ICT – An Agent of Change That Can Enrich a „Society of All Ages"

Marilena IANCULESCU, Monica PÂRVAN[*]

National Institute for R&D in Informatics (ICI). 8-10 Maresal Averescu Boulevard, sect.1, 011455 București, Romania.
E-mail(s): manina@ici.ro; parvan@ici.ro.

* Author to whom correspondence should be addressed; Tel.: +4-021-3161256; Fax: +4-021-3161030.

Abstract: Demographic developments, including an aging population, change pathological models and pressures on health systems sustainability of the European Union. ICT can play a significant role in approaching these challenges because they allow the management and providing of health and social services more efficiently. Health informatics systems have the potential to play an important role in achieving well- being, independent living and delaying of the aging process and restoring the vitality of the mature body. The „*Multidisciplinary Complex System for the Efficient Management of the Anti-Aging information (AgingNice)*" creates favourable conditions for the participation of all at the Information Society. AgingNice allows the sharing of the knowledge concerning the specific research and the promotion of the theoretical and practical information, both among the stakeholders from the medical area and at the citizen's level. „*Informational Centre of Dermatology (CID)*" is a complex system that has as target to achieve a modern informatics tool able to centralize in a single point a variety of web services and information classified by user's type. Both health informatics systems demonstrate how ICT can improve the dissemination of health information, knowledge, comprising the users' motivation concerning educational content and its new promoting methods.

Keywords: Health education informatics systems; Anti-aging; Empowerment; Healthy aging / lifestyle.

Introduction

The aging of the population, resulting from the lower rates of birth rate and from the increasing life expectancy, represents a well-known phenomenon nowadays. Till 2050 the people over 65 will have a 70% growth in EU and those over 80 a 170% one. [1]

A healthy aging is supported by actions meaning to encourage the adoption of a healthy way of living, to reduce the harming behaviour, to prevent and treat some specific diseases. These will lead to the prolongation of the active life, the population will be able to enjoy a good state of health while the life expectancy will be bigger and bigger, and the health costs due to the aging of the population might be reduced at half.

The self-determination of the citizens represents a fundamental value; the medical assistance becomes more and more patient-centred and individualized and the patient himself becomes more and more an active subject instead of a simple object inside the medical assistance services.

Taking into consideration that Romania has an aging population (14% of its population is at the third aged, there are over six million pensioners, and the figures will increase in coming years), the phenomenon should preoccupy us increasingly more.

ICT can play a significant role in approaching these challenges because they allow the management and providing of health and social services more efficiently and they offer more opportunities for communitary attendance and self-nursing, for innovation in terms of services.

Access, affordability and ease of use of equipment and services are necessary preconditions for providing advanced services for the aging society. It is expected that the average citizen should have a greater role in ensuring his own state of health and that he will look for high quality, updated, reliable dermatological information. All these will lead to an increased online availability of trustful specialized information and to the forthcoming of new easy-accessible web applications.

Health informatics systems have the potential to play an important role in achieving well- being, independent living and delaying of the aging process and restoring the vitality of the mature body.

Aging Population and ICT

This aging population is significant in both its number and its implications for ICT development. As a person ages, the probability of losing some amount of functionality – whether it's hearing, vision, mobility, dexterity, or cognitive – increases significantly, creating an immediate "second tier" of demand for accessible ICT adapted persons over 65 who lose sensory, motor, or cognitive capabilities. [2]

ICT usage in the past had emphasized pioneering informatization and supported the fields where the informatization had not been developed. Now, ICT focuses on resolving various social problems such as the falling birth-rate and the aging population. As a result, people will realize that ICT is a tangible and helpful tool to resolve various social issues.

Elderly people are the main users of healthcare. The aging of the population implies new challenges for healthcare systems, which have to improve the way they respond to the illnesses suffered by elderly patients without overlooking elderly people who are healthy. It has been estimated that, in Europe, investments in these matters will cause an increase in public healthcare spending by around 3% of GDP. [3]

The trend is the fact that the use of ICT is becoming an interest among people in their sixties or seventies. It is important that the delivering system of ICT be devised for those people's convenience, instead of assuming that they can not use ICT because of their age and geographic disadvantages.

Older users can be much better informed than ever before and thus can take increasingly more responsibility as regards their own health, physical condition and living with independent information on the Internet, special television channels and the individual solutions offered by ICT in terms of daily life, personal health and physical condition. [4]

Access, affordability and ease of use of equipment and services are necessary preconditions for providing advanced services for the aging society. However, ICT basic products and services rarely meet the needs of the elderly, such as those related to multiple progressive deficiencies associated with aging.

