Evaluation of distance learning delivery of health information management and health informatics programmes: a UK perspective

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Abstract

The aim of the article is to review evaluations of distance learning programmes in health information management, in order to identify the critical success factors for such programmes and discuss future directions. The emphasis is on the UK experience, based partly on reflections on the experience of one programme at University of Wales Aberystwyth (now over 10 years old), and partly on a policy review conducted for the NHS Information Authority and the NHS Information Policy Unit. The methods are, as far as possible, those of a systematic review of existing research, with, additionally, an overview of relevant policy developments for lifelong learning. The topics covered include the aims, objectives and educational philosophies of the programmes. The evidence, combined with the UWA experience, indicates the importance of face-to-face interaction, to complement distance or virtual learning. A student-centred approach to curriculum design and delivery is essential.

Introduction

Many policy and technological developments influence design and planning of distance learning in health information management and health informatics. Recent developments include:

- Educational policies promoting information literacy.
- Greater emphasis on continuing professional development (CPD) for information professionals.
- Developments in delivery of learning such as the 'virtual classroom', virtual learning environment (VLE) software and other web-based learning materials.
- Health policies emphasizing the use of evidence to underpin practice.

A greater emphasis on knowledge management in the health sector has meant that all staff need to acquire skills in managing health information. In turn, this means that the information professionals, who support the clinical and managerial staff, continually need to update their skills and knowledge in health information management.

Previous reviews[1,2] of health informatics education and training discuss the growth of educational and training programmes in health information management and health informatics, noting the

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wide range of topics covered in such programmes, from clinical and biomedical systems, information technology (e.g. databases and data structure), healthcare information (e.g. knowledge management) through to health management and policy.

The spectrum of health information management skills

Traditionally, there has been a divide, in the UK, between the health information professional working in a health library, and the health information professional working in the information management department. This is now changing, as information managers become involved in networking of knowledge databases (such as MEDLINE) and librarians increasingly handle multimedia and bioinformatics data. Although the two types of health information professional have perceived themselves as different, the divide is not as sharp as might be thought, with skills required better viewed as a spectrum[3] allowing professionals, if they wish, to move from one type of information work to another. Development of units such as health informatics services and knowledge management units, will bring together health information professionals who have traditionally worked apart. One of the original aims of the distance learning MScEcon in Health Information Management at the University of Wales Aberystwyth (UWA) was to encourage staff from both ends of the spectrum of health information management to explore the common, and complementary, information management skills each other possessed.

Methods

This section outlines the methods used for the policy review reports,[4–6] for the NHS Information Authority and the NHS Information Policy Unit, and how these have been extended for the present paper. The policy review was concerned principally with health informatics specialists who were not librarians. The aim was to gather and assess evidence which would determine policy for the future planning and delivery of IM&T (Information Management and Technology) training in the NHS. The Project work was undertaken by a Project Team collaboration (from three Higher Education institutions) under the guidance of the Projects Board, and on behalf of the UK Institute for Health Informatics. A Project Adviser provided independent advice, and quality assurance for the review was undertaken by a Peer Review Group.

A Professional Awards scheme for IM&T staff was developed in response to the 1992 Information and Management Technology Strategy for the NHS (in England) which recognized the need for appropriately skilled and qualified IM&T staff. The modular scheme used, what was at the time, a novel portfolio-based assessment, with exit points at Certificate, Diploma and Advanced Diploma level.

For this article, the literature review has been updated and extended to include published (1996–2001) evaluations of networked learning projects for health sciences librarians and similar health information professionals. Unpublished documents such as course reviews for the MScEcon Health Information Management (HIM) at University of Wales Aberystwyth were also scrutinized, and the emphasis in this paper is placed on the experience gained at Aberystwyth, in relation to the evidence in the literature.

Methods for the policy review

The methods included:

- examination of documentation for the Professional Awards;
- examination of policy documents concerned with health informatics/IM&T in health education and training, workforce planning issues, as well as identification, and evaluation of new developments in educational delivery (e.g. the Virtual Classroom);
- interviews with 40 stakeholders in the Professional Awards;
- collection of prospectuses and course outlines from providers of health informatics and health information management education in the UK;
- consensus development (to help advise on commissioning), using a modified Delphi method.

