

MODELS AND PRACTICES FOR THE DEVELOPMENT OF E-LEARNING COMMUNITIES IN HEALTH CARE

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ABSTRACT

This paper presents how Virtual Learning Communities can be used for the Education and Training of executive personnel of Health Units. More specifically it gives an overview of the various e-learning methods and designates how they can be combined to support the learning process inside a Virtual Learning Community. The community approach provides flexible and promising ways of education, training, communication and collaboration among people working in health sector and other involved in this, independent from geographic and time restrictions imposed by their working conditions.

After some virtual communities are presented, a sequence of steps for developing a VLC for the Greek health system is proposed, and the steps that should be followed are discussed. Afterwards two use cases for educational procedures are presented. Finally a critical discussion with the factors of success, the advantages and disadvantages of this undertaking takes place.

KEYWORDS: lifelong education, tele-education, Virtual Learning Communities, health personnel educational needs.

INTRODUCTION

The need for continuous, effective and qualitative education and training of executives in health sector is exigent, due to continuous growth of scientific data, rapid changes in used methods, techniques and medical applications, high degree of specialisation, and need for critical decisions in short time. Previous works in running "life-long learning" programs inside *Virtual Learning Communities (VLCs)* have sporadic results and have no predefined implementation path. Healthcare VLC intends to create a learning environment where healthcare professionals and citizens meet, communicate, jointly confront emerging problems, obtain and produce knowledge. The methodology for developing and supporting the HVLC is presented in this paper. Since the merits of VLCs in education, life-long learning and in healthcare have been discussed in related bibliography, this article moves one step towards the implementation of such a community by presenting the design issues of the VLC and the sequence of actions to be taken for the development of a VLC for healthcare.

In the following section, we present some actions related to Healthcare and Virtual Communities. Section 3 lists the educational needs of Healthcare professionals and non-professionals and locates the role of VLC in healthcare related education. Section 4 describes the overall development process and section 5 presents typical examples from the use of VLC for supporting Healthcare education. In section 6, we present the conclusions of our approach.

RELATED WORK

A virtual community refers to (Demiris, 2006) a group of people (and the social structure that they create), founded on ICT technologies aiming at collectively conducting activities related to health care and education, i.e. actual delivery of health care services, staff or patient education, support providing, discussing health and treatment related issues, etc. The stakeholders and participants comprises health care providers and givers (Varlamis &

Apostolakis, 2006), patients, health educators and researchers, and members of the general public.

