Analyzing Health Care Information Needs Within a Computer Supported Cooperative Work Framework using Documentation Theory

As medical- or patient records are gradually developing into an electronic health record, the paper-based records; the individual documents, the collections of patient documents are broken up into small fragments of (medical-) knowledge and information in terms of clinical data[1]. This is done through the systems-development process. The computable 'atoms' of medical *information* are later re-assembled into suitable *information* for health care purposes. The data are stored in databases and the document viewed is the computer extract of these data; the predefined selection-process that present the data to the users who generally are healthcare workers. The issue of assembling the data into a suitable form is regarded as an GUI task; how to create the perfect, or more correctly, the adequate interface to the information and medical knowledge so as to give the healthcare worker best possible ground to make correct medical/treatment decisions. The motivation behind computerizing the health record is supported by the fact that the flow of information around the patient is anything but streamlined and secured, and the same goes for the (rapidly growing-) medical knowledge base. It may be argued that the securing of correct information to the correct people has the same impact as new treatments or drugs to overall (quality of) healthcare.

On the architectural level, the construction of the electronic health record and standardization is the cornerstone of the field of health informatics and has been a research issue for over 30 years. Computer- or information systems-development processes as we know them today have come short at producing a satisfactory solution so far. Current work suggests new development techniques and methodology for coping with the complexity of the EHR (Beale 2002).

Figure 1 The display wall at Department of Computer Science, University of Tromsø. The left picture shows Prof. Bruce Shriver lecturing. The right picture shows a presentation of a course assignment. (Photos by Prof. Otto Anshus)

[1] We are here distinguishing the terms knowledge and information as e.g. defined in "Archetype Definitions and Principles" by T.Beale, available at www.openerh.org

If we, at the 'presentation level' of the document, say that the issue with the EHR is how it is displayed to the user; the *document* has changed form from notes and sketches to extracts of information from an electronic database on the patient. Within computer science the problems faced at this point lies within the genre of human-computer interaction, HCI. In our research, involving cooperative work arrangements between healthcare professionals, we are moving the focus from human-computer interaction towards 'human-human interaction' via information systems (and the EHR). In this case, you have the issue of how to aid not only *one* person in treating the patient, but a whole team of people (shared care, continuity of care, teamwork). So; not only will you have to present the information/knowledge in most appropriate way for medical decision making, you also have to do it in the way that appeals most to cooperative work arrangements. In addition, advances in ultra high resolutions displays, like the display wall projects at Princeton University[2] and the University of Tromsø (See Figure 1), enables new ways of presenting and organizing health care data. This also calls for a more fundamental understanding of the underlying health records and medical documents as e.g. teams of specialist have a new tool to examine clinical data, images and the likes and new way of working in cooperation.

This, one might argue, is a problem scenario that might be unprecedented in complexity, at least in terms of information systems development, until now. The complete-, common-, shared-, etc., electronic health record is viewed upon as the holy grail of health-informatics. The fact that it has been pursued from the 1970s and still not found says a lot about the complexity of the task. So, intuitively (or logically) we have the complexity of building an information system that still, after 30 years+ of research, has not been completed, and imbuing it with functionality that currently is one of the hardest ones to implement into computer systems: support for cooperative work arrangements.

The point is the following: if the EHR is the holy grail of health informatics; that is – not very easily attainable, and the desired addition of functionality to this not-created system has the status of being "work in progress" (CSCW functionality) – perhaps we now should look other places than tradition is within computer science for help?

> *In my presentation I would like to discuss how the broad view of a document has a lot to offer the process of development of information (computer-) systems; in our specific case the complex case of the EHR – or a CSCW-enabled one. The goal is perhaps a new methodology for requirements gathering process, or at the very least a powerful tool for identifying (I daresay; previously hidden) requirements.*

[2] http://www.cs.princeton.edu/omnimedia/

description of how the work would be presented (verbal presentation, PowerPoint, video, performance, demonstration, exhibit etc. and equipment needs):

The work will be presented verbally with the aid of a PowerPoint presentation

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up to 5 keywords.

Medical informatics, EHR, CSCW, requirements analysis

References

Beale, T. (2002). "Archetypes: Constraint-based Domain Models for Future-proof Information Systems."