Health Informatics Education – What's holding up progress?

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Abstract

In the UK the government is committed to major expenditure on IT infrastructure and systems (electronic records, booking and prescribing) between now and 2008. It is acknowledged that with a projected expenditure of £11.6 billion, the NHS is embarking on a very high-risk project. These pending developments pose big challenges for those involved in Health Informatics education. One concern is whether NHS staff and those currently in training will be ready, willing and able to use new ICT systems in ways which benefit patients. This paper reports on the outcomes of a national survey and three case studies of acute hospitals investigating Health Informatics education, training and development provision for clinicians and health service managers. This work was funded by the Department of Health and the final report was submitted in July 2002. Our evidence suggests that we are some way from integrating Health Informatics into the curriculum. The paper identifies the factors which are holding back progress and outlines steps which need to be taken to ensure education and training keep pace with the planned roll-out of technology into both the acute sector and primary care trusts.

Keywords:

Curriculum Issues; Health Informatics Education; People and Organisational Issues; Evaluation Issues

Introduction

Plans to modernise the delivery of healthcare are deemed to be dependent on sophisticated technology-based systems. [1] In the UK the government is committed to a complex IT project (electronic records, booking and prescribing) which will require an additional £5 billion of IT investment between 2003 and 2009. [2] It is estimated that total NHS IT expenditure over the six years from 2003 will be about £11.6 billion. [3] If this investment is to deliver benefits to patients, staff need to be prepared and motivated to use these emerging systems. To achieve the requisite skills and culture change, the relevant principles, concepts and methods of Health Informatics (HI) need to be integrated into the curriculum of all clinicians and healthcare managers. [4] In the UK, a variety of educational "gold standards" have been proposed, the main example being the those `Expectations for Learning' outlined in a document called *Learning to Manage Health Information (LMHI)* (1999*).* [4]

Learning to Manage Health Information identifies eight areas of HI (plus IT skills) and provides expectations for learning for each area.

Table 1 – The Nine Areas of Health Informatics in LMHI

1. Communication
2. Knowledge Management
3. Data Quality and Management
4. Confidentiality and Security
5. Secondary Uses of Clinical Data and Information
6. Clerical and Service Audit
7. Working Clinical Systems
8. Telemedicine and Telecare
9. Basic Computing Skills

Nearly all the professional bodies have signed up to the proposals in this document. In 2002 the standards outlined were reviewed and the view of the NHS Information Authority was that they were still relevant to the NHS. [5] It was recognised, however, that "integration and implementation of these standards fully into pre and post registration training needs more work." (p5)

This paper will provide evidence from a national survey that progress towards the goal of ensuring all healthcare staff have the necessary knowledge, skills and attitudes to use and share patient information has been slower than anticipated. The paper draws on a study funded by the UK Department of Health. (DoH ICT/136). [6] The main focus of the paper will be an analysis of the reasons why Health Informatics education and training is not keeping up with plans to use information systems to modernise the health service. An understanding of the barriers to progress in integrating Health Informatics into the clinical curricula should suggest what actions are needed to ensure clinicians are adequately prepared to use information in support of patient care.

Methods

A national survey of educational providers was carried out between June 2000 and March 2002 to determine the amount of education, training and development (ETD) being

provided in Health Informatics and the degree to which provision conforms to the standards specified in *Learning to Manage Health Information*. This data was supplemented by three case studies of acute hospital trusts which sought to gain insight into the opportunities employers provide for staff to develop Health Informatics competencies.

Design of the Questionnaire

The national survey covered the teaching of basic IT skills and generic Health Informatics knowledge and competencies. The proforma for the study was derived from the consensus document, *Learning to Manage Health Information*. The questionnaires were designed to be completed by the person(s) responsible for teaching of IT and Health Informatics. The basic form was adapted to meet the needs of three different educational sectors (pre-registration, post-registration and postgraduate programmes) and the three different target groups (doctors, nurses, NHS manager). Copies of the forms are available on-line on the project website (under forms) http://www.rhied.org.uk/

Part 1 of the Questionnaire - IT Skills

In the IT skills section, respondents were asked to indicate which topics (from a list of nineteen) were covered in their programme. Some of the items on the *Learning to Manage Health Information* checklist were excluded on the grounds that they belonged to the HI part of the questionnaire. Respondents were also asked to provide information about how IT skills were taught, how many hours of teaching were provided, who provided the teaching and whether the skills were assessed. Finally, there were questions relating to barriers, attitudes, the European Computer Driving License (ECDL)[6] and the skills of incoming students.

