- 1-

Nurses and Computers

An international perspective on how nurses are, and how they would like to be, using ICT in the workplace, and the support they consider that they need.

Dr Carol S Bond
Bournemouth University

Abstract

The use of IT in nursing (nursing informatics) is increasing, and has the potential to improve patient care. Research, and the experience of the author, have shown however that nurses lack basic IT skills and informatics knowledge. This study sought to explore what nurses' want from IT in the workplace, and how pre-registration education can help to prepare nurses for working in this changing environment.

The study, undertaken in New Zealand, a country also seeking to drive forwards its use of IT in healthcare, found that nurses want systems that save them time, and equipment readily available at the patients' bedside. Nurses who had recently completed their pre-registration programmes tended to have better skills than nurses who had trained some time ago. Nurses who lacked skills, or confidence, wanted support available that understood the role of nurse, and could provide help when it was needed.

Nursing schools in New Zealand tend to have a lecturer leading nursing informatics. Nursing informatics is included in pre-registration education programmes, and I was able to see several innovative developments supporting this. Qualified nurses and students generally considered that pre-registration programmes should include information security, legal and ethical issues and supporting patients in meeting their information needs as well as basic IT skills.

Contents

Nurses and Computers

An international perspective on how nurses are, and how they would like to be, using ICT in the workplace, and the support they consider that they need.

Aims of the Study

1. Understanding of what nurses want from ICT in the workplace, especially in terms of meeting their own and their patients' information needs

2. Exploration of what nurses think the barriers are, and how they could be overcome

3. Identification of nurses views on the elements necessary in pre-registration nurse education to promote the effective use of ICT by nurses, and to equip the nurses of tomorrow with the skills and knowledge that they will need to work effectively with ICT

Background to the study

In the UK the government made Information and Communication Technologies (ICT) a priority area when the NHS published Information for Health in 1998 (Burns 1998). This strategy identified that:

> *'People need information about health and healthcare in many different circumstances. Patients want to know more about what is wrong with them and how they can best look after themselves. Carers or relatives or friends seek information on behalf of others'*

Providing information to patients was seen as 'an integral part of the local clinical care process' it was however recognised that a culture change was necessary to achieve this, discussing that

> *'It is important to develop a culture among NHS staff that promotes a positive attitude to patients' rights to give and receive information'.*

The strategy identified the need for computerisation of many support systems, including the introduction of nationally available electronic health records, networked services to support appointment systems, electronic handling of a wide range of diagnostic tests and results and a networked prescription service. The need for this to be managed nationally was identified, and it is currently being implemented through the National Programme for IT (NPfIT) and the Connecting for Health programme. This ambitious programme will see all patient administration, patient records (including nursing care records) and communication between professionals being computerised over the next 5-7 years.

Nurses need to be engaged with these developments. At the very least they need to have the skills and knowledge to use the systems efficiently and safely. They also need to have the skills to support patients and their family/carers in meeting

their information needs. Nurses however generally have poor ICT skills (Bond 2004, Bond 2003, Griffiths & Riddington 2001) and are resistant to the introduction of ICT (Timmons, 2003).

A National Audit Office report into the implementation of the National Programme published after my return concurred with these findings. One of the findings in the report (NAO 2006 p7) stresses that the lack of IT skills within the NHS is a risk to the timely implementation of the programme.

Just what skills are needed is not universally agreed. The NHS (NHSIA 2001a) has published competencies required of nurses, which includes a range of knowledge and skills, e.g. clinical informatics and information security, as well as basic IT skills. In spite of this the perception found in some studies (Murphy et al 2002, Murphy et al 2004), is that all nurses need are basic IT skills. The amount of nursing informatics included in pre-registration nursing programmes was found to be very variable by Murphy et al (2002) who found the average to be 12 hours. The leadership of nursing informatics in UK nurse education has also been questioned. A lack of informatics expertise amongst university staff was noted by Brittain and Norris (2000) and four years later Murphy et al (2004) found that only 11% of schools of nursing in the UK had a nursing informatics specialist in the teaching team. Heather Tierney-Moore, the nursing clinical lead for Connecting for Health has stated that

> *'The problem is that IT is a big turn-off for most nurses…. If things are branded as IT it's unlikely nurses will bother to pick them up, let alone engage with them,' (e-health insider 2005)*

One of the aims of Information for Health was to establish, amongst other things, a culture to ensure that NHS clinicians would be able to access the information that they need to provide effective patient care. In the case of nurses the evidence suggests that this culture has not yet been established. This study is seeking to better understand how nurses can be helped to engage with this relatively new agenda.

The study was undertaken in New Zealand for a variety of reasons. The New Zealand health system and culture is similar to that in the UK. The challenges that they face, identified in the Health Information Strategy for New Zealand 2005, are very similar challenges to the UK:

- ➢ an ageing population, which will increase the pressure on our health sector
- ➢ rising incidences of chronic diseases such as diabetes and cardiovascular disease
- ➢ the re-emergence of some diseases
- ➢ the emergence of new infectious diseases such as Severe Acute Respiratory Syndrome (SARS)
- ➢ new technologies that are making more effective treatments available, often at higher prices.

