MEDINFO 2007
HISA Ltd Australia
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Structure and Functional Overview of a Web Based Knowledge Management Tool in Healthcare Organizations

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Abstract

In this poster we present the development and the evaluation of a Web-based knowledge management tool for healthcare organizations. We make clear the necessity for the existence of a knowledge management system and we analyze all the functions of the tool we have developed. The evaluation of the system is achieved through the examination of a sample of users according their satisfaction from the tool. Finally, we report the evaluation results, the conclusions and the future work which we have to do for the improvement of our system.

Keywords:

Healthcare Informatics, Knowledge Management, Healthcare Organizations

Introduction

The healthcare organizations face a lot of challenges, because of the changes that take place in the structures and the more general frame of health systems. Increased costs, economic restrictions, bigger emphasis in the medical responsibility and transparency, changes in the education, enormous developments in the biomedical research, new collaborations in the area of health, are the main factors that influence the effectiveness of healthcare organizations. At the same time, with the above factors, a new difficulty in the work of clinicians is added in our days, which tends to become a permanent characteristic of a healthcare environment. The healthcare professionals are called continuously to absorb information on new drugs, new illnesses, new clinical processes and biomedical techniques, governmental directives, warnings on negative effects of medicines and new scientific discoveries in the medicine. It is almost impossible for a doctor to absorb completely and to apply rightly the new knowledge, which is included in big volume of texts that he receives daily. He is allocated to dedicate concrete effort and small period of time for this procedure. Also, each doctor has specific capabilities of memorizing and retracting information. Similarly, a nurse should be able to think and to act using his own judgment, through the big volume of information that he gets from various sources. There are the doctor's commands, the patient's demands, the patient family's needs, new nursing activities and simultaneous demands from various departments of the healthcare organization [2]. So, the area of healthcare requires precise, complete and comprehensive data for efficient clinical practice, effective clinical management, control, education and research.

These data should be provided in a healthcare organization with the help of a Knowledge Management system, which will be managed and organized by specialized healthcare professionals. In this paper we present and evaluate a Knowledge Management Tool which provides the capability for integrated and effective Knowledge Management in a Healthcare Organization.

Materials and methods

System analysis and development

In order for a doctor or a nurse to be capable to face all these above challenges, able to be fully informed, to cover his cognitive voids and to apply the new knowledge with the most effective way at the appropriate time, it requires that he has the capability for access in qualitative information and knowledge. This is feasible through a Knowledge Management environment, which gives the capability in each healthcare professional who is seeking knowledge inside or outside the limits of his organization, acquiring and storing this knowledge, organizing and categorizing it in corresponding categories of data. Furthermore, through this environment, the healthcare professionals can recover easily the knowledge of the organization whenever they want, can communicate with professionals who are related with it, and finally, be able to share the knowledge with other users of the system [1].We present a Web based system which integrates the above operations.

The application is built on Windows Advanced Server 2000 with the object-oriented programming framework ASP.net, which is one of the elements of .NET Platform and is used for building powerful Web Applications. It is based on Web Standards and practices, fully supports existing Internet technologies and provides an easy and dynamic Web User Interface. As development Database was chosen SQL Server 2000, which is a common and reliable well known database but the application itself could be build on any other relational database [3].

The capabilities of this system, succinctly, are determined in the followings:

- It has been built on a relational database which has the appropriate infrastructure to storage data of various departments and operations of a healthcare organization.
- The knowledge can be in various formats. Each element of knowledge that exists in the application is called 'object'.
- The knowledge can be stored in a central server via the interface of the application. Each object can be available to the public for time interval that its owner wishes.
- There is a User Profile, which contains personal data, studies, scientific interests etc. After each action from a user, his profile is updated automatically according to his fields of knowledge.
- The objects of knowledge have been organized and classified according the thematic unit and the scientific field that they concern, aiming at the easy search and retrieval of knowledge by the user.
- There is search capability for knowledge within all the knowledge base and users of the system. The search results are categorized in objects, individuals, localities of knowledge and other relative categories. For this aim, meta-data are used, which are collected by the application every time a user interacts with it.
- The tool we present emphasizes equally on the technical aspect of knowledge (storage and organization of knowledge) and on its distribution between the users (personal contact of users).
- The application can be connected with the database of any other applications of the healthcare organization for retrieving information

Tool evaluation and results

Our purpose was to evaluate the effectiveness and usefulness of the application. The application was installed in the Faculty of Nursing (National and Kapodistrian University of Athens) in order for its operation to be tested. The system was tested and evaluated by a representative sample of users, undergraduate and postgraduate students. For the evaluation procedure, we used specific scenarios and questionnaires according to user's satisfaction and the effectiveness of the tool. The questionnaires and scenarios are based on standard questionnaires such as QUIS (Questionnaire for User Satisfaction), SUMI (Software Usability Measurement Inventory), WAMMI (Website Analysis and Measurement Inventory), CSUQ (Computer System Usability Questionnaire), ASQ (After Scenario Questionnaire) and other well known questionnaires and they have been improved and adapted to the special characteristics of a Knowledge Management system. Some of the basic criteria we used for the evaluation are the following [2]: *Speed*, *Flexibility in use, Flexibility in data source,. Ease to use, Interactivity, Accuracy, Efficiency, Control, Search engine facility, Traceability and activity links*. The evaluation results has been collected and analyzed and they will be presented in the MedInfo2007 Conference.

Conclusions and future perspectives

Through the presentation of the tool we have developed and its evaluation, we intend to define with concrete way the practical usefulness of such systems in the daily practice of healthcare professionals. Our main future work is to complete the evaluation of the application in a real clinical environment such as a hospital. Also, the next step in the research on the field of Knowledge Management in healthcare has to do with the complete incorporation and integration of a KM tool with the potentials of the technology of intranets, electronic medical records, document management, visualization tools, collaborative tools and data mining tools in order to provide more personalized Knowledge Management and capabilities for creating new Knowledge [4]. A research on the development of Knowledge Management systems leads to the awareness for the creation of conditions, which can help healthcare professionals to face most efficiently the problems that are related with the knowledge and the information in the field of healthcare.

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