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Electronically Assisting Communication for Health Professionals

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Electronically Assisting Communication for Health Professionals: engaging with digital documents

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Abstract: New information and computing technologies offer cost efficient and effective learning opportunities for health care professionals. The Assisted Electronic Communication project is prototyping, administering and evaluating a digital discourse system for health care professionals within an acute Hospital. Health care staff participating in the study are able to access and contribute to threaded, asynchronous discussions and themed information in the context of critical work documents. Early indications are that the system is viewed very positively, and seen as a way of critically engaging with new material that is getting closer to an idealized learning in the workplace.

The Health Context

Health care systems are now looking to new technologies to effect changes their working practices and culture. Enhanced clinical performance is directly associated with the development more open and efficient communication systems, and, certainly in the UK, national priorities and funding have been directed in this way (Department of Health, 1997). In this policy context, the health care professions and particularly nursing, have seen very radical changes in respect of the demands being placed on the profession for information management.

Ongoing research at a typical UK Hospital (Brooks, et al 1998) on nursing communication and management structures has highlighted that although commitment to change is high among nursing staff, there is a need for communication systems that will facilitate the management and dissemination of information efficiently. Moreover, systems are needed that will also assist with the vital cultural and attitudinal change required to develop nurses as critical reflective practitioners who can actively participate in the process of multi-professional decision-making.

One approach to the health care 'communication and information gap' lies in the development and application of information systems that can assist in the dissemination of best practices and enhance inter-professional collaboration, (eg. Nauert, 1997). Research on Computer Mediated Communication (CMC) has identified that CMC technologies are capable of positively altering interaction patterns both in interpersonal and organizational relationships although this is dependent on the local context and culture of use being supportive of such change (McCarthy and Monk, 1994).

A critical understanding of the impact of the CMC technologies on the health care sector remains to be developed. In particular new technology systems need to be based on an understanding of health professionals communication processes and information needs. Commitment to computer based applications among health workers is likely to be higher if it is implemented in the context of a clear solution to a clinical or professional issue rather than being technology driven (Coiera, 1995). Secondly, it seems likely that the development of an understanding of how health care professionals currently (and ideally need to) communicate will prove as important as an exploration of any specialized technological communications infrastructure for health care (McCarthy and

Monk, 1994). Thirdly, existing information technologies and particularly asynchronous systems (Coiera and Tombs, 1998) such as email, internet communication tools, and text-based conferencing systems that can take advantage of communication that is threaded and themed may hold the potential for rapid, cost-effective advances in the quality of clinical information and communication for health professionals. Asynchronous electronic communication is vital to enable mobile and time-constrained professionals to communicate effectively and at convenient times. Threaded communication can establish and identify working dialogues within a collection of messages, and themed communication in a conferencing environment allows for the clear organization of information. However, above all of the technical features of such systems, the social context of the communication is significantly more important for the effective implementation of a meaningful digital discourse (Houde et al, 1998).

The Assisted Electronic Communications Project

This paper reports on an ongoing project that is prototyping, administering and evaluating a suite of systems that aim to foster digital discourse amongst health care professionals. The first of these systems helps staff within an acute NHS Hospital Trust to access and contribute to threaded, asynchronous discussions and themed information relating to the implementation of critical health policy documents.

The UK National Health Service periodically issues policy documents, which aim to regulate and standardize the practices of health care professionals nationwide. Recent examples of such publications are the National Service Framework (NSF) documents, which include for instance, an NSF for Coronary Heart Disease (CHD), an NSF for Older People and an NSF for Mental Health. Organizations such as hospitals are required to implement these frameworks by discussing and responding to these substantial documents at all levels. So for instance, in a typical acute NHS Hospital Trust, a nurse presented with a patient suffering from Coronary Heart Disease could be expected to have a clear understanding of the national standards discussed in the NSF for CHD and her own Trust's response to these directives! In a health system which is notoriously under great pressure the expectation of a deep engagement with National Frameworks is, to say the least, ambitious.