The IT systems underpinning their health care systems are also under review. The New Zealand strategy contains many of the same aims and initiatives as the UK. There are however subtle but important differences in focus. Whilst the UK is currently focusing on NPfIT commissioning and purchasing a national computer and records system, New Zealand considers the need for local customisation of the systems to be an important feature of their strategy,

New Zealand is also putting information for clinicians and patients higher in the priorities than the NPfIT is. The initial launch of the New Zealand strategy was the 2001 WAVE - Working to add value through e-information, project which emphasised the information needs of clinicians. The 2005 Health Information Strategy for New Zealand also makes the need for consumers and their advocates to have access to information to make informed choices about health and independence a top priority.

Nursing Informatics

The use of IT in nursing is called nursing informatics, this has been defined as

> *'the use of information technologies in relation to any of the functions that are within the purview of nursing and are carried out by nurses in the performance of their duties. This comprises the care of patients, administration, education and research.' (Hannah 1985 p181)*

The Visit

The study tour was approached as 'conversations with nurses' rather than as a research project, although the underpinning ethical considerations were based on research ethics. This included the basic principles of Beneficence; Non-Malfeasance; Informed consent; and Confidentiality/Anonymity (Bournemouth University 2003, p10).

All participants were given a brief overview of the nature and purpose of the study tour, and permission was sought to takes notes in meetings. There is little potential for the conversations being harmful to those who participated, however anonymity was promised unless specific exceptions were agreed. Because of the location and nature of some of the conversations it may be possible to guess at the identity of some participants, therefore the location of the information gathered has not been identified unless essential, and then only if the contributor will not be identified, or was happy for the information to be attributed to them.

Organisations Visited

- Waiariki Institute of Technology, Rotorua and Tauranga campuses.
- University of Auckland, Health Innovation Centre
- Waikato Institute of Technology (Wintec), Hamilton
- Unitec, Auckland
- Victoria University, Wellington
- Christchurch Polytechnic Institute of Technology.

- Lakes Health Board, Rotorua Hospital
- Bay of Plenty Health Board, Tauranga hospital
- Christchurch Hospital
- Health Informatics New Zealand Nursing Group

The people who participated in conversations with me fell into three main groups.

- Students
- Nursing Academics & lecturers
- Nurses in practice. These fell into two sub groups
  - Senior Nurses
  - General Nurses

    The main difference between the two groups is the general nurses would be in regular contact with students, whilst senior nurses were not the students' everyday day role models.

Visits and Information Gathered

General Visits

The Institute of Health Innovations at Auckland University invited me to discuss the development of this initiative. The university has secured Government funding and is now in discussion with 43 commercial interests to secure matched funding. One aim is to set up a clinical software lab with all New Zealand systems available so that industry can use the facility to test the interoperability of their software. Software will also be available for students to use to develop their systems/informatics skills.

The Institute will build on work already being undertaken at Auckland University, such as PREDICT a CVD-Diabetes assessment and risk management tool developed by Dr Sue Wells. This is based around a central database that is used to hold the record, carry out the analysis and provide anonymised data for research purposes.

Auckland University is also involved in a project to develop the use of other technology such as SMS to more effectively deliver targeted health information messages, e.g. smoking cessation information, which smokers can use when they feel the need for a cigarette and receive a text message back giving personal motivational/behavioural advice.

When the Institute is fully up and running work such as these projects will move into the Institute.

Nurse Education

Pre-Registration nurse education in New Zealand has many similarities to that in England. In 2003 the country adopted a competency based system for all healthcare practitioners through the Health Practitioners Competence Assurance Act. The Nursing Council of New Zealand (2005) has identified the domains of competence for nursing. These are very similar to those in use in England. As in England education providers have the scope to develop their own curriculum to meet academic and professional body requirements.

New Zealand has several different types of higher education establishments; Universities, Polytechnics and Institutes of Technology all offer nursing courses. The most striking differences in the nurse education systems of the two countries are possibly that nursing is a graduate level entry profession in New Zealand. The other is that as well as successful completion of the degree course students then sit the Nursing Council of New Zealand Examination for registration in the registered nurse scope of practice.

One further difference is that education providers are separate from health boards and hospitals, which have no obligation to provide placements, and can charge the education provider. Students work with a preceptor (qualified nurse from the placement organisation) on placement however education providers also provide support through their own nurse lecturers and/or clinical tutors employed specifically for the role. The education provider is responsible for the final assessment of students' practice outcomes.

Information Technology and its appropriate use appears in, or supports, several competencies, including

> 1.1 Practises nursing in accord with relevant legislation/codes/policies

> 2.3 Demonstrates literacy and computer skills necessary to record, enter, store, retrieve and organise data essential for care delivery.

> 2.4 Provides appropriate information to clients to protect their rights and to allow informed decisions.

> 2.7 Provides health education appropriate to the needs of the client within a nursing framework.

All the nursing courses visited included nursing informatics in their programmes to some extent. Basic IT skills however were often not included. Most nursing department's policy expected that students would start the course with the necessary skills to be able to cope, and would developing their use during the course as necessary. Often students who lacked skills were directed towards courses provided which, whilst often free, required the student to undertake them in their own time, ideally before starting the course.

