eHealth Wikiplatform to Increase the Uptake and Impact of eHealth Technologies

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Abstract - **We have constructed an evidence-based holistic guideline to develop technologies in order to improve the measurable impact of eHealth. It accounts for most observed deficiencies and comprises human-centred, context-sensitive and practical principles that are effective and useful for all stakeholders. These principles are: multidisciplinary in action, development as co-creation, the social nature of technology, integration of development, implementation and evaluation. The guideline is published as an on line eHealth wiki in order to share knowledge and information on how to improve the uptake and impact of eHealth technologies in a collaborative effort of researchers, developers, policymakers, and healthcare professionals. In the panel presentation we will elaborate and discuss the possibilities of the wiki to contribute to better outcomes in eHealth. We will show cases in which the eHealth wiki has been applied, and we'll show the benefits of this holistic approach. We invite participants to discuss the use of a virtual knowledge platform to increase the quality of eHealth technologies and to foster the implementation of eHealth technologies in practice.**

Keywords - eHealth; design; implementation; holistic; health 2.0; wiki

I. INTRODUCTION

eHealth technologies may contribute to solve some serious challenges to global health and health care. The impact of eHealth technologies on healthcare practice is below professional expectation, which is widely discussed in scientific literature [1-7]. In our research [8-18] we have identified four clusters of major causes: a) inadequate research methods, b) lack of knowledge about the process of technological innovation, c) a skewed medical expert-driven approach to eHealth technologies, and d) the use of inapplicable old world theories on human behavior. These causes often lead to the development of high-tech solutions that are unsuitable for use in complex healthcare environments or in patients' social situations.

The development of eHealth technologies involves a lot more than simply designing a product or a service, and includes more than merely procuring stand-alone medical devices. We recognize the social dynamics and the significance of eHealth technologies and its potential for improving healthcare. Creating a new technology works as a catalyst for innovation. It induces clarification of how the process of healthcare delivery actually runs; who are the key stakeholders; how is payment organized et cetera. It also illustrates the interdependencies between technology, healthcare providers, their social-cultural setting, and the infrastructural organization of healthcare. Ideally, all stakeholders should be aware of these complex relationships. In the wake of Health 2.0 and Medicine 2.0 initiatives, a growing number of studies have emphasized the importance of a *participatory development* process involving (end-)users, and other stakeholders such as payers, decision-makers, insurers, government officials to increase the uptake of eHealth-interventions. To support a participative development process we have introduced a holistic research and development guideline; the CeHReS roadmap [19].

A. CeHRes Roadmap

A holistic approach accounts for the major issues of finance, management and the biased technology-driven approach. It constructs a productive fit through the integration of social sciences, engineering and business modelling. In the international arena (EU-eHealth, European Centre for Public Policy [20]) the need for a holistic eHealth approach towards durable technological interventions and sustainable innovations in healthcare has been explicitly emphasized. The roadmap (Fig. 1) serves as a practical guideline to help plan, coordinate and execute a participatory development process of eHealth technologies. The guideline is meant for developers (e.g., technicians, designers, health care professionals), researchers and policy-makers. It also serves as a tool for educational purposes (e.g., students, healthcare providers) and as an analytical instrument to support decision-making in eHealth.
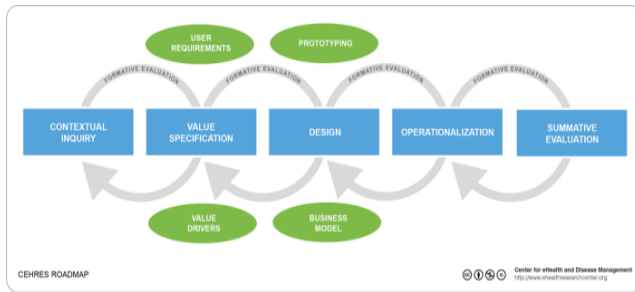
Figure 1. CeHRres roadmap

The guideline is based on reviews in the field of eHealth and progressive insights from current research projects using the guideline. Multidisciplinary theories and methods from psychology, communication, and human-computer interaction design are used to study the capacities of technology for behavior change.

The model integrates *persuasive technology* and *business modelling*. Persuasive technology is used to make technologies human-centered, tailored to stakeholders' needs, capacities and capabilities to change their (professional) behavior. Business modelling is interwoven with the development of eHealth technologies to foster ownership by co-creation and to construct business cases to successfully implement eHealth technologies. The roadmap consist of five cycles (see Fig. 1).

1. **Contextual inquiry**. To understand the problem and needs of various stakeholders, the contextual environment should be analyzed (field observations, focus groups, literature reviews etc). This results in an overview of problems and needs that are prioritized into a strategy for possible solutions by stakeholders.

