PRESCRIPTION FOR NURSING INFORMATICS IN PRE-REGISTRATION NURSE EDUCATION.

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ABSTRACT

Information and communications technology is becoming ubiquitous in our everyday lives. This does not however mean that we all inherently know how to use it, or have the skills and knowledge to use it to best effect. This is especially true in nursing where nurses not only need to be able to use it to support their own practice, but also need to be able to help their patients make best use of it.

This paper argues that nurses are not currently adequately prepared to work with information and technology through their pre-registration education. Reflecting a lack of nursing informatics expertise it is recommended that all pre-registration nursing programmes should have access to a nursing informatics specialist.

A prescription to meet the informatics needs of the newly qualified nurse is proposed. This places the areas that need to be included in pre-registration education into broad groups that both articulate the expertise that nurses need to develop, and indicates why they are needed, rather than providing a context free check lists of skills. This is presented as a binary scatter chart with two axes, skill to knowledge and technology to information.

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Introduction

The English National Health Service (NHS) has been a major user of information and communications technologies (ICT) for the past forty years. For most of this time clinicians, including nurses, have had little involvement with the ICT applications as they were seen as primarily for administration. This changed in 1998 when Information for Health[1] was published. As well as identifying the need for further development in systems it also stressed the need for patients to have access to information to support their care. Progress in making the changes contained in the plan was however slow and in 2001 it was replaced by the National Programme for IT (NPfIT) which is planned to run until 2010 [2] and is now managed through the auspices of Connecting for Health.

As with many large computer programmes, implementation has encountered problems, and not always received positive publicity [3,4,5,6]. In spite of the problems being experienced the systems that NPfIT are delivering are an obvious driver for nurses to develop the skills and knowledge that the use of ICT in practice requires. NPfIT however is by no means the only driver. The Chief Nurse[7] has identified that nursing is changing, nurses are moving from providing care that is 'dictated by custom and practice' to basing their care on 'evidence and critical thinking and assisted by new technology'. Nurses not only need these skills to support their practice, they need them to support their patients. Whist the National Programme is limited to England the need for nurses to have skills and knowledge in the use of Information and Technology, rather than just information technology, is an international rather than a national issue.

There has been a shift away from the traditional paternalistic model of healthcare and patients are becoming partners in their care. The rights of patients to expect, and receive, help with accessing information as well as treatment is discussed by Kemper & Mettler[8]. They state that many patients are finding information for themselves, but that the quality of that information can be a problem. They consider that information should be an integral part of any treatment programme, with patients being provided with a 'prescription for information' tailored to their specific needs. The shift of power within the patient / professional relationship is discussed by Hardey[9] who, in a qualitative study of households who regularly used the Internet to locate health information, found that it is the users of the information who decide what is accessed and how it is used, rather than the professionals they are involved with.

Given this increased importance in the use Information and Communication technology in nursing the key issue has to be is nurse education keeping pace with this rapidly developing area and preparing nurses to work in this information rich environment.

Professional and academic standards

In the UK the requirements of nurse education are set out in Statutory Instrument 2000 No. 2554[10]. The body that implements and oversees this is the Nursing and Midwifery Council (NMC). The need for nurses to have skills in, and understanding of, both information and technology is demonstrated by the NMC requirements for registration[11]. Some of the requirements of the NMC for entry onto the register (i.e. qualified nurse status) do not specifically require ICT skills but with knowledge of information and technology related developments it is easy to see how skills in this area will facilitate achieving the

requirements. These include providing health information to patients and using evidence to support practice. Other requirements are explicit; nurses are required to be able to:

> *(Use) Information technology and management – interpret and utilise data and technology, taking account of legal, ethical and safety considerations, in the delivery and enhancement of care*
>
> *Demonstrate literacy, numeracy and computer skills needed to record, enter, store, retrieve and organise data essential for care delivery. (p18)*

The Nursing and Midwifery Order 2001[12] requires the NMC monitor programmes which lead to registration annually to ensure that they meet NMC requirements.

In addition to professional requirements for registration education programmes work with the Quality Assurance Agency (QAA). The QAA has established subject benchmarks [13], the function of which is described as

> *'(providing) a means of describing the nature and characteristics of programmes of study and training in health care. They also represent general expectations about standards for the award of qualifications at a given level and articulate the attributes and capabilities that those possessing such qualifications should be able to demonstrate.' (p3)*

The Benchmark statement: Health care programmes document [14] contains benchmarks for general healthcare education programmes. These update an earlier version, and postdate a set of benchmarks specifically for nursing programmes. The updated version acknowledges various changes in healthcare, including the development of technology. As with the NMC requirements the inclusion of ICT is implicit in some benchmarks, such as

education and quality assurance. Its explicit inclusion is wide ranging, the general healthcare benchmark statement including identifying electronic communication alongside other communication skills. The nursing statement[13] includes the ability to use word processing, email, spreadsheets and databases; access health care research and literature databases; use the internet as an information source; and use relevant electronic patient information systems.