The majority of staff acknowledged that there were a significant number of students who did not have the level of basic IT skills that the policies expected. This view was re-iterated by the students.

Wairiki has invested in developing e-learning. Mandy Williams, the lecturer leading the work showed me their Moodle Virtual Learning Environment (VLE). She has also, in a joint initiative with Auckland University of Technology (AUT), developed 'study texts'. This is a website (www.studytxt.com) which provides an on demand study support system using text messages on mobile phones. These take key points from lectures and reproduce them as revision points which the students can buy as mobile phone downloads. There are plans to use the capabilities of newer phones to also provide video clips.

Unitec has developed a data management system for use in nurse education, KIWIN. This system is designed to help students gain proficiency with electronic data entry, standardized nursing terminology and data transmission. Initially students are introduced to the web interface for planning and documenting care. Students develop their use of the system over the three years of their course, and by their final year they are loaned a PDA (handheld computer) to enable them to capture (anonymised) clinical data at the point of care. This also provides access to clinical reference tools such as drug guides and clinical encyclopaedias. Academic staff can use reports provided from the system to review student's clinical experience.

Students' can elect to do a unit in nursing informatics. This has proved popular with students, and consideration is being given to including it in the core units for the programme.

I also visited a new clinical simulation facility that Unitec has recently opened. This has been developed in partnership with the local Waitekere hospital. A unit that became surplus to requirements has been converted into a comprehensive education facility for use by hospital staff and Unitec students. It offers an interview / consultation room, clinic, bedsit, ward with sluice room, and an operating theatre. Every area has video facilities, data points and a wireless network to enable IT to be integrated into the simulations. High specification mannequins are being purchased to enable realistic scenarios to be developed. The clinical areas are supported by a teaching room, and an audiovisual control room.

Feedback from students suggested that they found using the KIWIN system to be difficult. In spite of a tutorial assistant being available for technical and troubleshooting help students experienced practical problems with the PDAs, such as letting the battery run out and losing their data. Students on this programme, in common with most others, did not receive any basic IT skills input as part of the course. Unitec does make courses available, free of charge, to the students, but they have to access these in their own time.

There was also a suggestion that some lecturing staff did not fully understand the system, and expressed some reluctance to engage. This was no doubt not helped by changes in staff including the key developer leaving, although she remained as a consultant to the project. Another factor identified was that some staff as well as some students needed to improve their IT skills.

The support of staff, especially management, was seen as being essential for the ongoing development and implementation of the system. As with any IT programme change management skills were essential for the project team as implementing KIWIN required staff to change the way that they worked, as well as learning the system.

WINTEC have also been involved in the KIWIN development, being one of the sites to undertake initial testing of the programme. It is implemented differently at Wintec; here students have two sessions on technology in nursing in semester 1, and in year 2 are introduced to the KIWIN web interface. Unlike Unitec who provide PDAs for their students Wintec students have to supply their own hardware.

Students at Wintec were possibly the most confident in their IT skills of all the nursing schools I visited. The 3rd year students however reported mixed experiences of the use of computers in practice. Whilst there was some report of low use one student discussed how the ward manager on her placement had used a PDA. The students in this group (approx 8) all thought that instant access to information at the point of need, such as the access afforded by a wireless PDA system would enable more accurate recording and make the nurse's life easier.

Wintec kindly arranged for me to visit **Waikato hospital** in Hamilton to talk to Matt Watson, a nurse, who was leading the project to implement the use of PDAs by nurses. The aim of the project was to provide a mobile point of care documentation system thus helping nurses improve their record keeping by making it possible to update records at the point of care, and to make access to clinical support information available at the point of need. The project team included P McClunie-Trust from Wintec and Professor Ken Walsh from the University of Victoria.

Matt had initiated the project in response to the problem of patients' records being updated at the end of the shift. This lead to the full range of nursing tasks often not being recorded as memories were not perfect, and updating records could be rushed, or result in the nurse working late to complete the task. One of the key aspects of nurses' acceptance of the system was that it was being designed in response to a problem that they had identified. Although many of the nurses in the clinical area did not have the knowledge to see how IT could help solve the problem they were actively involved in the project, as they understood the nursing need.

My final visit to a nursing school was on the South Island, where I visited **Christchurch Polytechnic Institute of Technology** (CPIT). CPIT include nursing informatics throughout their pre-registration course. Somewhat unusually for nursing informatics (certainly in England) informatics is compulsory and is assessed. I was able to meet CPIT students in their placement locations, and was also able to speak to recent graduates.

Nursing Lecturers views on Nursing Informatics and IT

The norm was that programmes did not include basic IT skills, with the expectation that students would either have the skills, or would work on them in their own time. Most lecturers however acknowledged that a significant number of students lacked essential IT skills, and that within busy programmes students were not motivated to add to their study load by also taking IT courses that were not seen as essential.

Some lecturers also professed to having poor IT skills, and there was a general view amongst staff that skill levels and computer use varied across staff.

