The CHIME Graduate Programme in Health Informatics

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Abstract

In 1999 University College London inaugurated a programme of graduate part-time Health Informatics courses to support the UK National Health Service's Information for Health strategy. The programme has attracted students from across the UK and abroad, with a diverse range of backgrounds and skills and has proved a challenging and rewarding experience for students and tutors alike. The modular programme aims to provide a thorough grounding in the theory and practice of Health Informatics and addresses important application areas. The guiding principle is that Health Informatics graduates need to understand computers and programming but that, since the majority are not going to become programmers, programming methods should not dominate the curriculum.

In the taught phase of the programme students attend college for 3 days a month and complete an assignment each month, based on home study. Students may graduate with a certificate or diploma, or go on to tackle a dissertation leading to an MSc. Research projects have included a patient record system based on speech input, a mathematical model for illustrating to patients the risks associated with smoking, an analysis of Trust staff's preparedness for Information for Health and a patient information leaflet giving advice about drug related information on the Web. As we move towards our fifth intake of students, we are in the process of evaluating our programme and carrying out a follow up study of our graduates' subsequent career pathways.

Keywords:

Curriculum Issues; Health Informatics Education

Background to the Programme: Health Informatics in the UK

The UK government is committed to the modernisation of the National Health Service (NHS). Organisational change is seen as central to meeting rising expectations of access to increasingly expensive treatments within a cash-limited budget. An essential component of this modernisation initiative is the national strategy for using information and communications technology in direct support of patient care [1, 2, 3].

The national education and training strategy [4] to support *Information for Health* aims to:

- create a prevailing organisational culture that values and encourages the development and application of health information skills
- ensure that all staff are able to use and manage information and information technology appropriately
- achieve the right mix of specialist skills within appropriate career development frameworks

One of the preconditions for the success of such an initiative is the existence of a cohort of individuals with an advanced understanding of the scope and potential of the field. The CHIME graduate programme was inaugurated in 1999 with the aim of enhancing the skills of the workforce (clinicians, managers and IM&T professionals).

Course Design and Rationale

The starting point for our graduate programme was the need to provide an educational experience for clinicians, managers and IM&T staff which did not require participants to take extended leave from their service roles. Hence, students attend a maximum of three days teaching each month, over a period of at least two years. As a result, nearly all our students combine studying with full-time employment in the NHS. A second feature of the programme is the provision of staged accreditation of achievement – a postgraduate certificate, a diploma and a degree (MSc in Health Informatics). At the point of registration students must select their target qualification but they are free to alter their decision. One consequence of the way in which the programme is designed and delivered is that it allows our research staff to teach without compromising the progress of their own research. Nearly all the modules we offer are taught by individuals who are actively engaged in Health Informatics research.

Structure of the Programme

The programme is modular and consists of four core modules and an extensive range of optional modules which reflect the research interests of the faculty. See Table 1 for details.
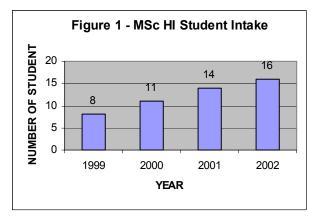
Table 1 – The Curriculum: Core and Optional Modules

The Compulsory (Core) Modules	Description
Principles of computing[1]	The essential technical vocabulary of computing and the workings of the software industry
Principles of health informatics	How the delivery of healthcare is changing in response to the use of new technology
Research methods in health informatics	Design of surveys, experiments and data analysis using qualitative and quantitative methods,
Systems in practice	A series of seminars given by visiting speakers from leading health informatics projects in the UK
The Optional Modules	**Students normally take eight option modules**
Bioinformatics	Information management in applied genomics
Communication, telemedicine and the internet	The impact of telecommunications on healthcare
Consumer health informatics	Facets of providing information for consumers
Creating educational resources	Developing and evaluating electronic material
Decision support systems	What makes a clinical decision aid succeed?
Electronic healthcare records (I and II)	Role and design of electronic healthcare records
Health knowledge management	Knowledge needs and methods for meeting them
Human and computer interaction	The design and evaluation of user interfaces
Imaging and imaging devices	Acquiring and presenting data about the body
Leading and managing change	An introduction to organisational development
Programming	An introduction to Perl and other languages

[1]Students with previous technical experience of computing may ask to be exempted from the Principles of computing module, though few have exercised this right, preferring to consolidate their knowledge and skills.