The limitations were largely those of time, which limited the number of stakeholder interviews which could be undertaken. Commercial and data

protection concerns made collection of unpublished, in-house course evaluations or course documents very difficult.

Literature review of networked learning projects for health librarians and information professionals

A search of LISA-NET (1996–2001) was conducted to identify evaluations of formal and informal CPD programmes in health information management and health informatics which featured use of networked learning support. This was supplemented by MEDLINE, Social Science Citation Index and Science Citation Index searches over the same period to update the previous policy review searches. Citations were followed up, and further contacts made with expert informants. Articles which announced plans for programmes, but had no results or evaluations, were excluded, as were studies which only covered user education programmes in generic information skills. Research done outside the UK was included.

Methods for review of the distance learning MSc Health Information Management

Existing course reports and evaluations for the years 1998/1999, 1999/2000, 2000/2001 were compared to identify views and attitudes towards:

- curriculum requirements;
- delivery methods.

Results

Evaluation studies for degree programmes (Table 1) are separated from evaluation studies of less formal, but possibly credit-bearing networked learning CPD programmes (Table 2) in health information management. The summary tables outline the main aims and objectives of the programmes and projects, the type of evaluation done, and the main findings.

The evidence is extremely limited, and it is disappointing that so little published evidence is available beyond the initial pilot evaluations of many of these programmes. It seems that developers of new programmes are likely to repeat mistakes made by previous programmes, if long-term evaluations are not published. Of course, successful programmes have little incentive to share the secrets of their success, in a competitive student market.

Nevertheless, it is clear that there are some factors which seem to affect the success of distance and networked learning programmes. The demands of the workplace and the academic institution sometimes differ[7,8] and negotiation between higher education institutions and the workplace or professional bodies is required. Despite the apparent benefits of using new technology, the technology used should be appropriate to the needs of the learner.[8,10,15] Students often prefer the convenience of a printed pack, and network reliability or poor technical support can be a deterrent to learning. The amount of academic and general pastoral support required should not be underestimated.[8,9,12,15] Peer-peer support also seems important[8,11,14] and this may need to be structured in a virtual classroom environment, with a facilitator acting as a virtual mentor.[12,13] Face-to-face interaction is a valued part of the learning experience.[8,11] Participants in networked learning programmes are interested in their practice needs rather than the technology itself.[10,11,16]

Distance learning and networked learning: the UWA perspective

The Department of Information (and Library) Studies in the University of Wales Aberystwyth has operated distance learning programmes since 1985, and the MScEcon Health Information Management by distance learning since 1990. The philosophy of the scheme is based on the Open University (UK) model, with learning materials provided (workbook plus resource packs), residential study schools, complemented by tutor support and peer-peer support (often through computer conferencing).

As the 1996 survey[8] found that students viewed more flexibility on course progression acceptable, the MScEcon Health Information Management then adopted the model used by other distance learning schemes within the Department whereby students, within some constraints on the maximum length of time set to complete a part-time degree by the University, complete the programme at

Table 1 Evaluation studies of degree level programmes in health information management and health informatics.

Title	Scope of aims, content	Methods of implementation/trends/forecasts/evaluation
First experiences in undergraduate healthcare-information management education (1996), on BSc HIM (Derby)[7]	Course structure and perceptions, discussion of workplace learning Descriptive account only	Notes some problems in undertaking placements Course structure: modular, some modules undertaken with large number of other students Staff support: notes changes in development team
Professional development in health information management (1997), on MSc in HIM (Aberystwyth)[8]	To examine future options for distance learning course development, assess student perceptions of gains from the course, their current and future training needs and personal career development plans Cross sectional survey of distance learning MScEcon HIM students	Telephone survey of 58 students (mostly current), summer 1996 Students gained a broader overview, gained a relevant qualification (benefits), students often felt isolated within their own organisation, with some (but limited) support from colleagues/managers. 79% received some financial support, self-financing or part-financing viewed as inevitable. Time constraints mean course flexibility valued Cohesive student group valued (78% in favour), with residential school element important. Flexibility of option choices desired, within some structure and 'drivers' for course completion. CAL (computer aided learning) viewed as complementary—happy with print format for course materials—convenient and portable
Studying health informatics from a distance, on Sheffield MSc Health Informatics[9]	Describes philosophy of course planning, support using WebCT Initial pilot evaluation	Early observations only
HIM current course reports, course reviews[10]	Course reports presented to students and members of the course review team prior to course review Comparative analysis identify the main themes	1998/99: Curriculum should include more on research methods, critical appraisal, interpersonal/negotiation and project management skills Delivery: students prefer convenience of ring-bound paper resource packs to Web-based delivery 1999/00: Curriculum: collaboration on content development necessary to reduce preparation costs Delivery: use of computer conferencing for delivery of some content acceptable 2000/01: Curriculum: additions such as Electronic Publishing welcome, foundation statistics/numeracy modules may be required, information appraisal more important, management studies need to be retained Delivery: No comments made