Engaging with ICT to promote health and healthcare delivery requires specific levels of skill or literacy that allows the users to operate the systems, navigate the Web, retrieve and input information, and grasp the correct contextual meaning of information. At this stage, it is unrealistic to hypothesise that those individuals with access to Web and mobile technologies have the required skill and literacy to use these technologies pro actively. Studies show that even in countries with high rates of Internet adoption such as the USA and Canada, over 40% of adults have a basic literacy level below the requirement for optimally participating in the information society. [5]

A rejection of new technologies due to the effort required to learn how to use them may exist, but this is exactly why we have to design health informatics systems to encourage the citizens to "desire" to use them. In this sense, we have to promote "active" aging, encouraging everybody – including the seniors - to get involved by all possible means and to accept to take advantage of the possibilities provided by new technologies.

New Person-Centric Health Education Informatics Systems

Health informatics involves applying an understanding of computer technology, medical knowledge and organisational processes to develop new systems for healthcare delivery.

While exacerbated by an aging population, poor lifestyle choices remain one of the main issues that lead to increased costs of healthcare. The key challenge is convincing individuals to change deeply ingrained lifestyle habits. The increased focus on behavioural modification requires IT specialists and health professionals to profoundly re-think how they design, communicate, and deliver Health Education Informatics Systems (HEIS).

The emerging solution is a "person-centric" approach that tailors behavioural-modification strategies to individual needs, able to empowers individuals with comprehensive personalized health awareness. Innovations in new HEIS advise and motivate patients to make better health lifestyle decisions and enhance their personal medical compliance.

Three key phenomena have been changing the nature of computing over the last few years, including the new types of HEIS. The first is the popularity of portable devices such as mobile telephones and Personal Digital Assistants (PDAs). Today, around 80% of the Western Europe adult population possess their own mobile phone and there is a large variety of smart phones on the market that integrate PDA functionality. The second phenomenon is the large number of embedded systems; these are everyday devices that have their own processor and memory. Estimates suggest that more than 98% of the world's processor's are in embedded systems, thus facilitating the deployment of a variety of information systems that control physical objects. The third phenomena is the increasing variety of wireless networks available for personal and embedded devices, e.g., Bluetooth, Wifi, GPRS, etc.

The combination of these three phenomena has permitted the emergence of context-aware person-centric applications. Thus, HEIS can complement a person's physical ability to interact with his environment, are continually available and can be tailored to the needs, preferences and location of each person interested in preserving his/her health. [6]

Designing HEIS must take into account the evolving nature of the health domain and the aging of the population, a growing trend towards primary and preventive care and the explosive growth in global networking as exemplified by the Internet. While, historically, storage and retrieval of data has been the main target for informatics systems development, the need to capture knowledge itself is becoming the focus for HEIS development.

In the context of promoting health in the dermatology domain, different types of health education are necessary, intended for individuals, groups, organizations and communities. This approach is linked to the awareness of the causality relations existing among the environment, economic and social factors and the state of health.

HEIS are changing the way health information is disseminated and managed, but implementation is a difficult task in which social and cultural issues must be addressed. Empowering the citizens through readily-available health information is a valuable use of the ICT, but the nature of the Internet environment raises the spectre of abuse of vulnerable persons [7].

Multidisciplinary Complex System for the Efficient Management of the Anti-Aging Information – AgingNice

Anti-aging represents a new concept that tackles the body health from another perspective – the one of preventing and treating the degenerative diseases with a therapeutic protocol elaborated by a team containing all of medical specialties. The result consists in the delaying of the aging process and restoring the vitality of the mature body, but also an aesthetic appearance. Health promotion for the increasing aging population is an urgent and essential task because evidence indicates that health promotion interventions can extend longevity and improve quality of life. Health informatics systems can play an important role in achieving wellbeing, independent living and delaying of the aging process and restoring the vitality of the mature body. [8]

The multidisciplinary complex system AgingNice belongs to the health informatics systems with particularization in the anti-aging domain and allows the sharing of the knowledge concerning the specific research and the promotion of the theoretical and practical information, both among the stakeholders from the medical area and at the person level. AgingNice is a research project developped inside the National Research, Development and Innovation Plan for the period 2007-

2013 (NP II) is the main instrument by which the Romanina National Authority for Scientific Research (NASR) is implementing the National Strategy for RDI.

