3	0	9
Cancer	28	3	0	0
Skin	0	4	0	0
Total			74	132

Source: our elaboration, 2016