their own pace. Students agree their own learning targets and progress meetings check whether students are meeting these. In some ways, this is just as hard on students as the previous structure, with fixed deadlines for assignments, but a more realistic approach to lifelong learning in encouraging them to realize that ultimately they are responsible for their own learning.

Evaluation of the distance learning programmes in Aberystwyth has been part of the normal course review process[10] with occasional more formal surveys[8] and regular study school evaluations. The experience gained by Aberystwyth confirms the indications of the literature review that the level of support required by distance learning students should not be underestimated. Ideally tutorial

Table 2 Networked learning support for CPD in health information management and health informatics.

Title	Scope of aims, content	Methods of implementation/trends/forecasts/evaluation
Regional learning networks. Learning transfer tool[11]	To support implementation of a government information strategy Published as a toolkit	Qualitative study, around 50 participants. Study found that face-to-face interaction was important in establishing trust for the virtual network
WISDOM project for primary care[12,13]	A virtual classroom in informatics for primary care professionals, with open, adult learning Participants identified personal learning objectives, with personal learning plan, and compiled a portfolio of evidence to ensure these objectives had been met Pilot evaluation	5-month evaluation of the pilot, 1997, qualitative and quantitative evidence. The website, seminar programme, and discussion list were rated as useful in delivering health informatics training. Areas highlighted for further research were the role of the facilitator in the virtual classroom and the process of mentoring in a virtual environment
ADEPT project[14]	ADEPT is a workshop + DL programme on evidence-based medicine for librarians Sample: 40 librarians, 33 evaluations received	Overall, course rated as satisfactory or very satisfactory. Problems with DL components largely those of meeting the needs of a mixed ability group Concludes that more tutorial, peer-peer support is necessary
NLM funded study, Missouri[15]	Topics for CE (credit options available) Content of CE: Consumer health informatics, telemedicine and implications for health librarianship, plus some hands-on searching Initial phase evaluation	Three modes of delivery tested (satellite, Internet, intensive seminar, in various combinations) Over 400 participants viewed the satellite broadcast, rated 5.7–6.7 mostly on MLA evaluation scale, Internet portion not as popular (over 50 participants, rating 4.2–6.7). Seminar less attractive (fees involved, 17 participants, but rating highest at 6.1–7) Use of technology appeared a deterrent to some potential participants Support required (technical, pedagogical, communications) should not be underestimated
John Hopkins University CE programme[16]	Three day general interest session (in four tracks), plus one-day special topic session on the Human Genome Project, plus electronic poster session Training needs analysis results only, no evaluation findings	Offered in three formats (onsite DL classroom, telecourse, online via the Web) Findings for training needs analysis indicate high interest in IT and Web publishing, user education, service development, low interest in specific computer applications or networking, medical informatics, research study design and methods

support might be provided through interactive learning materials (rather than by one-to-one interaction) but development of good interactive learning materials is very expensive.[17]

Given the possibilities offered by virtual or managed learning environments (VLEs/MLEs) there is a need to understand how the social interactions can be supported by computer media. The growth of networked learning[18] means that such facilities can support campus-based learning, as well as learning delivered to students at a distance, and there has been a rapid take-up of VLE/MLE software by many higher education institutions, as well as in-house development of virtual learning environment software. The evidence of effectiveness is mixed, and transferability of evaluations of the effectiveness of computer supported collaborative working may need to take into consideration the type of organization, the exact purpose of the

intended collaboration, and size of the community supported.