The location of nursing informatics in the curriculum was also a matter of some debate. Most of the staff directly involved favoured it being a discrete, compulsory element of programmes. Others, often those not directly involved, preferred a more integrated approach, often seeing it as a skill rather than a knowledge base. There was support for including some basic skills in programmes to ensure that students had these.

Although there were a variety of attitudes to IT most lecturers felt that computers were important in nursing and that they were becoming more so. Lecturers and clinical tutors appreciated the value of IT as a tool to support evidence based care as well as a skill needed for use of hospital systems. One clinical lecturer that I spoke to stressed the importance of her role in supporting qualified nurses who may have qualified before IT was included in nurse education, and making sure that the requirements of the new competencies were clear and understood by the nurses who acted as preceptors to the students.

Information from Qualified Nurses

I talked with approximately 50 qualified nurses about their computer use and wishes. Most qualified nurses were spoken to on a one to one basis, although small groups (3-4 nurses) were also used e.g. when speaking to staff in shared offices when more than one nurse was willing to talk to me. Nurses came from a wide range of disciplines including community care, intensive care, day care, mental health, children's, acute medical and surgical areas. The nurses spoken to split into 2 distinct groups. Senior & specialist nurses (clinical specialists, nurse educators and clinical nurse leaders) and general nurses. I also met several larger groups of nurses in the invited lectures that I gave.

The hospitals visited used a variety of systems, these included patient administration systems, diagnostics & results. The Bay of Plenty District Health Board has invested heavily in developing IT systems which includes TrendCare, a clinical information system for patient acuity/patient nurse dependency. Local customisation is being undertaken to ensure that this tool is useful and timesaving for nurses, e.g. diets ordered are automatically sent to the kitchens for actioning. A clinical pathway management module is also being implemented. A lot of students who had placements in the Bay of Plenty District Health Board hospitals said that they had used the Trendcare system on placement.

Nurses generally mentioned using a combination of patient record systems and care planning systems. Fewer staff mentioned using computers to access evidence based information, or information for their patients.

One group of staff spoken to were educators in practice. These were employed by hospitals and did not have formalised links with higher education. This group were quite anti-computer. One thought that they belonged only in high dependency areas, but not in general wards. Several had the view that computers took nurses away from patients. Their comments supported the view of one clinical lecturer, that for pre-registration students learning about patient care was more important than learning about systems. On behalf of the staff they supported they also made the point that many nurses had poor IT skills, found online learning difficult, and that they had neither the computer access, nor the protected time, to use it.

Nurses generally fell into one of three groups.

> ➢ ***Those who used computers quite extensively***. As well as using the systems that they were required to use they also mentioned using computers to access research and library resources to support evidenced based care. One nurse from the UK who fell into this group felt that New Zealand systems offered more flexibility than the systems experienced in the UK. Another commented that she wouldn't want to see nursing without good computer systems to support it. This group were more willing to tolerate imperfect systems and to see ways that they could be improved.

> ➢ ***Those who were willing, but felt that they lacked the skills*** to use systems confidently. One nurse, who was finding that patients and families were using the Internet for information, felt that they expected her to be competent as well. She considered that education programmes should be including this so that newly qualified nurses had these skills from the outset, and that programmes should be available for qualified staff to catch up. This group struggled with imperfect systems and wanted access to help and support that met their needs.

> ➢ ***Those who did not want to use computers***. The comments from nurses in this group included that paperwork was easier before computers, and that with new computerised systems nurses were having to do work that ward clerks did previously. These nurses also tended to see computers as taking nurses away from patient care. This group felt that poor systems justified their not using them.

The comments from nurses fell into three main themes.

Systems in use

Often nurses did not feel that the systems in use met their needs. One very heavily criticised problem was that there were often duplicate systems in use (especially paper and computerised systems) as systems did not have the ability to talk to each other. This was felt to be especially true for systems in different organisations (e.g. hospital and community) which made transferring patients

time consuming. The need to enter the same data into different systems, or more than once, was also criticised.

In one location nurses had the choice of using a computerised patient care planning system, or a hard copy one. Most nurses, especially those who liked the computerised system, complained that they never knew where to look for information as not all the computerised records were printed out and put in the patient's file.

Some nurses, especially those who were uncertain about using computers or who found them complicated, felt that a familiar 'look and feel' would help them. The example given was that it would be easier if the navigation was similar to that in Microsoft programmes, as the nurse was familiar with them. She found the interface of professional systems to be cumbersome and difficult to learn.

Email was sometimes seen as a poor way of communicating with some general nurses felt that senior nurses expected them to use it too much. Many nurses complained about receiving too many irrelevant emails.

Nurses wanted systems that would save them time, e.g. send orders to pharmacy when a prescription is written, or identify equipment necessary for a care pathway and place the order automatically.

Having to remember several passwords, all with a different length and expiry date was seen as a big problem. Difficulties with various password systems was considered to led to nurses writing them down, intentionally sharing them or just not bothering to log out when leaving the computer for a short time.