Across various NHS documents a variety of terms are used, including ICT, information management, computer skills and health Informatics. Neither the Professional Standards[11] nor the QAA Benchmarks[14] specifically mention nursing or health informatics. Hannah[15] however has defined nursing informatics as being

> *'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.'*

a definition which clearly encompasses the various terminologies, skills and knowledge identified as being needed by nurses.

Nurses' skills

Against this background of increasing importance of information and technology lies a serious problem. The National Audit Office report into the implementation of the National Programme [16] highlighted the problem as being the lack of IT skills within the NHS which would result in a risk to the timely implementation of the programme (NPfIT). Nurses, who form the largest group in the healthcare workforce, must be confident and competent in using information and technology to support patients.

The ability of professionals to support patients in meeting their information needs was questioned by Fieschi [17] who found that whist patient requests for information (mainly from the Internet) have increased, caregivers are lagging behind patients in using the web as a resource. Donald [18] however found that nurses who had received training in evidence based medicine skills used these skills to support patients' information needs.

A study by Jones et al [19] using a four-stage multicentre multidisciplinary qualitative approach involving semi-structured interviews with clinicians in three locations, followed by a postal questionnaire and a Delphi study, found that clinicians felt they needed more education and support in several aspects of helping their patients. This included understanding the patient's information needs; helping patients to understand about health care and health care information and knowing about information sources and their use.

In addition various studies have found that nurses do not engage with IT and are often resistant to its introduction [20]. This resistance has been found to take many forms, including low use of:

- information from research to support clinical decision making [18]
- research databases [21]
- Internet based information sources [22, 23]
- clinical information systems [24]

Heather Tierney-Moore [25] 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,'*

Nursing informatics in pre-registration curricula: The current position

The NHS Executive [26] considered nursing informatics inclusion in pre-registration programmes in the late 1990's to be opportunistic, and heavily dependant on the hospital where the clinical experience was gained. They were however optimistic about the future, considering that 'significant progress' had been made in building information management and IT into the curricula for healthcare professionals (including nurses). They stated that that some elements of health informatics, IT training and knowledge management were included in most programmes.

Some three years later [27] variability was still considered to exist in the amount and nature of the informatics elements included in education programmes. One particular issue identified was that even though many education programmes included elements of the skills and knowledge identified as necessary very few included any assessment of these.

A review of the progress made in including informatics skills in pre-registration nurse education was carried out by Murphy et al [28] They surveyed UK medical schools and schools of nursing, midwifery and health visiting and reviewed to what extent they drew on Learning to Manage Health Information [26] in developing their curricula. A response rate of 43% produced 128 responses, of these 53% (n=46) were from schools of nursing. The survey found that understanding of Health Informatics was generally poor, with many respondents equating health informatics with IT skills. Learning to Manage Health Information had not been used at all in developing curricula in 38% of pre-registration nursing programmes. Murphy et al (op sit) found that there was great variability in the amount of health informatics included in pre-

registration nursing programmes, with the median amount being 12 hours of teaching.

The question of who in nurse education is providing, or is available to provide, the expert input required to develop and support informatics education is also an ongoing issue that needs to be addressed. In 1998 Hasman [29] identified that there was a serious shortage of professionals well trained in health informatics to contribute to education programmes. In 2000 Brittain and Norris [30] found that there was a lack of expertise amongst university staff. Four years later Murphy et al [31] reported that the situation had not improved, with only 11% of schools of nursing having a health informatics specialist in the teaching team. The authors pondered if the fact that IT and health informatics standards are voluntary led to a lack of 'buy in' to ensuring that health informatics was integrated into the curriculum from senior mangers and educational groups.

Two research projects reviewing the implementation of the standards set out in Learning to Manage Health Information were carried out on behalf of the NHSIA [32]. These concluded that health informatics standards needed to be more fully integrated into both pre and post registration training. One project concluded that there was little integrated development happening between higher education and the NHS, with both having a negative view of the clinical relevance of health informatics and technology within pre-registration programmes.

A survey of a small sample of six schools of nursing was undertaken by Bond [33] who searched programme information for topics related to health informatics. Informatics and Data protection, and the synonymous terms information governance; information security; Information management;

knowledge management; information skills; and IM&T did not yield any results. ICT was searched for using the terms IT; ICT, 'Information Technology' and 'Computer skills'. Four programmes were found to include basic IT skills. Three were vague about what skills or how they would be developed, one was specific in identifying European Computer Driving Licence (ECDL) standards, which have been adopted as the reference standard by the NHS[2].