Recruitment

To date 49 students have entered the programme.

Figure 1 - MSc HI Student Intake

The ratio of males to females is 4:3. Students range in age from 24 to 61, with an average age of 37. In addition to staff working in Information Management and Technology (IM&T) departments, students have included doctors, nurses, pharmacists, senior managers and laboratory staff (see Table 2 for breakdown).

Table 2 – Background of CHIME HI Students

43% Clinicians (doctors, nurses)
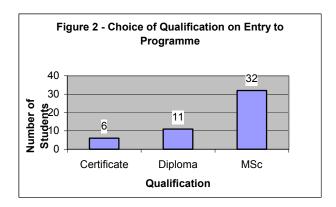33% IM&T Staff
10% Pharmacists
14% Others

Most of our students are UK based (84%). The rest have come from a wide variety of countries, including the USA, Australia, South Africa, Holland and Portugal. Nearly all students work full time in the NHS.

Methods of Recruiting Students

As well as placing advertisements in various newspapers and journals, for the last two years we have organised an Open Evening for those who are considering applying for the course. This has been done in conjunction with our partners, the London IM&T Unit and the London Information Systems Steering Group. The first year about 25 potential students attended; this year we attracted nearly 40 would-be students to the event.

Student Choice of Qualification at the Start of the Programme

Students are required to indicate which award they intend to pursue at the point when they enter the programme (viz. Diploma, Certificate or MSc). They may, however, alter their decision after they have begun their studies. Figure 2 below shows that most students' preferred qualification is the MSc.

Figure 2 - Choice of Qualification on Entry to Programme

Partners, Sponsors and Collaborators

The CHIME programme has received backing and funding from a variety of sources – (1) The Engineering and Physical Sciences Research Council (EPSRC); (2) The London Information Systems Steering Group (LISSG), together with the London IM&T Unit. We have also been fortunate in that staff from other University College London departments have been willing to contribute to the programme by designing and teaching modules. One of our core modules (Systems in Practice) is taught entirely by people from industry, NHS bodies and service departments in hospitals and primary care trusts. We are presently looking to find ways to develop collaboration with other universities in the UK.

Outcomes

To date, twelve students have completed the programme, six of whom did dissertations and were awarded an MSc degree. Overall, 63% of those eligible to complete have done so in the minimum time (2 years). Most of the others from the first two intakes have completed their taught courses and are in the process of working on a dissertation. (University regulations require students to submit their dissertation within five years of starting the programme.)

Table 2 below demonstrates that, apart from two modules (AI in Medicine and Imaging), all of the original optional modules have proved popular and have attracted sufficient students to be scheduled each year. Although it is too early

to know whether all three new modules will recruit a minimum of five students per year, what is clear is that students have been keen to sign up for the module on Leading and Managing Change. Our NHS partners (who fund about 60% of our new intake, have made this module compulsory for their students.)

Table 2 - Pattern of Option Choices – Number of Students Selecting Each Option

Name of Option	Cohorts			Totals
	1999	2000	2001[5]	
AI In Medicine[1]	2	5	0	7
Bioinformatics[2]	0	0	0 [1]	--
Consumer Health Informatics	7	7	8	22
Creating Educational Resources	6	10	10	26
Decision Support Systems	4	10	9	23
Electronic Healthcare Records 1	8	10	10	28
Electronic Healthcare Records 2	8	10	10	28
Human Computer Interaction	6	9	0 [1]	15
Imaging & Imaging Devices	2	0	3	5
Knowledge Management	7	9	8	24
Leading and Managing Change[3]	0	0	9	9
Programming[4]	0	0	0 [2]	0
Telemedicine	7	9	8	24
Size of the cohort[6]	8	10	11	29

Notes:
[1] Module withdrawn in 2001
[2] Module introduced in 2001
[3] Module introduced in 2001
[4] Module Introduced in 2001
[5] Numbers in brackets selected module but too few to run
[6] This excludes students who deferred or opted for the certificate

Resources and Course Management

Although CHIME is part of the new medical school (which arose from the merger of the Royal Free School of Medicine and University College London Medical School), the centre is based not at the central campus but at the Archway Campus, adjacent to the Whittington Hospital. This campus

has been developed as a partnership which includes UCL, Middlesex University (School of Health and Biological Sciences), and the Whittington Hospital Trust and Postgraduate Education Centre.