Equipment

In order to use computerised systems nurses wanted greater availability of equipment. Senior nurses generally had access to their own computers, however ward staff had to share, and in some locations nurses did not consider that they could access computers when they needed to. Most of the wards that I visited did have computers visible and available, although I was not on wards at the end of shifts so possibly did not witness times when staff most wanted to be using computers.

Nurses did not generally want more desk based systems. Computers that could be used at the bedside were in greater demand. This could be seen to be a logical result of my visiting areas where PDAs were in use by students, or local initiatives were being developed, however nurses in locations where these initiatives were not in use also wanted this from their computer systems. The Waikato initiative arose from the desire for computers at the point of care in response to nurses' work patterns.

Skills

Some nurses felt that they did not have the skills, or the confidence, to use systems. This did not generally apply to senior nurses, or to nurses who had completed their training in the past couple of years.

Most nurses felt that more support needed to be provided. Training was available, and most nurses who mentioned skills did appear to know how to access training or the helpdesk in their organisation. This however did not meet the nurses' requirements, as it was not available at the point of need. Nurses who considered themselves to have poor skills did not generally feel comfortable with worksheets or other written guidance. Computer based training materials that nurses had to use in their own time were also unpopular.

Most nurses who mentioned the need for support wanted something available that fitted with their work patterns (e.g. on the ward) and that addressed immediate problems when they arose. One expert had been involved in a project in America to completely computerise a hospital. She perceived the implementation to have been successful. One key aspect of the implementation was that help was provided on the ward when the system was installed, giving those nurses the help at the point of need that was being requested by the nurses who talked to me.

Information from Students

I spoke to approximately 175 students from all three years of their pre-registration programmes. Some were individual discussions; some were in large classroom groups. For the larger groups I asked the students to consider questions in small groups, circulating around the groups to make sure each group was happy with the questions, and willing to makes notes about their answers to let me have at the end of the session. I also took feedback from the groups and used it as both an educational experience for the students, and a way of looking for consistency or divergence of views across the whole group. To make sure that the principles of voluntary participation and anonymity were maintained I asked the students not to put names on the notes, and to pass them along to the end of the row so that I did not know if any groups had decided not to give me their notes.

As 1st year students had not experienced clinical placements I focused on discussing the skills that they had, and how well they thought these would prepare them for using computers as nurses. I also asked what they based their judgement of their skill levels on.

Initially I asked students how they rated their IT skills on a range of Expert, Good, Poor or None. Few students thought they were expert or that they had no skills. Most fell into good or poor. When asked what they were basing that judgement on a wide variety of suggestions were made. These included keyboard skills, comparison to friends (can do more / less then others) and the amount that they like using computers. The ability to do what the individual wanted to do was a frequent answer.

Very few students thought about their skills in relation to how they would be using computers in placement, or as qualified nurses. When asked about what they thought their course should include in the next 2 years students tended to mention skills rather than knowledge. When challenged about information security all thought it essential that it was included.

The majority of students who had been into clinical placements had seen computers being used, even if they had not used them themselves. The experience of students varied according to the organisation, and the placement location within the organisation. Where students were using computers it was mainly hospital systems that were in use, e.g. those for checking test results, preparing handover information and paging staff. Powerpaging, a computerised system used for paging staff, was mentioned quite often by students in one hospital.

Students mentioned accessing information about evidence based care less frequently than they said they used placement records systems.

Some students had not used IT in their current placements, although most had in at least one previous placement. Whilst there were variations across health boards there was also variation within, as well as between, organisations. The attitude of the preceptor and the ward culture were influencing factors.

Quite a few students said that they were not given their own IT accounts on placement, which they felt was unhelpful. This meant that they could not access record systems, the internet or intranets without using someone else's login information, a practice that undoubtedly happened and that some students were concerned about.

Students generally thought that their courses prepared them for using IT in their placements. Some students said they would like their course to train them on the systems they would be using in practice, although as one student acknowledged this could be difficult as 'everywhere seems to have different systems' and felt that life would be much easier if they were all the same.

When asked about what they would like to see being developed for when they were qualified most students contributed some suggestions. Portable computing, including PDAs were a frequent suggestion. This did not just come from students who had experience of the KIWIN system. Students also wanted to be able to access information at the point of need.

Students also wanted systems to be easy and intuitive to use. One student suggested that if systems had the 'look and feel of Microsoft' it would make life easier. Mouse over 'help bubbles' were also suggested.

Information from health / nursing informatics experts

As well as the lecturers who were leading nursing informatics education in their nursing schools I met clinical experts at the Auckland University Institute of Health Innovations, at the HINZ (nursing group) seminar, and at an invited presentation to a health informatics group at the University of Victoria. The guest lecture I delivered for Health Informatics New Zealand and the School of Nursing at the University of Auckland was attended by a mix of academics, specialist informatics nurses and practice based nurses with a specific interest in informatics.

Nursing Informatics experts agreed that within New Zealand, as with England, nurses had a wide range of IT skills and informatics knowledge, but that many nurses lacked the skills and knowledge to fully engage with the informatics agenda.