Another element of this research[33] reviewed student nurses' use of Information and Technology on placement. Questionnaires were distributed to 129 final year students, and three focus groups were held with 15 qualified nurses in placement locations. Only 33% of the students felt that they had the skills and knowledge that they needed to use computers on placement. When asked what made them answer in the way they had most focused on the computer skills that they had rather than any knowledge base. This was reflected in the group discussions with qualified staff who felt there was a lack of knowledge especially around information security and governance.

Nursing informatics in pre-registration curricula: Meeting the new agenda

In order to ensure that new nurses are prepared for the information and technology rich workplace of the future pre-registration programmes need to improve their handling of nursing informatics. Dreyfus & Dreyfus[34] propose a five step model of skills and knowledge development, moving from novice to expert. To ensure that information governance standards are maintained they should be inherent in every task, rather than being something additional to an informatics skill and knowledge set. Drawing on Dreyfus and Dreyfus's model (op cit), nurses need to develop into experts in using technology in order to be able to use it safely and efficiently, a development from the current position where the focus has tended be to on the skills element rather than the knowledge element.

Drawing on the literature discussed and research carried out[33] a prescription for curing the deficits and clearly articulating the informatics needs of the newly qualified nurse is proposed. This places the areas that need to be included in pre-registration education into broad groups that both articulate the expertise that nurses need to develop, and indicates why they are needed, rather than providing a context free check lists of skills.

Prescription for Nursing Informatics

All nurses need the expertise to:

1. ***Understand the fundamental computer basics essential for effective use of information and technology, including:***

   At a user level know how a computer and associated equipment works and undertake simple problem solving

   Understanding the function and use of various types of software and be able to select an appropriate software application for a given purpose

   Using electronic systems to aid communication, for example Internet services and patient records systems

   Identifying the need for help and knowing how and where to obtain it

   Keeping up to date with software and hardware developments, having the ability to transfer skills and knowledge to new equipment and systems

2. ***Identify and meet information needs to support both own professional practice and patients' information needs, including:***

   i. Knowledge of computer based information systems available to meet those needs

   ii. Understanding the structure of data, information and health record systems.

   iii. The ability to locate and recall appropriate information

iv. Evaluating the information, with reference to the purpose for which it was obtained
v. Manipulating, organising, sharing and presenting the information as necessary and in appropriate formats
vi. Keeping up to date with developments in appropriate information systems and transfer skills and knowledge
vii. Mentoring and supporting student nurses in developing safe and effective use of technology

3. Work within an Information Governance framework to ensure safe, legal and ethical use of information and technology, including:

i. Understanding security, ethical and legal issues of computer use in healthcare settings

Having the expertise to ensure that the principles are applied in practice

Appreciating the abilities and limitations of technology and ensuring that systems are used to the benefit of patients

All nurses need an appreciation of, and nurses moving into more senior roles such as nurse managers or clinical specialists need expertise in

4. Information for Quality, including:

i. Using computer systems to provide information about the quality of services / care given.

Working with IT specialists as necessary, developing the capability of current systems, or developing new systems, to meet identified need or respond to changes in technology and working practices, and understanding the change management issues in introducing new or altered systems into the workplace

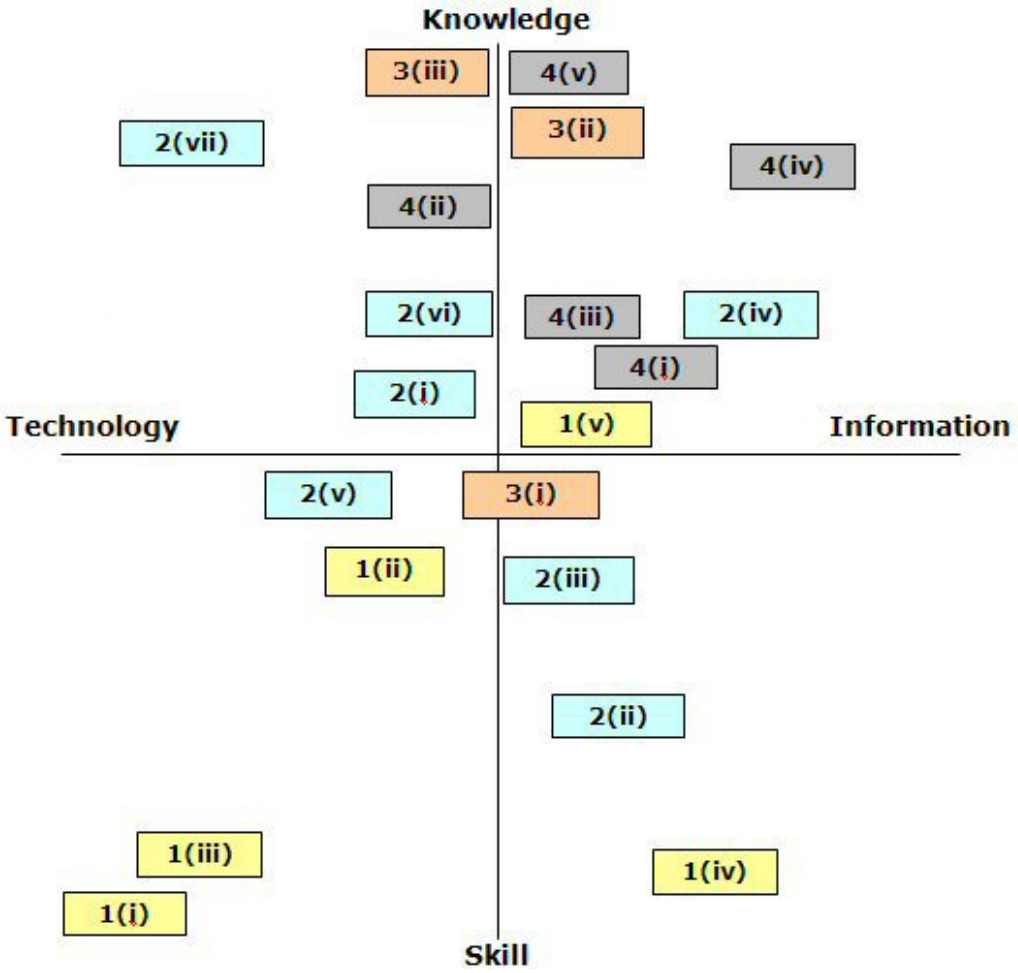
Manipulating data and presenting it to an audience in an appropriate format