Faculty

Twelve academic staff contribute to the programme, eight of whom are based in CHIME. The academic background of staff are quite varied and include medicine, physics, computing/IT, psychology, medical statistics, management, languages and bioinformatics.

Classroom and Student Common Room

New teaching facilities have been created on the Archway Campus for our two MSc programmes. (We also run a parallel modular graduate programme in Risk Management).

Computing Facilities and Library

A new library has been established, with computing facilities and a teaching IT lab. Students also have access to computers in their common room.

Web Support Site for the HI Programme

A programme support web site has been developed to ensure that students have access to all the course materials (timetables, assessment schedules, module handbooks, handouts, PowerPoint presentations, etc) wherever they happen to be. This has been conceived as a learning resource to supplement the taught aspect of the programme, particularly during those periods when students are not on campus. Students have asked us to think about whether we might develop the resource so as to provide them with a means of on-going professional development after they have completed their studies.

Course Management and Quality Assurance

The programme is managed by a programme director, with the support of a full-time course administrator (shared between our two MSc degrees). The departmental teaching committee is responsible for matters relating to quality assurance. Students are encouraged to provide feedback on the programme in a variety of ways: through their student representatives, via the staff-student consultative committee (which, because of our timetabling model, is largely run by email), through their personal tutors, and by completing end of module and end of programme evaluation forms. All UCL programmes are reviewed every five years by the university and ours will be due for review in 2004. Our Visiting Examiner also plays an important role in ensuring the standard of our award. Finally, discussions with our partners have also played a role in shaping the programme. In response to comments made by students and our NHS partners, we have broadened the range of optional modules to include *Bioinformatics Applied to Healthcare*, *Leading and Managing Change* and *Understanding Programming*.

Students' Perspectives

We have recently been awarded a small grant to enable us to carry out some in-depth interviews with students both at the start of the programme and after they have finished their studies. As part of this exercise, we have invited students to tell us their stories (i.e. what motivated them to study Health Informatics, why they chose our course, which modules they felt were relevant to their needs). The quotes below are taken from the responses we have had to date.

- Reasons for Enrolling on a HI Programme

"The main driver for me was increasing awareness of massive IT systems in the Trust where I worked, which had nothing to do with clinical care. I didn't know what they were for. At the time there was not even a pathology or X-ray system for clinicians to use, it was all about NWCS returns. I started to get involved with clinical audit in stroke patients, which was an incredibly cumbersome manual process...and started to think there has to be a better way of automating the handling of clinical information... I was also frankly, bored with my job and deliberately looked for a course which would be challenging, i.e. well outside my comfort-zone." (Female, Doctor)

"I had a background in general management in the NHS and had been appointed Director of Information, because of my interest in the field. I wanted to get a formal academic qualification to give my leadership more credibility. I also believed it would help me in my job." (Male, Manager)

- Reasons for Selecting CHIME Programme

"The drivers to do the course were the fact that: I could (had to) work while doing the MSc and the part-time nature over two years suited this; I felt that London was relatively easy to get to from anywhere in the UK so locum jobs could be anywhere; I wanted more formal structure to a rather home-grown approach to medical informatics. The cost was pretty steep, but it's something I have always wanted to do. I started the MSc in HI in 1999 and last studied formally in 1986. I selected the CHIME course in comparison with many others virtually solely on the basis of information available on the various web sites, because at the time I was 6,000 miles away from the UK in Cape Town." (Male, Doctor)

"I have to admit it was the quality of the web site that initially drew my attention to CHIME. Also its association with the Royal Free and UCL/UCH." (Male, Manager)