One problem that was raised by a group of Auckland based nurses was that of access to computers for students, especially questions of where the responsibility for safety and quality of the students' use of records systems lay. It was felt that there was a resource problem in the setting up of accounts and access for nursing students. It was noted that one hospital that has both medical and nursing students, provides accounts for medical students, but not for nursing students.

Unsurprisingly the majority of experts saw the use of computerised systems as being beneficial to nursing. They were more aware of the potential for quality improvement, for example systems being used to provide reports on tests that were ordered but not carried out so nurses can check if anything is outstanding and what action is needed (although this was also seen as being a new nursing task that took nursing time). There was a strong view that new systems should promote change (quality enhancement) not just computerise the current way of doing things.

This group could see also see the scope for a range of improvements to the available computer systems. Practicality was high on the list. Equipment was seen as needing to be small but lightweight to make it portable around a ward. Wireless networking was considered a good way of enabling portability. Speed of the equipment and programmes was also important, the systems needing to be able to work at the same speed as the nurse.

The need for systems to support communication across the health sector was considered essential for sharing information about patients and to ensure that notes etc would always be available when and where needed.

Nursing informatics experts felt strongly that managers also needed to be knowledgeable about IT. Support from the top was considered to be particularly important for the work culture to be one where computer use is seen as being a part of care giving.

Decision support systems were wanted, but with the proviso that they must be linked to up-to-date evidence, and have the ability to be updated rapidly.

Every education provider I visited had someone on their academic staff team leading nursing informatics. Unsurprisingly all the nurse informatics experts considered that both IT and nursing informatics should be included in pre-registration programmes.

Analysis of information gathered

What Nurses Want

Two of the aims of this study were

> Understanding of what nurses want from IT in the workplace, especially in terms of meeting their own and their patients' information needs

> Exploration of what nurses think the barriers are, and how they could be overcome.

Generally nurses wanted computer systems that would make their lives easier. This included saving them time by automating tasks such as stock ordering. Two essential elements were ensuring inclusion of information from all points of care, and minimising data entry.

Offering good quality decision support and access to evidence based information was not as high a priority for many nurses, but those who wanted it wanted it to be available when and where they needed it, and for it to regularly updated.

A very important requirement was that computers needed to available wherever the nurse and patient were. Wireless networks and portable computers suggested as the best way of meeting this need. Computers at workstations were not popular for several reasons, including the pressures to find a free computer at the end of shift to update records. Point of care data entry, such as the initiative being introduced at Waikato, will not only meet nurses requirements but will also contribute to improved patient care by allowing records to be updated contemporaneously when memories are fresh; a great improvement on handwritten notes being scribbled and kept until the nurse can get back to a free computer.

Nurses also wanted systems to be quick and easy to use. Various suggestions were made, including systems using a familiar 'look and feel' such as that used in Microsoft programmes, which most computer users are familiar with. Context sensitive help available from within the programme was another suggestion to help nurses use systems effectively.

Passwords were a big problem for many nurses. Each individual system often requires its own login information, each renewable on a different cycle. Nurses were almost unanimous in wanting this simplified. The ideal solution was seen as each nurse having just one password that would give entry to all systems.

Support was a frequently mentioned need. The help available needs to fit with nurses' work patterns (e.g. on the ward) and address immediate problems as they arise. Although training on systems was seen as important the need for ongoing support was also identified. Most nurses did not want this through manuals or computer aided learning programmes that they had to use in their own time. Having access to a helpdesk that would get back to them, often a couple of days after their enquiry, was not seen as meeting their needs. The most popular support method mentioned was for a specialist nurse to be

available to come and give one to one help when and where problems were encountered. A nurse was requested rather than an IT person because there was a feeling that a nurse would understand the context of the situation, what the nurse was trying to do and how they needed to do it. Nurses, especially those who lacked confidence, did not feel that IT specialists 'talked their language' or saw their problems in the same way that they did.

The four biggest barriers to the use of computers that were identified were:

> The co-existence of paper based systems, meaning that nurses didn't have to engage with the computerised systems. This was seen as leading to computerised systems being incomplete and therefore promoting the use of paper-based systems.

> Systems being slow and not user friendly, so that using the computer took longer than doing the same task did (or had done) in a paper-based system. Linked with this was a distrust of computers with the fear that they would increase workload by making tasks that were previously done by clerical staff part of the nurse's workload.

> Lack of support when and where it was needed. Nurses did not see waiting for help as being acceptable when a problem was stopping them doing work that they needed to do.

> Computers not being available where and when they were needed. A culture of using computers not being seen as being as important as giving patient case was often mentioned. Nurses keen to engage would like to have computers available at the bedside (or consultation) so that they became part of care giving rather than part of a separate administrative workload.

Nurses tended to focus more on using systems than they did on accessing information to support care. Part of this may just be lack of awareness of what is available, but part is also likely to be attributable to a culture where spending time on a computer is not seen as being as valuable an activity as spending time with a patient, irrespective of what is actually being done in either case.

The Role of Education

The last aim of the study was to identify nurses' views on the elements necessary in pre-registration nurse education to promote the effective use of ICT by nurses, and to equip the nurses of tomorrow with the skills and knowledge that they will need to work effectively with ICT.