We selected a typical small town general hospital in central England - Kettering General Hospital as the site for this study and chose initially to focus on staff in the Nursing and Midwifery discipline. Previous work in this hospital (see eg. Brooks et al 2001) had provided a baseline analysis of the use of online communication (primarily email) prior to this study, which is discussed briefly below. As a further focus, we selected four distinct professional contexts within an acute setting for our initial work. The four key areas selected were: Accident and Emergency, the Coronary Care Unit, a general Assessment Unit and a general Medical Ward. These locations were chosen as those with a highest engagement in the first document to be released – the National Service Framework for Coronary Heart Disease. The spaces selected in these areas all had staff rest facilities where some desk space could be found to locate a dedicated networked computer. The four selected areas cover approximately 100 Nursing staff, with very varied computer experience. No formal training in the use of the system was provided to these staff, but informal "show-and-tell" sessions were available to staff who were present when University researchers visited the areas. The machines used were designed for shared use, shift work, and without an email client available. The system in use is entirely web-browser based; with users clicking though web-pages and submitting forms in all interactions. The system is contained within the hospital Intranet, based upon a Windows NT™ server behind the NHS-Net firewall. The prototype system has been in operation at the hospital since January 2001. A detailed user evaluation, alongside an analysis of email content is being undertaken.

Professional views and experiences of CMC

A baseline survey of considered the actual usage and content of email by nurses, as well as their attitudes towards CMC. This consisted of analysis of 477 emails, depth interviews with 66 staff and a postal questionnaire to 114 nursing staff. Commitment to dissemination of information and finding a means to share information with colleagues was very high, 85% of the general survey respondents stated that it was an important or a very important aspect of their role to cascade information to colleagues. As a solution to this problem CMC was felt by the overwhelming majority to be a valuable resource by both users and non-users to achieve this. Of those whose work related to CHD 87% felt that CMC offered *improved sharing of clinical information*. Findings from this stage of the project indicated that professionals also perceived themed and threaded CMC to be supportive of discursive information sharing. The interview data indicated that CMC had the potential to develop supportive networks among isolated and time constrained staff.

"Now, there is a network of people out there that I am involved with (and) it's a way and means of actually getting the communication over more quickly and while it's there, actually in your mind. Because at the end of the day we're all human and something else can come along. ... You can think, 'I must tell Sue that' but you don't see them or can't make the next meeting." (Staff nurse, part-time, qualified 26 years)

Email specifically was perceived as offering an improved means of organizing, managing and owning the increasingly vast amounts of information that health professionals are required to deal with. Analysis of the content of emails communication demonstrated a marked pattern of evolution both in terms of a gradual increase in volume particularly at busy times, but also in terms of the type and form of information conveyed. Initially the main forms of information conveyed via email were largely simple and formally structured 'flyer' type information concerning study days and education issues or the organization of meetings. However, over the period analyzed there was increase in the amount of discursive emails, i.e. emails that canvassed views, generated discussion or attempted to progress developments. Additionally over the period these types of emails were increasingly likely to be related to clinical knowledge and practice. There was also an increased use of 'forwarding' to create basic threaded discussions. Moreover use of CMC did involve the sharing of knowledge and experiences, thereby retaining some of the strengths of informal direct verbal information. Consequently, the need to retain informality of communication and allow for discursive sharing of information were features that were specifically incorporated into the design of the digital discourse system.

Technical Directions

In this study we are integrating key features from 3 robust systems developed within the Knowledge Media Institute of the Open University into a range of clinical contexts. The overall architecture of the CMC developments is illustrated in figure 1. The first of these systems, and subject of this paper, is a digital discouse environment. This is based around server-side technologies which can augment bulletin-board-like asynchronous discussions (see for example, http://d3e.open.ac.uk/). At the centre of each discourse is an artifact, typically a document, which acts as a focus for the discussion. Contributions from participants are solicited as email or via a browser based web forms interface. The contributions are text messages which are themed and threaded, and most importantly, are in the context of the document.

Figure 1 - The CMC architecture for the General Hospital study.

The second discourse tool is a (semi) intelligent agent which contributes to the communication. The agent is simply a server side tool which is delegated to act on the behalf of individual participants. In this case the agent can assist in the automatic production of a newsletter which is associated with the document (see for example, http://kmi.open.ac.uk/projects/planet). The third of these systems is a set of streamed media production tools that

help to stimulate and seed the discussion by the production of both live and offline video and slideshow/multimedia presentations (see for example, http://kmi.open.ac.uk/projects/stadium).

The Discourse System

In figures 2-4 we see a selection of screenshots, taken from the discussion interfaces to the NSF for CHD.
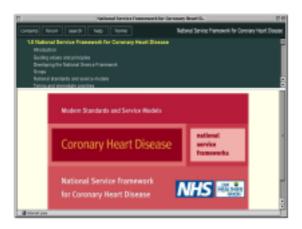

Figure 2. The front-page of the online NSF for Coronary Care.

Figure 3. A document search.

Figure 4. A threaded communication in the document.