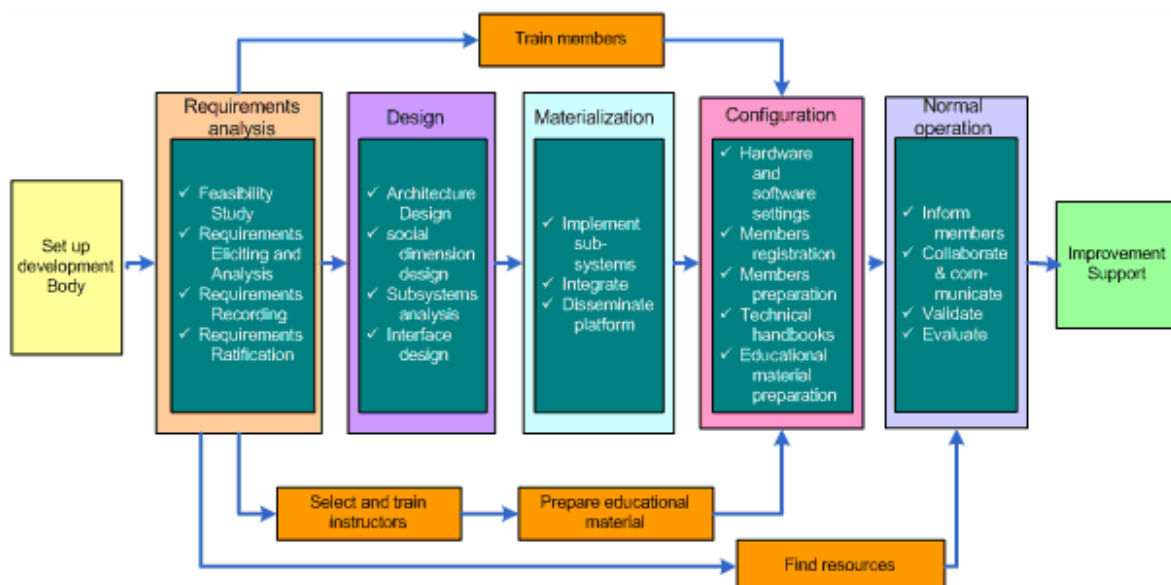
Virtual learning communities are emerging everyday in many health related domains. All these communities functioning today can be divided in 4 types of communities, classified by the intended members. Virtual health care delivery teams, in which health care providers of different disciplines (such as physicians, nurses, social workers, physical therapists, etc.) create a team in which they combine their knowledge and expertise to provide a comprehensive plan of care (Demiris, 2006). An example is the virtual medical teams for the continuous treatment of home care patients, developed by Pitsillides et al. (Pitsillides et al., 2004). The second type of health care communities, is the virtual research teams, where health care researchers and professionals meet using new ICT technologies in order to communicate and exchange information. As an example we can refer to VirRAD (VirRAD, 2007) developed in the frames of eLearning program. Afterwards there is the virtual disease management, which aims at enhancing the care plan and the provider-patient relationship while emphasizing prevention of deterioration and complications using evidence-based practice guidelines. As an example we can refer to the home asthma telemonitoring (HAT) system (Finkelstein et al., 2004). Finally there is the support groups (Eysenbach et al., 2004), where people with interests gather “virtually” to share experiences, ask questions, or provide emotional support and self help. As of April 2004 Yahoo!Groups (www.yahoo.com) listed almost 25.000 electronic support groups in health and wellness sections.

Useful practices and methods, as well as the results of above mentioned communities, and many others functioning in international level, if taken carefully under consideration, can provide significant help and the wizard for creation of an Integrated Training Community for Health sector (from now on with abbreviation HVLC), which due to the particularity of its object requires precision handling and particular attention in the analysis, design and realization.

DEVELOPMENT PROCESS

In order to achieve successful introduction of the HVLC in health units and receive best acceptance from potential participants we need an Action plan (Papadopoulou, 2006). The plan should be elaborated by the Ministry of Health in collaboration with other institutions, such as the Ministry of Education and Religion Affairs and the National School of Public Health. During its development, the proposed step sequence, as shown in Figure 1 and analyzed below, might be used:

Figure 1: Steps for the development of HLVC



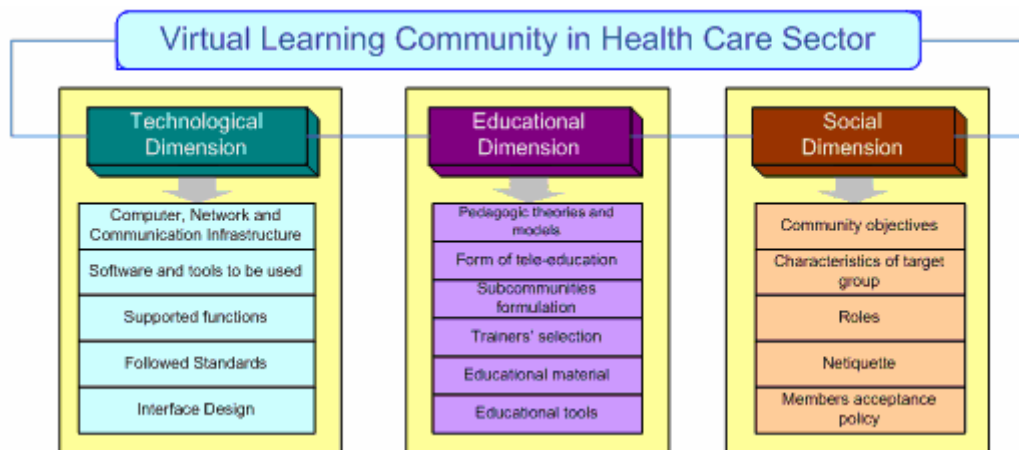
Establishment of HVLC Development Body

The HVLC Development Body is responsible for the supervision of the strategic Action Plan for realization and function of the platform and will be set up by the Ministry of Health. Its members will comprise Ministry executives, scientists (with medical, ICT and medical informatics expertise) and esteemed representatives from all three personnel categories (medical, nursing, administrative) (Papadopoulou, 2006). The formulation of working groups will increase flexibility. The organization that will undertake the development of the information system must be selected in this preparative step.