Other than the nurses who did not think that computers had a place in nursing the qualified staff thought that pre-registration education should include IT and informatics to ensure that newly qualified staff can use computers in their work.

Most nurses tended to think in terms of skills rather than knowledge, however when prompted did think that understanding about computers, information security and the legal and ethical issues in their use were as important as having the practical skills to use them. Some nurses had met patients and families who

were using the internet for information and felt that nurses needed to be prepared for this by knowing how to evaluate the information, and how to help patients meet their information needs effectively.

Nursing informatics appears to be more integrated into pre-registration nurse education than it is in England. All the schools of nursing visited had a lecturer leading informatics and from discussions this would seem to be the norm.

Whether a direct effect of this or not, all the programmes offered included some nursing or health informatics. The more involved the lead lecturer was the more comprehensive the programmes appeared to be. Students were familiar with the term and most were able to have an informed discussion about developments they expected or would like to see. Students in the 2nd and 3rd years of their course, and newly qualified nurses thought that the informatics elements of their programmes had prepared them for using IT in placements.

Unfortunately students' experience of IT use in placements varied. Some worked with preceptors and qualified staff who integrated use of IT into their everyday work patterns. Others experienced low use and resistance to computer systems. The KIWIN system appears to meet some of the students' requests for developments. Although it is not a programme that they will use once qualified it is an educational tool that replicated the knowledge and skills that they will need once qualified. KIWIN has taken several years to develop and has required a major input of resources, staff as well as money, to develop and integrate the system into the education programmes. In order to be successful it has needed an involved and motivated leader, support from management, and the support of lecturing staff who need to integrate it into different parts of the programme.

Only two of the schools visited were using KIWIN. Other schools took different approaches to developing nursing informatics. The way that it was being taught did not appear to be as important as the fact that it was being taught, and then used in practice placements.

A repeated problem expressed by nurses was that many nurses lacked basic IT skills. Students often felt that their skills would benefit from updating as well. In spite of this pre-registration nursing programmes tended to not include IT skills in the core curriculum. Most provided students with opportunities to improve their skills however this was something to be done outside of the course. This is possibly the opposite in England where the emphasis tends to be on basic skills rather than nursing informatics knowledge.

The nursing informatics experts, especially those in education, saw informatics as an essential element of pre-registration education. There was less consistency about how it should be included, although there was concern that if it was integrated across the curriculum it was in danger of being 'lost'. There was not a lot of faith that all colleagues knew enough about nursing informatics, or had the necessary skills, to be able to successfully integrate it in to their teaching. Given the research carried out in England (Murphy et al 2002, Murphy et al 2004, Brittain and Norris 2000) these concerns seem very realistic. One solution,

preferred by some experts, was to seek to maintain nursing informatics as a discrete topic in the curriculum.

The nurses who were willing, and felt able, to engage with computers tended to be more positive about them. Whilst they acknowledged the faults in the systems they knew how they wanted them to be improved. This group of nurses also made more use of computers than other colleagues, including using the computer as an information tool as well as a record system. Nurse education needs to maximise the number of new graduates who fall into this group.

Nurses who did not have the same confidence in their ability used computers but struggled with systems and were dissatisfied with the way help was provided. Nurses in this group thought that students should learn how to use computers.

It is not as clear why some nurses are in the 'not wishing to use computers' group. Problems that nurses in the other groups either lived with or sought help with were used as reasons for non engagement. It may be that the nurse who commented that the problem wasn't actually to do with the computers at all, it was a fear a change, had identified the root of the issue. Computers had generally been introduced during these nurses' working lives, so adopting their use required them to change their practice. If this is the case then the more that computers are introduced in pre-registration education, such as through the KIWIN system, and the more nurses are taught to understand nursing informatics the more likely it is that newly qualified nurses will not join this group.

Recommendations

Within my area of work

On a personal level I will review the IT/Informatics elements of the pre-registration nursing programme at my own university to ensure that both basic skills and nursing informatics are adequately included in the curriculum. The danger that the focus becomes the computer system rather than the information has been highlighted in this study, and this is one aspect that I will seek to avoid.

I will also explore ways of supporting mentors to ensure that they have the necessary understanding of informatics to be able to assess it in the nursing competencies that students are required to have met by the end of the course.

Education

The New Zealand experience of schools of nursing routinely having nursing informatics as one of its disciplines, and having an academic leading it appears to have supported the development of nursing informatics in pre-registration education. This in turn appears to be preparing students to use computers in practice. These staff also need to work with the nurses who support students in placements to ensure that they can be good role models and support students.

New Zealand, in common with England, has a problem with basic skills amongst much of its nursing workforce. There seems to therefore be little justification in perpetuating this by not ensuring that newly qualified staff have basic skills. The NHS sees basic computer skills as one of the elements of nursing informatics. Pre-registration education programmes need to include both basic skills and nursing informatics skills and knowledge. These should be developed across the 3 years of the programme so that students have ample opportunity to apply theory to practice.