A more detailed study[19] of the social network structures in one distance learning class, of 14 students, indicated that there were many types of interaction going on. Social support, work-based support, advice and emotional support were all identified types of interaction. A more informal learning network, within the health sector, was the experimental Regional Learning Network in Trent[11] which found (more by accident than by design) that face-to-face interaction was important in the early stages. What recent evidence[20] on the effectiveness of communities of practice reveals is that much continuing professional development is informal, and that networked collaboration may, increasingly, supplement and complement the face-to-face interaction. Social learning in health information management or health informatics cannot be separated from formal learning.

Much of this shift towards more networked collaboration, as people adjust to the use of e-mail and virtual team working in practice, is reflected in experience gained on the distance learning programmes in University of Wales Aberystwyth. The UWA experience is that study schools are an important element in the programme and that the friendships and collegiate working fostered at the schools form a basis for the virtual support provided by computer conferencing. Increasingly, we may formalize the peer-peer virtual interaction, to ensure that all students use the conferencing successfully as a formal part of learning and assessment. This might not have been acceptable to students five years ago, but it may be acceptable now, as they are accustomed to the use of such media in everyday life.

The materials that have been developed for the distance learning students are now being used for full-time undergraduate and postgraduate students, who are offered some of the optional modules in open learning mode. Full-time students who undertake the modules in open learning mode are supported by occasional tutorials, and the computer conferencing system, that is used by the distance learning students (FirstClass), or the Blackboard Virtual Learning Environment software, which has been purchased by the University. The Department views such converged provision as a way of encouraging full time students in independent learning, and 'learning to learn', collaboratively, for lifelong learning. The Open Learning Unit within the Department continually trials new technologies and methods, and new technologies are adopted if the benefits (educational and administrative) outweigh the costs.

Discussion

It may be a sweeping generalization, but it seems that educational policy making has lacked firm evidence for many of the educational methods used or proposed. This situation is changing, however, and the Department for Education and Employment (DfEE) has established the Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) at the Social Science Research Unit at the Institute of Education, University of London[21] which may aim initially for 'best evidence synthesis'.[22] Other UK government supported initiatives in the area of research into teaching and learning include the ESRC Teaching and Learning Research Programme.[23,24]

The following sections examine the available evidence for certain educational philosophies in vogue in the health sector, i.e.:

- problem-based learning;
- reflective practice and continuing education;
- portfolio learning and CPD;
- learning technologies (web-based learning).

The sections conclude with reflections on the UWA perspective and experience on these issues.

Problem-based learning (PBL)

Firstly, there is a difficulty about definition in this area,[25] but most instances of problem-based learning involve some variation of case-based learning, with students usually working in small groups under the direction of an advisor/tutor, and with access to resources. As a philosophy it is not particularly new—case-based learning appears as a proposed US medical education reform in 1910,[26] but McMaster University in Canada was possibly the first institution to fully implement the idea.

An overview[27] of some problem-based learning research (and reviews of research) indicates that research into the effectiveness of PBL research shares some common problems with other educational research:

- the need to be seen to be doing something to serve society's needs better is as important as what is actually done;
- criteria used to assess outcomes are weak;
- PBL curriculum may only last for a portion of the total education—hence difficult to apportion the effect of one element of the educational process;
- problem solving skills cannot be separated easily from 'knowledge' or case-related experience.

A later review[28] also found no convincing evidence of the effectiveness that PBL improves the knowledge base and clinical performance, and suggested that any improvements would be hard to justify in terms of the increased resource base required for a fully PBL approach. Albanese[29] in response, points out the problems of demonstrating an effect size, and suggests that the effectiveness of problem-based learning is related more to the learning environment, which in a PBL situation seems more pleasant and more enjoyable for students and academic staff. A systematic review of the effectiveness of PBL is planned, using methodology appropriate to the Cochrane/Campbell collaborations.[30]

Problem based learning—the UWA approach

In health informatics education, the WISDOM model[12,13] and the later MSc Health Informatics at Sheffield University[9] use a problem-based approach. The MScEcon Health Information Management at UWA has not specifically adopted a problem-based approach but every effort is made to ensure that assignments are set which encourage students to reflect on their own practice, and use that as the problem case. For example, an assignment, for a systems analysis module, requires students to prepare a presentation on an information strategy for a new or recent development in their organization, discussing the appropriate methodologies which might be used. Students are therefore encouraged to identify what they need to know, and how they are going to develop a solution to the problem. There has been a subtle, but distinct shift in the emphasis in assessment on the need for students to appraise the appropriate research evidence for their assignment work. If there is very little evidence for the topic area selected, students are asked to make that clear in their discussion. They are thus encouraged to work out what they need to know, and how they must find appropriate evidence, and if necessary, make suitable interpolations of the existing evidence.