Requirements Analysis

This step comprises many substeps. *Feasibility Study* includes the determination of general principles and functions of HVLC. In this sub step, issues related to the 3 dimension of a VLC, as it appears in figure 2 - *technological, educational and social* -.should be taken under consideration (Papadopoulou, 2006). The *technological dimension* is related to required technological infrastructure, the software and the tools that will be used for the realization of the platform, the used standards, the functions which it will comprise but also the general pattern and aesthetics of virtual training environment (interface). During the design of *educational dimension* of HVLC, subjects are supposed to be taken into consideration such as: the new pedagogic theories and models to be used, the way of tele-education (asynchronous or modern), the instructors' selection, the educational tools to be used (courses in virtual classes, educational software, simulations, etc), the selection of digital educational material and its form, etc. Finally *social dimension* will refer to subjects deriving from the fact of a community existence, as e.g. the access right in the community, the policy of new members' acceptance, various roles to be assigned to the members, the rights and the obligations that result from them, the intellectual property, the behaviour codes and rules, etc.

Figure 2: The three dimensions of a VLC



Requirements Recording requires field research and requirement collection methods (questionnaires, interviews, Hard Data Capture) in order to identify human educational and informative needs and their familiarization with the new ICT technologies. *Users' Requirements Elicitation and Analysis* demands that requirements will be processed and the existing computer and telecommunications infrastructures will be tested, in order to locate possible improvements and extensions. In *Requirements Ratification* process, decisions concerning the platform, tools and models are finalized. Functional, performance, documentation requirements and timetable are posed to the software company. The imposition of quality specifications and standards (e.g. ISO standards) are significant, in order to be ensured the product has high the necessary quality and reliability and it is appropriate for use. An existing platform, for example moodle (www.moodle.com) can be used as a prototype VLC in Health Care, in order to collect, specify and validate

requirements. The Development Body, will determine the services to be offered by the community (Papadopoulou, 2006) (*Educational, Communication and supporting*), the advantages and disadvantages, the costs and merits.

HVLC Design

It is based on Requirements Analysis and realised in collaboration with the software company. It comprises *Architecture Selection*, that is the technical environment in which the HVLC will be realized, the required for development hardware and software, data structure, and the definition of the real place the platform will be situated, etc.) and *subsystems analysis* according to supported functions. In this stage, issues related to sociability and usability should be taken into account (Preece, 2000) (Loi & Apostolakis, 2005) (Demiris, 2006).. Sociability refers to the collective purpose of a community, the goals and roles of its members, and policies and rules defined to foster social interaction. Usability implies that the VLC should be designed in a way, where members will be able to communicate with each other, find information, and navigate the community software with ease. Also actions for ensuring members' identity recognition, in order deception to be avoided (Demiris, 2006) (Varlamis & Apostolakis, 2006), as well as for providing privacy and confidentiality should be undertaken.

HVLC Realization

The specified subsystems are materialised and tested, and their integration in a single platform takes place in this phase. The quality of the delivered products is checked against initial requirements. In this stage, Health world is also informed, in order to join the HVLC. In parallel, the development team will work on the preparation of human resources (training courses regarding new ITC technologies and tele-education methods, in order digital divide to be eliminated), the selection and training of instructors (in pedagogic and tele-education methods) coming from hospitals and relative scientific fields and the selection and preparation of educational material.

The educational material must be digitized in a form that facilitates distribution and reusability among community members. Multimedia files, organised as Learning Objects, are the ideal solution. Instructors will prepare the required Learning Objects, which after revision and approval by the Scientific Council of HVLC (approved executives and scientists of Health Care Sector especially selected for this aim by the Development Body of HVLC) will be available to community members.