Part 2 of the Questionnaire - Health Informatics

In designing the questionnaire it was decided to rename some of the original *Learning to Manage Health Information* areas and to collapse two of the areas in order to make them more meaningful. In the RHIED questionnaire, the informatics topics were designated as:

1. Confidentiality and Security
2. Knowledge Management
3. Information Management (this includes Data Quality and Management and Secondary Uses of Clinical Data and Information)
4. Communication and Team-Working
5. Audit
6. Clinical Systems
7. Telemedicine and Telecare

For each of these areas, respondents were first given a brief definition and then asked whether it was included in their curriculum. Those who said it was included were asked to provide further information on what was covered (using a series of checklists, again derived mainly from the Expectations for Learning set out in *Learning to Manage Health Information*). In addition to asking about which HI topics were covered, respondents were asked about the number of hours of teaching, methods of teaching, who did the teaching, whether learning was formally assessed, and whether *Learning to Manage Health Information* had been used to develop the curriculum. There were also open-ended question which asked the respondent for additional comments about the way they taught Heath Informatics.

Table 2 – Sample Sizes and Response Rate

Educational Sector	Total Sample population	Final Sample Size	No of Responses	%
1) Pre-registration Nursing, Midwifery and Health Visiting	76	76	48*/46**	63%
2) Undergraduate Medical Schools	23	23***	18/11	78%
3) Postgraduate Clinicians and Basic Medical Scientists	353	88	38	43%
4) Postgraduate Nursing, Midwifery and Health Visiting	134	36	5	14%
5) Post-Registration - Nursing, Midwifery and Health Visiting	355	55	12	22%
6) Postgraduate Healthcare Management	107	21	7	33%
Total Number of Courses - all Samples	1048	299	128	43%

*   Number completed section 1 (IT Skills) of the questionnaire   ***   St Andrews not included
**   Number completed section 2 (Health Informatics) of the questionnaire

Sampling Methods

Forms were distributed to all UK medical and nursing schools and to a sample of post-registration nursing courses and a sample of graduate courses of doctors, nurses and health service managers. In all, 299 courses or programmes were included in the sampling frame. The overall response rate was 43%, yielding 128 forms to analyse. Table 2 gives figures for each sector and the response rates.

Sampling Frames

Compiling lists of educational providers and courses for the six sectors proved to be quite challenging and extremely time consuming. We had assumed that it would be relatively straightforward to obtain up-to-date lists of schools and courses. In actual fact, undergraduate medical education turned out to be the only sector for which a definitive list of providers was readily available. In developing a comprehensive sampling frame, we explored many information sources: literature searches, the Internet, government agencies, professional bodies, health science librarians, as well as discussion groups on the Internet.

Analysis of the Questionnaires

Returned questionnaires were entered into a statistical package (SPSS) for analysis, either by hand (from postal and email returns), or electronically (from on-line questionnaires). Most of the questions were close ended. Two researchers independently coded the open-ended question. These were discussed and a common coding frame agreed. Each of the six educational sectors was analysed separately

Case Studies of Three Acute Trusts

To gain insight into the type of continuing professional development (CPD) available to staff after they have completed their training, we carried out interviews in three acute NHS trusts. The sites were chosen for the case studies on the criteria of ease of access and resources available to the project team. Triangulated methods for conducting the case studies were used including: observation, interviews, questionnaires and document research.

Interviews were carried out with Senior Managers (e.g. Head of Human Resources, Head of IM&T), Senior Clinical Managers (e.g. Director of Nursing, Medical Director), Middle Manager (e.g. ward sisters) and with Junior Staff. The areas for questions used in the interviews were created by what is sometimes referred to as "snowball methodology": information obtained from each interview contributed to the design of subsequent interviews. In all, 12 proformas were developed.