Objectives

- Creating an environment able to facilitate the knowledge, information and date circulation aiming an efficient management of the anti-aging domain;
- Supporting and motivating the actuality of the anti-aging concept and increasing the quality in health systems;
- Developing the informational space of the Romanian state of health;
- Putting into value the advantages offered by ICT regarding the accessibility of the information in the anti-aging domain.

Methods

AgingNice respects the main tendencies of developing informatics solutions for the health system, emphasizing the interoperability as a must be demand to have an efficient exchange of health data and knowledge. It respects the quality criteria established by European Commission applied to health informatics products: transparency and honesty, authority (sources of information), confidentiality and data safety, updating information, receptivity and responsibility, accessibility [9].

The used architecture is a Client Server type organized in three tiers and it has a structure composed from elements that can function autonomously, and which architectural requirements were developed both different types of users. Each module comprises several applications structured on levels for an optimal organization of information, according to the specific aimed objectives and it was qualitatively evaluated for its ability to be linked with the others and for its coverage.

The graphic user interface has an intuitive, ergonomic and friendly feature; it has a unique structure and it allows an easy access to the functions and applications of the system.

AgingNice is at the designing phase. There have been evaluated till now the use and impact of ICT on physicians and citizens concerned about their own state of health, the role of HEIS in improving the efficiency and quality of healthcare and the technical, functional and organizational demands for the system.

Results

AgingNice comprises tools and information concerning anti-aging methods and strategies, clinical and laboratory investigations for aging preventing, anatomical modifications, educational models, self-evaluation tests, defining a personalized demeanour, tendencies in the anti-aging biomedicine, anti-aging campaigns and applications for facilitating the dissemination of the therapeutic protocol, study cases and recent research among the specialists. (see Figure 1)

Discussions

The use of the information technology in Romania in the anti-aging domain is insignificant and it doesn't cover the specialists' demands and the citizen's need of informing. By presenting cosmetics products, the existing web applications in this area center with priority on the aesthetic aspects of the aging. The physicians are interested in a domain with such implications, but they don't have access to recent and centralized information. The stakeholders at the society level haven't elaborated yet a perspective strategy concerning the prevention in this domain.

ABOUT ANTI-AGING
MEDICINE

ANTI-AGING GLOSSARY

FOR SPECIALISTS

ANTI-AGING CAMPAIGNS

PUBLICATIONS

ORGANIZATIONS, CLINICS,
ASOCIATIONS,
FUNDATIONS, DOCTORS

FOR CITIZENS

FORUM

Figure 1. AgingNice Modules

The Health Education Informatics System "Informational Centre of Dermatology" (CID)

In last years it has become more and more obvious that the value of dermatological information grows while more people have access to it, because they can use it in their own habitat, confer it new interpretations, broadening thus the potential of information. The use of ICT in the dermatology domain can be considered having at least two major objectives. The first one consists in facilitating the permanent updating of the dermatologist's knowledge and the sharing with the patient the responsibility regarding this one's health, due to a more performing exchange of information. The second objective is related with improving the basic dermatology knowledge of a person, with consequences on long term in adopting a healthier lifestyle and making better the relation with the physician.

The complex integrated system "Informational Centre of Dermatology" (CID) belongs to the newest types of health educational applications that comprise the users' motivation concerning educational content and its new promoting methods, obtaining better results in the learning process, developing new capacities (as the communication capacities), cognitive skills determined by digital information, like observing, viewing, a systematically approach and the information processing. [10]

Objectives

CID is an informatics system that allows the collaboration among health professionals and with the citizens and it was designed to be easily accessible to all groups of users due to specialized information expressed in a simple and clear language, functions and modules easily to understand and use.

CID is an efficient tool for promoting health, which facilitates the co-operation between the dermatologist and the patient by making the latter becomes aware about the implications of dermatological diseases, and how he can maintain and improve his own state of health. The

information offered by CID aims to supply, not to replace, the existing relation between a patient/user of this Internet application and his/her doctor.

In the same time, CID can be a modern tool that facilitates the access of the dermatologists to the updated information and knowledge in the domain, in order to make them familiar with the latest approaches and trends of dermatology. Having at their disposal an informatics system with authorized access and reliable information, the physicians can establish efficacious dialogues and collaborations.

Methods

CID is a web-accessible informatics product which comprises an inter-connected database system in the dermatology domain, having a modular structure.

The implemented solution has as its main objectives the performance, scalability, platform independence and accessibility of the complex integrated system. The performances of this system take into consideration the user-friendly interface, safety functioning and data, high response time.

Security controls are a part of the integrated system design. Users must register with the authentication procedure and obtain a login ID and password to access the system.