Initial operation and ratification of platform step

The hardware and software are configured to guarantee the smooth operation of the community. Members register into the community and get access rights into the Knowledge Base. This is the kick off point for the HVLC. Ratification and control subsystems and the integrated platform are performed in a continuous manner so that the community operates without interrupt. Members receive their credentials and are accredited their roles. User manuals inform members on the functionalities of the HVLC, on their rights and responsibilities. The dissemination of the community attempt among citizens is performed via Press and Media.

Normal Operational of the community

This phase includes supportive actions. Trainees participate in telecourses inside virtual classrooms, download recorded courses, chat and exchange e-mails and collaborate to carry out assignments, search for material etc. Instructors prepare their tele-courses and digital educational material to be put in the community, while at the same time they answer in queries. Specialised and well-known members of scientific field are invited to give virtual lectures from wherever they are situated. Citizens make queries and receive scientifically validated answers. At the some time, HVLC performance evaluation by Development Body

and participants takes place, so that several useful conclusions on its strong and weak points to be extracted.

Improvement & Maintenance Step

In this stage solutions and improvements for the emerged problems during the performance of Community but also essential modifications for the environment to be more functional and user friendly are proposed and materialised.

USE CASES

HVLC can be used for both theoretical and practical cognitive objects teaching. For a theoretical object, e.g. "*Intrahospital infections prevention*" targeting the nursing personnel of health units, asynchronous educational manner is selected and the educational procedure will be performed generally as described below.

Course material is made available to the nursing sub community. Potential students apply for the program and consequently register. When the course is ready to start, a reminder is send to all participants. Instructors create and upload educational units and exercises regularly, answer to queries via e-mail and chat during their "Office Hours" with trainees. Trainees form "informal" work groups in order to study, search in HVLC Knowledge Base and in the World Wide Web for additional educational material, and collaborate for the exercises. Instructors receive exercises by e-mail and reply with comments and marks. Trainees may send comments on the course or educational procedure, or discuss about them in specialized discussion groups of their sub community. The students' exams are performed online and along with quantitative and qualitative (active or passive attendance) criteria evaluate students. Possible problems are identified and recorded at every step, and the necessary actions are taken by the Community operators.

Educational procedure of a practical object, e.g. a software programme targeting the medical personnel will be carried in a synchronous education matter and the procedure is as described below. Educational material on "task management" is put on the community site and the Community members are informed to browse and register for the program. Virtual classes are performed using presentations, examples on a virtual blackboard, etc. and questions are answered. At the end of each class, a small exercise is delivered in order to be elaborated up to next course, so trainees practise and motivate themselves. Additional queries are answered via discussion groups. Trainees create "informal" work groups, exchange additional educational material and already existing files of this program, and work on small projects. Assignments are evaluated and commented and some of them are made available as paradigms to other trainees. Overall conclusions on the course are processed by instructors for the re-designing of program.

CONCLUSIONS

VLCs offer a flexible, attractive and promising way for lifelong learning, continuing training and collaboration for health executives. Educational opportunities are created for all citizens, irrespectively of time and geographic obstacles. Knowledge transfer from instructors towards trainees is accelerated, and it becomes easier for domain experts to participate from distance. The produced knowledge incorporates trainees' experiences and is related to real problems and situations, is filtered, enriched and restructured in order to be more useful for all. Although the development process has been well defined, the obstacles for the development of a HVLC are many. First, the economic cost of this attempt should be considered in contrast to the expected merit. Second, the main danger for a fully functional VLC is the limited attendance and contribution of members, which is due to the increased professional and other obligations, to the lack of personnel to the opposition to change and to ICT technologies, etc. Seminars on ICT technologies and tele-education methods can change this attitude. The progressive adaptation through short and easy courses is another good practice. Finally a critical point for the successful performance of a Community is the

participants' behaviour and the quality of educational material and services. The building of trust to the community will start from a respective Scientific Council and Administration Board.

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