Results

The research hypothesis was that in the UK HI has not yet been incorporated either into formal education programmes or continuing professional development. The results of the investigation lead us to conclude that the hypothesis has been upheld (although there are big variations across schools and between sectors). Our conclusion is that few newly qualified clinicians have been exposed to all of the eight areas of learning specified in Learning to Manage.

IT Skills

Nearly all pre-qualification courses (nursing and medicine) make some provision for teaching IT skills. But there are enormous differences in the amount of time set aside for these skills and in the number of application areas covered. The majority of schools do *not* formally assess their students' IT skills (either at the start of the programme or at the end). At the post-qualification / postgraduate level, the prevailing view was that if the student lacks IT skills, it is their responsibility to find a remedy.

"Healthcare workers need core skills as part of their work long before they come on postgraduate degrees and it is reasonable to expect students to already have basic level or to do a bridging programme before they come on a degree course."
        postgraduate sector, healthcare management

A considerable proportion of respondents in all sectors felt that students do *not* receive enough IT training.   This was especially true in schools of nursing (both pre and post-registration).   Table 3 gives the proportions of respondents who felt that insufficient training was provided:

Table 3 - Respondents Reporting Insufficient Amount of IT Training in their programme

  - ➢ 25% postgraduate medical respondents
  - ➢ 33% medical school respondents
  - ➢ 44% pre-registration nursing school respondents
  - ➢ 60% postgraduate nursing respondents
  - ➢ 89% post-registration nursing respondents

There was widespread endorsement for a national curriculum in IT as indicated in Table 4. But this endorsement for a core curriculum was contradicted by the fact that fact that many educational providers had not heard of the ECDL and of those who had, few were planning to adopt it as their standard. [This situation is changing as a result of the amount of publicity given to the ECDL over the last year.]

Table 4 – Proportion of Respondents in Favour of National IT Curriculum

- ➤ 92% post-registration nursing school respondents
- ➤ 78% medical school respondents
- ➤ 73% pre-registration nursing school respondents
- ➤ 69% postgraduate medical respondents
- ➤ 50% postgraduate nursing respondents
- ➤ 0% of postgraduate managers respondents

Health Informatics Provision

The areas identified in *Learning to Manage Health Information* are meant to be essential for all healthcare professionals. However, the results of the RHIED study show that individual educational providers have a different view. Only a minority of providers within each sector (apart from the medical schools) cover all seven areas.

Table 5 - Proportion of Schools Covering all Seven HI Areas

postgraduate clinicians	5%
post-registration nursing	10%
healthcare managers	15%
postgraduate nursing	20%
pre-registration nursing	35%
medical schools	55%

At the pre-qualification level most programmes cover some of the areas of Health Informatics specified in LMHI. However, only a small proportion of educational providers attempt to teach all the areas and many of the topics appear to be taught in a very superficial manner.

Extent of Coverage of HI Areas

A comparison of medical schools, pre-registration schools and post-registration nursing programmes found marked differences in terms of how much coverage is given to the different HI areas.

For example, in the medical school sector, there is extensive coverage of both Knowledge Management and Information Management. The nursing sectors devoted far less time to these areas. At the same time, nursing schools appear to teach more about Communication and Teamwork than do medical schools. On the whole there appears to be greater consensus in medical schools as to what Health Informatics areas are most important, and schools are more selective as to what they teach.

In pre-registration nursing schools, although Information Management and Communication and Teamwork stand out as two areas that receive the most extensive coverage, there is a less disparity across the areas. Most schools teach about half the topics for each of the other areas.

In post-registration nursing, the average amount of coverage is low for all areas apart from Knowledge Management.

The amount of coverage for both Clinical Systems and Telemedicine and Telecare was low for all sectors. Not only do few schools include these areas in their curriculum; those who do teach them cover fewer topics. Within the area of Clinical Systems the pre-registration nursing schools in our study cover only 41% of the material (i.e. the six topics) and the medical schools cover just 26% of the topics.