2. **Value-specification**. Next, the stakeholders determine who the key-stakeholders are involved with the innovation in healthcare. These key-stakeholders determine the critical vales (socio-economic, cultural, clinical) based on the problem and needs inventory, using software for critical decision making to prioritize these values, important for the next step.

3. **Design.** The value specification will be translated into functional requirements and technical requirements via experts (for example hygiene experts) and technical design experts. These requirements will be evaluated by the other stakeholders (end-users).

4. **Operationalization**. A business case and implement-tation plan will be developed by stakeholders (management, payers, providers et al.) based on the Contextual inquiry and value specifications and design requirements.

5. **Evaluation cycles**. These formative and summative evaluations cycles consist of research activities to test

whether the technology fits with needs and contexts; and what the effects are (clinical, behavioral, organizational).

B. eHealthwiki-toolkit

The eHealthwiki toolkit is based on web 2.0 technology to share health research information. This is why the Dutch National Institute for Public Health and the Environment (RIVM) invests in its development. Thus a narrative literature review on current eHealth frameworks for development, implementation and evaluation was conducted to obtain insight in the quality criteria for development and implementation of eHealth technologies [19].

The eHealthwiki toolkit will be used as a virtual knowledge network for sharing information to enhance the quality of the development and implementation of eHealth technologies. The objective of the eHealthwiki is to foster collaboration between research, business and healthcare practice (supply and demand). It communicates and generates evidence of best-practices to enhance the social impact of research. The wiki is demand driven and functions as a virtual knowledge platform providing methods, tools and key features for successful eHealth technologies.

The wiki represents the CeHRes Roadmap (see Appendix I) and its corresponding tools for eHealth development and implementation (via a clickable image, tools are linked to the roadmap). The wiki supports participatory development via the collaborative effort of researchers, developers and healthcare professionals. The eHealth wiki *structure* captures the several cycles of the roadmap. The cycles, like contextual inquiry (see Appendix II) and the corresponding methods and tools are depicted and explained for usage in practice.

C. The panel discussion

To discover the values of the eHealthwiki we will organize several panel discussions among stakeholders during the autumn of 2011 (researchers, developers, engineers, policymakers, insurers, healthcare providers et al.).

The proposed eTelemed-panel consists of researchers and developers in the field of social sciences, medicine, engineering and business modeling. Conform the holistic guideline (Fig. 1), we are carrying out the contextual inquiry and value specification among key-stakeholders to adjust the design (content &structure) to stakeholders' needs. Several workshops have been carried out to show how the wiki can enhance the quality of eHealth technologies demonstrating the use of the methods and tools in our research & development projects (teledermatology; Infection control, etc). The eTelemed-panel discussion will address several generic, controversial issues to discuss the challenges of health 2.0 platforms , virtual collaboration and

the credibility of eHealth platforms in general. We will elaborate on issues such as:

- How would a 2.0 knowledge platform for eHealth be useful for several stakeholders?
- How to use it as a virtual tool for collaboration?
- How to manage an eHealth wiki and to deal with credibility and to avoid 'vandalism'?
- Will it work in diverse settings; What are the challenges in other fields using an ehealthwiki (semantic-wiki for ehealth education) for collaborative development of guidelines for medical practice, sharing knowledge of best-practices (research-wiki), for education, disruptive wiki's (ebuss-wiki) to create innovative structures for healthcare (based on business models)?
- How to inspire collaborative use of the wiki and convey it to a variety of research areas in eHealth?
- How to use an eHealthwiki as an instrument to enhance the social impact of research? (putting evidence into practice)?
- How to solve implementation issues in various contexts?

We will ask the panelists to *prepare statements* for the discussion; the presentation will be moderated by Lisette van Gemert-Pijnen (first author).

The outcomes will be used to contribute to general academic debate with regard to the usefulness of a wiki for improving collaboration in eHealth. The outcomes will also be used to upgrade the eHealthwiki and to finalize its' design. The eHealthwiki will ultimately be disseminated via web2.0 communities for eHealth research and development and via other virtual knowledge networks for eHealth development.

II.   CONCLUSION

In this paper we have introduced a holistic guideline for the development of eHealth technologies and the connected eHealth toolkit for research and development. At the moment we are discussing the value of such an approach for the quality of eHealth technologies (design and implementation)

Outcomes are used to upgrade the design of the eHealthwiki and to develop an infrastructure for implementation. Furthermore we will work to make the broader case on how wiki-development facilitates scientific collaboration and the social impact of science.

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Appendix I: Screenshot of Homepage eHealthwiki

Appendix II: Screenshot of eHealth wiki depicting the Roadmap and its cycles