The system is characterized by updating in real time the data and information. The primary source of information used to fill the relational database comes from dermatologists. For that, they have at their disposal friendly web-based forms adapted to the structure and demands of each module. The accessed information is analyzed periodically in order to make a fast conformation to the users' demands.

Evaluation of the system was done both objectively using automatically created log files and stored messages, and subjectively by using paper questionnaires from patients and health professionals. There have been also evaluated the ethical issues of CID (including online health information, forum of discussions).

Results

CID is structured into modules for: specialists (clinical cases, informational leaflets, medication news, scientific events, legislation), patients (healthy behaviour, risk factors, monitorizing the inter-connections of dermatology with other medical specialties, preventing dermatological diseases, little encyclopaedia), cosmetic dermatology, centres of specialized consultancy, preventing campaigns, discussion forum (see Figure 2).

The most important ones are "For Patients" – provides information for the ordinary citizen, concerning the novelties in dermatology, dermatological organizations and specialists, "Preventing Dermatological Diseases" – aims to foster the knowledge, the comprehension and the habits that encourage a person to change his behaviour. It presents the aggravating factors for health, the clinical and para-clinical investigations, a healthy behaviour, "Leaflets for Patients" – offers leaflets with dermatological information that can be used by the specialists to increase their patients' level of health education and "For Specialists" – creates an environment for information and collaboration, dedicated to the specialists so that they can find out the news in dermatological medication, scientific events, clinical cases.

Discussions

Implementing CID solves the aspects concerning:
- The integration and fortifying of the data coming from multiple sources;
- The setting up of the access rights so that the proper user might receive the proper information, at an opportune moment, with the help of the tools used everyday;
- A better understanding of the users' needs that will ultimately lead to make them stand to and to a better anticipation of the coming necessities.

Figure 2. The applications of CID

Conclusions

Citizens, healthcare providers and industry are all making increasing use of the Information and Communication Technology (ICT). More and more ICT users become aware of the risk induced by accessing online the health information and they admit how difficult it is to have access to reliable information.

HEIS, for being more accessible, should be designed in a manner from which the user can easily find out if it's useful to him, and the style, the nature of offered information and its presentation must be adapted to the targeted user. The quality of the health content is also an important issue that must be taken into consideration at the designing, implementation and managing of a health informatics system.

The introduction of ICT into the patient-doctor relationship represents a significant change in modern healthcare. ICT can provide citizens with better information – on treatments, on their condition, and on improved standards of living – and make it simpler for healthcare professionals to access and share information, both general and patient-specific. Better quality care for the patient will result from a more knowledgeable physician and lead to an increased benefit and efficiencies within the health are system overall.

The health professionals and the other consumers need to be better trained in the use of ICT, and physicians need to learn more about using technology for their practical needs in their day-to-day environments.

Information is empowering for patients and well-informed patients save physicians a lot of time explaining basic information. It is expected that the average citizen should have a greater role in ensuring his own state of health and that he will look for high quality, updated, reliable medical information.

All these will lead to an increased online availability of trustful specialized information and to the forthcoming of new easy-accessible web applications.

References

1. Previziuni demografice ale Eurostat publicate în Ziua internaţională a persoanelor în vârstă, 29 septembrie 2006
2. Anne-Rivers Forcke. At a Glance: The Demographic Imperative of Accessibility, IBM Human Ability and Accessibility Center, G3ict Global Forum United Nations, 2007.
3. Policy Committee economic and European Commission. The impact of ageing on public expenditure: projections for the EU25 Member States on pensions, health care, long term care, education and unemployment transfers [(2004-2050), European Economy, Report No. 1/2006.
4. Kaiser Family Foundation. e-Health and the Elderly: How Seniors Use the Internet for Health Information, 2005.
5. Canada Statistics: National Assessment of Adult Literacy (2005); Norman&Skinner (2006).
6. l'INRIA-Institut national de recherche en informatique et en automatique. Ambient Computing and Embedded Systems, Research Project Activity Report, 2006. [cited 2008 September] Available from: URL: http://ralyx.inria.fr/2006/Raweb/aces/uid0.html
7. Winkelstein PS. Ethical and Social Challenges of Electronic Health Information, ISSN 1571-0270, Volume 8, 2005.
8. Ianculescu M, Parvan M et all. Multidisciplinary Complex System for the Efficient Management of the Anti-Aging Information", Scientific Report 2007, National Institute for R&D in Informatics
9. eEurope 2002: Quality Criteria for Health related Websites (online).
10. Ianculescu M, Parvan M et all. Informational Centre of Dermatology. Scientific Report 2007, National Institute for R&D in Informatics.