England should also have the expectation that all pre-registration education providers should have an expert in nursing informatics on their staff, or available to advise the programme. Professional bodies and purchasers should ensure that they have adequate expertise in nursing informatics to be able to assess its effective inclusion in programmes, and actively seek it in their review of education programmes.

A copy of this report will be sent to the Council of Deans and to the NMC. I will also seek ways to promote discussion within the education sector.

Computer Systems

Many of the essential elements of systems identified by New Zealand nurses are already key elements of the National Programme for IT. These include the 'do once and share' concept, and having one integrated health record, available to all healthcare providers. The National Library for Health is also part of the National Programme, giving nurses access to reliable up to date information to support research and evidence based care.

There are however aspects of implementation that may not currently be present. Computing at the point of care was an important requirement. Achieving this may contribute to nurses seeing computers as being part of nursing care rather than being seen as a task that takes them away from patients.

Programme Implementation

The way that help is provided to nurses is another area that needs to be considered within implementation programmes. If the NHS employed informatics nurse specialists they could promote confidence in the support systems available and ensure that they understood and met nurses' needs. As pre-registration education also needs to work with mentors to ensure the integration of theory and practice there is clearly opportunity for joint working in this area.

A copy of this report will be sent to the Chief Nurse for England as the sponsor of the project. It will also be sent to the Connecting for Health clinical leads for nursing to ensure that the findings are made available to the National Programme for IT.

Conclusions

Whatever some nurses may wish, computers are not going to disappear from healthcare, rather their use is going to increase. Nurses therefore need to be

prepared to work with computers, and to integrate them into their normal working patterns. In return computer systems being implemented have to meet the needs of nurses.

Patients have the right to expect that nurses will use computers within legal and ethical guidelines, and that they will be able to use systems safely. Avoiding doing harm through incorrect data entry, or unsafe use, is however not a good enough aim. Nurses have the opportunity to improve their care by using the decision support systems that are available, and through accessing up to date research and information about evidence based care. They can also help patients identify and meet their information needs, possibly especially important as the focus in healthcare shifts to helping people live with long term conditions.

In New Zealand I saw nursing informatics as an integral part of nurse education. Although the 'what' and the 'how' is open for debate all of the education providers I met had someone leading nursing informatics so that there was informed debate. Most of those leaders were also developing the discipline of nursing informatics by carrying out research and publishing their work. This is a norm that I think nurses in England deserve as well.

Most of the initiatives that I saw included nursing informatics academics and hospital staff working together on their development and implementation. Most had encountered various problems however those involved had not let this deter them. Clear leadership, and a good understanding of change management, struck me as being key features in this.

Having spent a valuable and interesting five weeks meeting people with very similar aims to me, and learning from their experiences I have returned to England convinced that pre-registration is key in ensuring that nurses are prepared for working in the information age, and in helping NHS Connecting for Health to achieve its aims, especially those of improving patient care.

References

Bond, C, S. 2004. Surfing or Drowning: Students Nurses Internet Skills. *Nurse Education Today.* 24(3) pp169-173

Bond, C, S. 2003. Nursing Informatics for All. *E-health for All, 8th Nursing Informatics Congress.* Rio De Janeiro

Bournemouth University. 2003. *Research Ethics Policy and Procedures.*

Brittain, J & Norris, A. 2000. Delivery of health informatics education and training. *Health Libraries Review.* 17, pp117-128

Davidson, L. (2005). The Magic Glue. *e-health insider.* online at http://www.e-health-insider.com/comment_and_analysis/index.cfm?ID=93 [Accessed 1 Aug 2005]

Griffiths, P. & Riddington, L. (2001). Nurses' use of computer databases. *Health Information and Libraries Journal.* 18, pp2-9

Hannah, K. (1985). Current trends in Nursing Informatics: implications for curriculum planning. In Hannah, K. Guillemin, E. & Conklin, D. (eds) *Proceedings of the IFIP-IMIA international symposium on nursing uses of computers and information science,* Calgary, Alberta, Canada, May 1-3, 1985. Amsterdam: Elsevier Science Publishing.

Murphy, J. Stramer, K. Clamp, S. Grubb, P. Gosland, J. & Davis, S. (2004) Health informatics education for clinicians and managers — What's holding up progress? *International Journal of Medical Informatics.* 73, pp205-213.

Murphy, J. Stramer, K. Clamp, S. Davis, S. Grubb, P. & Gosland, J. (2002). *Health Informatics Education for Healthcare Professionals.* London: RHIED / Department of Health.

National Audit Office, 2006. *Department of Health. The National Programme for IT in the NHS. Report by the Comptroller and Auditor General. HC1173 Session 2005-2006; 16 June 2006.* HMSO.

NHSIA. (2001a). *Health Informatics Competency Profiles for the NHS.* Winchester: NHS Information Authority, Ways of Working With Information programme.

Nursing Council of New Zealand. 2005. *Domains of Competence for the Registered Nurse Scope of Practice.* Available online at http://www.nursingcouncil.org.nz/competenciesrn.pdf. [accessed 10th Feb 2006]

Timmons, S. (2003). Nurses resisting information technology. *Nursing Inquiry.* 10 (4), 257-269.

Acknowledgements