- Impact of the Programme on Career Development

"On finishing the MSc, indeed during the last year of the course, there was only one post advertised in the British Medical Journal where clinical and MI skills were required." (Male, Doctor)

"My role in the Trust has changed...expanded.! I have been involved in the EPR procurement process, still ongoing. Within the Trust I have been seconded as the 'information-literate' clinician on to the Information and Documentation Committee, which is involved in trying to reengineer clinical processes and documentation, with a view to EPR. We are just developing a clinical academy and I expect to be involved in the HI aspects of that. Those are some specifics; the real impact is the day to day awareness of information management and trying to champion such issues with junior (and senior!) colleagues." (Female, Doctor)

"I have made a decision to stay within Health Informatics (IM&T) within the NHS and having this MSc under my belt will complement my leadership and general management approach to being Director of Information Services." (Male, Manager)

Problems Along the Way

Many of the problems we have encountered in getting our programme established derive from the fact that we were a new academic department, based on a campus which was "under construction". In the initial phase we lacked the administrative infrastructure to support the day-to-day management of the programme. These hurdles have largely been overcome but like all academic departments we still find ourselves trying to do a great deal with limited resources. There is also the recurrent tension between the demand of teaching and research commitments. We are currently debating how best to support our students during the dissertation phase of the programme. Finally, we meet problems which arise from the flexible nature of modular MSc programme (which permits students to defer taking modules), and the inevitable life crises of adult learners which sometimes necessitate taking time off from their studies. All of these factors make our academic programme complex to administer.

Looking to the Future

In the years since we initiated our programme, major developments have taken place in the NHS which may well have implications for the content and delivery of all UK Health Informatics programmes. A lively debate is taking place regarding professionalism and accreditation, one spin-off of which has been the setting up of UKCHIP (UK Council of Health Informatics Professionals). The newly launched NHS University (NHSU) is another important factor to take into account in trying to plan for the future given its ambitions to shape and lead education, training and development in Health Informatics. With all these development we certainly are living in interesting times.

What exactly all this will mean for the future of academic departments is uncertain. Our view is that Health Informatics needs to face in two directions: We need centres of academic excellence to develop informatics as an academic discipline and carry out basic research and development. At the same time, we, the Health Informatics community, need to provide support to the health service; which means our education and training programmes must be relevant in an applied context. Our view (shared by colleagues running other graduate programmes in the UK) is that there is a benefit in having a variety of specialist, postgraduate courses, with different emphases, catering for a variety of audiences and delivered in a variety of ways. It must be possible to nurture diversity without short changing either the students or their employers. So whilst we endorse proposals to regulate Health Informatics qualifications, our concern is that this is done in such a way as to build on what has already been achieved.

One final issue which faces all educational providers relates to growing expectations about e-learning. We currently use our website to enhance and support our face-to-face teaching. It was a deliberate decision when we were setting up the programme not to offer any modules by distance learning mode until we had established the ethos of the programme. Our students feel very strongly that they would *not* like to do a distance learning, web-based course.

"I'm really glad it wasn't a distance learning course. The London days, meeting and learning from others from very different backgrounds, some extremely knowledgeable in their fields, was one of the most invaluable aspects of the course at CHIME."

However, we intend to look into providing some optional modules on-line. This development would link with our plans to develop new university partnerships by linking up with departments with a strong tradition in Health Informatics. We anticipate that such collaboration will make it feasible to share courses and students.

Acknowledgments

References

[1] Information for Health: An Information Strategy for the Modern NHS 1998–2005 (1998). NHS Information Authority. .
http://www.nhsia.nhs.uk/def/pages/info4health/contents.asp

[2] Building the Information Core: Implementing the NHS Plan (2001). Department of Health.
http://www.doh.gov.uk/ipu/strategy/overview/overview.pdf

[3] Delivering 21st Century IT Support for the NHS (2002). Department of Health.
http://www.doh.gov.uk/ipu/whatnew/deliveringit/nhsitimpplan.pdf

[4] Working Together with Health Information - A Partnership Strategy for Education, Training and Development. Department of Health. (1998)
http://www.doh.gov.uk/ipu/develop/nip/together.htm

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