Using the Internet to provide patients with information about their service or specialism,

Mentoring and supporting junior nurses and other colleagues in their safe and effective use of technology

It was considered that there needed to be some of verification of the competencies identified to see if they could be mapped against a model which would add a potential further dimension to understanding the competencies cited above. The competencies were mapped against a binary scatter chart in sector groupings taken from the text. It is accepted that there is a degree of subjectivity to the placing of the items, however to ensure some robustness they were discussed and agreed by four health informatics experts.

The scatter chart has two axes, skill to knowledge continuum following the work of Shanteau (1992) and, technology to information continuum based upon the work of Langtangen and Tveito (2000). The competencies, taken directly from the text and cited above in this article, have been assigned a position on the scatter graph using as objective an approach as possible.



1	Understand the fundamental computer basics essential for effective use of information and technology.	**2**	Identify and meet information needs to support both own professional practice and patients' information needs.
3	Work within an Information Governance framework to ensure safe, legal and ethical use of information and technology.	**4**	Information for Quality

The first category deals with fundamental computer use and thus the grouping quite appropriately moves from High Technology: High Skill (bottom left quadrant) in the direction top right, showing a gradual movement towards higher-level capabilities. The odd one out from a direct linear path is the competency item of knowing when you need help and knowing where to find that help (Item 1(iv)). This competency is shown independent of others in its

group and as a skill on the information side of the continuum, whereas the others tend to be skill on the technology side of the continuum. Such a division would seem appropriate given the higher order of dealing with information and one's own competence as set against mastering a skill using technology.

The second category, that of information needs supported by technology (high information and high skill) starts in the bottom right quadrant and moves to top left, again an expected direction. As adults we all have information skills, we have learnt how to cross roads, how to read and how to write, thus our information skills are quite high. Applying those skills within a new environment, that of technology, requires additional development so as our competence grows so does our knowledge and technological expertise. Again there is a 'wandering' competence 2(iv) which is about evaluation of information against the purpose for which it was obtained shown in the upper right quadrant as it has more to do with information handling than technological skills.

The third quadrant is a high knowledge and high technology area and this is confirmed by the position on the axes. The category is around the legal, ethical and safe use of information and technology and it seems fitting that all three competencies are close to or on the skills to knowledge axes. In order to fulfil these competencies, students will need to be knowledgeable thinkers rather than competent users.

The final group of competencies are those around information quality and given that a high understanding of information and a competence in thinking (knowledge) then it is only to be expected that the elements are shown in the top right hand quadrant. Competence 4(ii) was considered to have more

technical leanings than information leanings and for this reason its sits to the left of the vertical axes.

This model gives us a template for curriculum integration, for now we can clearly delineate between different competencies being included at different times of the curriculum, for example, those competencies in the bottom left quadrant should be included early on and demonstrated by student competence; bottom right and top left competencies need to be included before and after transition to branch and finally the top right quadrant elements should be included within the last six months of the training curriculum.

Conclusion

With policy pressure from Government and patient demands, ICT must become an increasingly important tool for the nurse. Nurses need to develop informatics expertise through their pre-registration education in order that as qualified nurses they will be able to maximise their use of ICT as a tool to achieve a task rather the focus being on the technology, and its use becoming the task.

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