In the first of these (figure 2) the front page of the document is highlighted in the bottom frame, with the table of contents of the document above this, and some simple access buttons at the top. Figure 3 shows the result of a simple search of the document, in this case where the reader has looked up "ambulance" and "services" in the document itself and then chosen to view the occurrence of these terms in the telemedicine section. Finally in figure 4 we can see some of the discussion threads from the discourse forum associated with the document. Readers can view the discussion in a number of different formats to track the topics that have been raised by staff and that are linked into the document. Readers click on a thread to read the comments, and have a very simple form interface to add their own contributions. In its use, nurses have used the system for a wide-ranging discussion of the documents presented. The following two discourse samples are presented uncorrected, but anonymised from a few days in February 2001.

Discourse 1: Thrombolysis Sample

        Angela (Staff Nurse - Assessment Unit)   21-02-01 15:27

           Where are the policies which dictate when to give particular drugs?

        Andrew (Staff Nurse - Coronary Care Unit)   25-02-01 07:52

           There is a policy on CCU (April 1998) which states when tPA

           should be used rather than streptokinase for acute MI:

           (1) for patients under 65 years with anterior MI presenting within 6 hours.

           (2) patient has had strep 5 days to 5 years ago

           (3) patient is severely hypotensive (<70mmHg)

           (4) patient has severe allergic disease

           (5) patient has strep throat infection.

       Barbara (Staff Nurse - A & E)   27-02-01 08:36

           is this policy avialable in a&e, mau and the wards?

       Corinna (Sr. Staff Nurse - Coronary Care Unit)   28-02-01 11:15

           Protocols for all cardiac conditions including when to give thrombpolysis are in all

           admitting areas All doctors within medicine are given the protocols on induction, with

           regular teaching sessions on treatment If you cannot find the policies please let me know

Discourse 2: Chest Pain Presentation Sample

        Derdre (Sr. Staff Nurse - Accident & Emergency)   20-02-01 08:24

           Does anyone think that it would be appropriate for all 'emergency admission' 'referrals' of

           patients with sudden onset of chest pain to come to A&E for assessment?

        Elaine (Staff Nurse - A&E)   20-02-01 13:49

           yes, so can be assessed and ref. for appropriate care or discharged under strict protocol

        Frances (Sr. Staff Nurse - Assessment Unit)   21-02-01 15:45

           I think that we have discussed this at this mornngs meeting, however it would also mean

           that you would set a precedent even for the days that we are not so busy !!

           The patients are required to stay for at least the second CK are you suggesting they stay

           for the whole of that time or ??? This could impact dramatically on your trolley waits.

        Glenda (Staff Nurse - Accident & Emergency)   23-02-01 00:08

           Is there evidence to support that even a negative 2nd CK means that the patient is

           definetly not having an M.I.? I don't think that all chest pains should go through A&E.

           Perhaps we could develop a strict protocol about what the history of chest pain etc.

Setting aside the detailed medical content of this discourse and looking at the style of it, we can see two very different conversations happening with nurses over the involved units. The first sample is a very simple query about policies relating to Thrombolysis in which the Senior Staff Nurse, who is overall in charge of the policy, closes the simple Q-A interaction with an answer. The second is a far more complex interaction, in which a nurse from one unit proposes a policy change that would have a significant impact upon another unit!

Summary and Future Directions

> *"Its been great - I said to my lot, look, if some-one as thick as me can use it, then you can do it!"*
> *(Senior Staff Nurse, full-time, qualified 28 years)*

> *"I am really really impressed with Jan sitting down at five in the morning and teaching Lynne how to use it. Now, I would never have seen her in that light at all - which is good, as she is going in for promotion."*
> *(Senior Staff Nurse, full-time, qualified 20 years)*

Overall acceptance of the potential of CMC to offer solutions to real clinical and health care delivery issues was very high among nursing staff. Early interactions with the digital discourse system indicate that new and developmental learning seems likely as a result of the interaction with the system, with staff sharing knowledge and 'best practice' across specialist areas.

The next phase of the project will expand the system and evaluate issues concerned with practical usage in the real clinical environment, opening it out into the entire hospital and for use by multi-professional groups. Currently, all documents in the AEC system have been added (with substantial hand-editing) by the University research team. We are now ready to release the server-side tools which will allow hospital staff (the nurses themselves), to upload of new documents without technical assistance. In addition to the National Service Frameworks we anticipate that they will use the system for a raft of other local policy documents, such as the notes of their regular "governance" meetings. Finally, late in 2001 we aim to release the integrated of agency support systems & telepresence elements. And we will then aim to explore issues around the impact of the system on the culture of the organisation.

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