

Introduction Of Handheld Computers Into The Haematology Department Of A District General Hospital

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Abstract

THE PROBLEM

UK doctors spend up to 33% of their time on “secretarial” work. Finnish studies using the latest in computing technology show that this time can be reduced to just 4%¹. However, such technology is currently expensive and requires a large IT department for installation, support and maintenance. Our team chose affordable handheld computers and provided limited IT training to the six clinicians who would use the technology.

Handheld computers have several advantages. These include portability, ease of use, stability and affordability. The machines are also capable of beaming. This is the process of transferring information from one handheld to another via the machines' infrared beams. It can greatly improve the ease and frequency of information sharing between clinicians. As a result, ownership of handheld computers amongst UK junior doctors is already 40%², and appears to be rising.

We carried out this project in a District General Hospital's Haematology department. Our aim was to show that the advantages of handheld technology can be captured without the need for central funding, or a large IT department.

WHAT WE DID

HARDWARE

One handheld was required for each team member. The machines chosen had two important features:

- A colour, high-resolution screen allowed comfortable viewing of the protocols.
- Their expandable external memory allowed storage of the maximum number of protocols. However, we advised the team not to buy the memory until the day it was necessary, because of the constant

improvements in power and price.

Total cost: £1800 for six team members (two consultants, one staff grade, and specialist nurses).

SOFTWARE AND REFERENCE TEXTS

1. The organiser software that was included with the handheld, which was able to synchronise with Microsoft Outlook. Cost: free.
2. Existing protocols on the ward were converted to Adobe Acrobat format, and installed onto the machine's Acrobat Reader. Cost: free.
3. Numerous free medical references texts found on the web, including Medical Approaches and haematology texts (<http://www.medicalapproaches.org>). Cost: free.
4. One of the consultants bought a copy of the Oxford Handbook of Clinical Medicine (OHCM) for his machine. Cost: \$60 for one copy.

TRAINING

Only one of the nurses and none of the doctors had already used a handheld computer. At the beginning of the study, we ran a two-hour workshop that all six members of the team attended. During this time, they were trained in basic handheld skills. These included writing on the handheld, entering information into the organiser applications, and beaming information to their colleagues.

In addition, we offered each team member two hours of one-on-one teaching. The aim of these sessions was to get the individual competent with the details of the basic applications, but also build confidence in exploring other

applications for future uses.

One of the consultants opted for an additional six hours of individual teaching. She used this time to develop highly advanced skills, which she then taught to her colleagues.

WHAT WE FOUND

THE ORGANISER SOFTWARE

One of the most important features of the diary software was the display of the day's appointments and tasks on one screen. This feature was important because it confirmed to the team that their electronic diary was as good as any Filofax. Furthermore, the handheld proved to be as reliable as paper: the machines all came with backup software, which gave the team a simple duplicate of the data. Constant and quick backups ensured the data was safe.

Like all computers, there were occasional crashes, and the software did not always respond perfectly. Over time, however, the team began to trust that their machines' data would survive such incidents.

The team also took advantage of the features that improve on paper. First, the handheld integrated fully with Microsoft Outlook, which is not possible with a paper-based system. This allowed the doctors, nurses and secretaries to have constant access to the team's up-to-date diary. Thus, changes to the diary could travel from the secretaries' desktop computer to the doctor's or nurse's handheld; and vice-versa.

In addition, the team's first experience of the handheld's address book instilled the important habit of beaming. During the first seminar on handheld use, we beamed the hospital's directory to one of the specialist nurses. She then beamed her data to her neighbour, and so on. From then on, the team members used beaming for all their data, including diary events, task lists and journal abstracts.

PROTOCOLS

From the start, the team could see clearly the advantages of storing the protocols on the machines. Less clear, however, was how to do so, because there were several options available. The three under consideration were:

1. The handheld's built-in memo program.
2. The handheld's bundled Microsoft Word-compatible software
3. The freely downloadable Adobe Acrobat Reader.

The team picked Adobe Acrobat. There are several reasons for this choice. First and most crucially, once the document is in Acrobat format, it cannot be changed. In other words, a decimal point cannot be deleted accidentally, making it safer to include dosages, etc in protocols. Second, the Reader is available for all major handheld platforms, as well as normal PCs. Third, the team was already familiar with the format of the paper-based protocols. Having developed and used these protocols over several years, they knew their way around the protocols by sight. They remembered that the dose in protocol 5 was on the second page in the bottom right-hand corner. By duplicating the spatial arrangement of the paper protocols, the handheld version of Adobe Acrobat Reader allowed the team to continue relying on their visual memory for navigating around the protocols.

Finally, Acrobat is a common multiplatform program. In this example only six handhelds were purchased, and, therefore, the impact may seem very small. However, other departments and a large GP surgery soon invested in their own machines. A large number of junior doctors had also bought their own handhelds. On an optimistic note, we expect the percentage ownership to increase. In other words, because the department chose Acrobat as their standard format, it was possible to take advantage of future investments by other departments.

CONFIDENCE AND COMPETENCY

Many of the team members were initially hesitant when dealing with the new machines. In the first seminar, the team was enthusiastic after learning about beaming. Nevertheless, following the seminar, the machines were not used much. We find this is a typical reaction because clinicians are extremely busy, and tend to avoid anything that slows the clinical workflow. The catch-22 situation of being slow with the machines because they have not been used to them, therefore, ensues.

However, after the first one-on-one teaching session, the clinicians became competent enough to use their handhelds quickly. After the second hour long session, we saw the competence develop into confidence. Once they understood how to download and try out software, their mindset changed. They began to think of how the machines can help speed up clinical practice, and they sought out the software to make this happen.

DISCUSSION

The most important result is that this project was a success

without requiring significant funding, or significant help from the IT department.

It is interesting how many extra lessons the female consultant requested. It was not because she was struggling with the machines. In fact, she had very quickly become very competent with her handheld. Rather, she was so pleased with the return on her initial time investment, that she felt that investing further time would continue to yield further rewards for her team in the future.

The team is now confident and independent with the technology. Long after the end of training, the team's members are still enjoying increasing their productivity by trying the latest handheld software, and applying it within their clinical practice.

We firmly believe that the future of clinical practice will include handheld technology. This is likely to involve:

1. Centralised funding, whereby each NHS clinician is provided with their own handheld computer. In Ireland, for example, all medical students are already provided with a £500.00 grant to purchase their own machine.
2. Integrated electronic patient record system. This would store the data in a central backend database, but offer clinicians several ways of accessing it, including desktop computers, laptops, and handheld computers.
3. Wireless networks, which allow clinicians constant, high-speed access to all the hospital's

computers, and the internet.

4. Large, well-funded IT departments, with supporting informaticians.

In the UK, for example, the government is already making investments towards such a future, including the acceptance of the Wanless Report's recommendations³ for a doubling of IT spending within the NHS. In the USA, hospitals such as the Childrens Hospital Los Angeles, Emory Healthcare, Memorial Hermann Health System, and University of Maryland Medical System have already begun deploying such systems⁴.

We also believe that clinicians can take advantage of handheld technology today. Numerous projects such as the one described in this paper are being carried out around the world. They are usually driven by clinicians enthusiastic about the technology, and deployed on a small scale across teams, departments or hospitals. By improving the management of clinical information, they can directly contribute to improving patient care.

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