Overall, 19% of educational providers did not cover *any* of the Health Informatics areas. The estimated number of hours teaching devoted to Health Informatics teaching in the pre-registration curriculum was 10 for pre-registration nursing (in a three year course) and 10 for medical schools (in a five year course). In the nursing sector, less than half the schools had any plans to expand their current HI teaching and those who said they had plans were very vague about what they wanted to achieve. In about half the medical and nursing schools there was no assessment of the outcomes of Health Informatics teaching. From replies to the questionnaires and our telephone discussions, we gained the impression that a considerable number of educational providers have little grasp of what Health Informatics entails and tend to equate Health Informatics with the teaching of IT skills. Despite efforts by the NHS Information Authority to promulgate the standards outlined in *Learning to Manage Health Information*, many schools totally ignored the document when designing their curricula (38% of pre-registration nursing schools and 27% of medical schools).

Continuing Professional Development in the Trusts

The findings from the three case studies of acute trusts suggest that some trusts do not have the expertise, or the infrastructure to deliver Continuing Professional Development in HI. Our impression was that two of the three trusts were starting from a very low baseline in that they lacked the infrastructure to support and monitor education, training and development and they lacked a generic Education, Training and Development (ETD) strategy. In addition, there was a lack of clarity as to who owned the ETD agenda for IT and HI. Human Resources departments did not feel it was their responsibility but the IM&T department also disclaimed responsibility. The trusts were not working in partnership with their local universities and their whole approach was very reactive. What training was provided by two trusts mainly related to basic IT skills. There was very little HI training provided and take-up of provision was not being monitored. In addition, there was no training needs analysis relating to IT and HI. In general, methods of publicising available training were not co-ordinated and junior staff was largely unaware of what was being offered. The trust that appeared to have a clearer vision of the

importance of HI and a better-structured programme, differed from the other two in that there was one person with a clear remit for ETD in IT and HI. As well, this trust had made greater progress in implementing their Electronic Patient Record.

Discussion

Why is Progress so Slow?

Having established some baseline data about the extent to which HI is being integrated into the curriculum, our concern was to try to tease out and understand the factors which are impeding progress in Health Informatics Education, Training and Development. From our survey (both explicit questions and replies to open-ended questions) and our interviews in the trusts, we derived the following barriers to progress:

- Lack of understanding of Health Informatics among health science educators (the majority of whom equate informatics with IT skills training);
- Lack of champions within clinical schools; an absence of trained qualified staff to promote Health Informatics and to teach it;
- Crowded curricula which makes it difficult to find time to innovate or experiment;
- A focus on IT skills (the "easy win") to the neglect of HI; the prevailing attitude in many sectors is that IT skills need to be addressed before able to deal with HI;
- Too many competing directives, checklists and gold standards, which leads to a "let's wait and see what happens" attitude; at the same time some of the directives about what schools and employers should be doing are een as vague; standards are purely voluntary, and are not backed up by incentives or penalties;
- Lack of "buy-in" from senior managers, school administrators, educational groups to the importance of integrating Health Informatics into the curriculum;
- Insufficient liaison and co-ordination between educational providers and employers;
- Confusion and uncertainty as to who is ultimately responsible for overseeing Health Informatics education and lack of an overview as how the different sectors and stages fit together;
- Students on placement denied access to clinical systems;
- Lack of guidance and support from HI research and development groups (centres of excellence).

Typical Quotes

"Very few Nursing Tutors have the specialist knowledge to cover HI in depth."

"Insufficient teacher expertise in the school to support HI."

Recommendations

1) Introduce a national HI curriculum;
2) Launch a national `Teach the Teachers' campaign to ensure clinical tutors understand what is meant by HI and its relevance to general training;
3) Encourage collaboration between HI centres of excellence providing specialist courses and university departments providing education for clinicians and health service managers;
4) Establish a National HI Educator's Forum;
5) Sponsor a series of `teach-ins' for those who commission ETD;
6) Ensure that HI is part of training courses aimed at clinical tutors.

Acknowledgements

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[8] ECDL (European Computer Driving Licence) http://www.ecdl.co.uk/

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