Reflective practice and continuing education

An assessment framework on learning styles popular in the health sector is the one developed by Honey and Mumford[31] which distinguishes (using the Kolb learning style inventory):

- Activists.
- Reflectors.
- Theorists.
- Pragmatists.

Kolb[32] sets out the stages of experiential learning as a learning cycle, consisting of concrete experience, reflective observation (on experience), abstract conceptualization associated with the reflective observation and active experimentation (theory testing), leading into concrete experience. This is a theoretical framework, and should be treated as such. Work funded by the EU in the Targeted Socio-Economic Research Programme Thematic Network included a comprehensive (though not systematic) literature review[33] which set out the research evidence for and against some common educational assumptions, such as transferability of skills.

Reflective practice and continuing education—the UWA experience

The MScEcon Health Information Management programme, like many continuing education programmes for professionals, aims to improve that elusive quality 'performance', but, taking a holistic view on competencies and skills, the steps to improved performance depend on more than just improved competencies.[34] The UWA experience is that the Kolb cycle provides a useful framework, and that students often need to work

from the concrete to the theoretical, through a stage of reflection on practice. The assignments are intended to motivate students to update their skills, as well as providing opportunities to reflect on their own experience and practice. For example, a core module on information needs analysis includes:

- an assignment which asks for critical appraisal of the literature on the information needs of a specific group of users (reflective observation, plus some abstract conceptualization), followed by;
- an assignment which requires students to conduct a small-scale needs analysis of their own (theory testing and concrete experience).

Ideally, 'active' learning requires formative assessment, so that students can check their own learning progress. The distance learning materials provide exercises followed by feedback. We have developed some interactive learning exercises on CD-ROM for some modules, such as systems analysis, where such exercises are particularly appropriate for concepts which may be very unfamiliar, and difficult, for some students.

Portfolio learning lifelong learning, and continuing professional development (CPD)

Portfolio learning is increasingly used as a means of providing evidence of continuing professional development, as well as encouraging professional learning in the workplace. Documentation of achievements, consideration of problems (or critical incidents), and reflections on practice provide a flexible and thoughtful engagement with professional practice. Such learning is student-centred as students control the process.

Studies of the effectiveness of such portfolio learning tend to be small scale, but the existing evidence suggests that it is effective but time-consuming[35] and not suitable for all learning styles.[36–38] Guidelines[39] stress the importance of a mentor.

Lifelong learning is now a preoccupation of undergraduate education, involving a shift in thinking how to encourage students towards acquiring skills and attitudes which will help them respond to the changing needs of the environment in which they live and work. Lifelong learning is not a new concept, but some of the work by UNESCO[40] provides a useful framework for some of the main ideas. The 1996 UNESCO report summarizes these as learning to be, learning to know, learning to do and learning to live together. To respond to such requirements, universities[41] need to be more explicit in their support and recognition of prior experiential learning, provide flexible award structures, collaborate with other universities and training providers, and employers.

Research[42] on personal development plans (PDPs) noted that self-organized learning is not part of the UK tradition. There is a fine balance to be obtained between encouragement and control, and PDPs, which focus on skill development for the current post do not appear to be popular with employees. Recommendations[43] (expert opinion-based) on teaching and learning strategies to be adopted for Generation X (young adults born between 1961 and 1981) suggest such young adults view their job environments as places to grow, but not to grow old in.

Portfolio learning, lifelong learning, CPD and the UWA experience

The problem seems to be matching the organizational need for information professionals to be up-to-date in knowledge and skills, with a structure for motivation and reward that staff recognize as useful to them. The 1996 survey[8] of distance learners on the MScEcon Health Information Management students found that 86% (50/58) wanted a relevant qualification in health information management. Personal development was ranked more highly than improving their own performance at work, suggesting that we need to meet the needs of Generation X.

The difficulty of portfolio learning for academic staff is the reliability of assessment, as it is difficult, and time-consuming, to make fair comparisons across portfolios which are very different. Our compromise solution is allowance for some flexibility in the approach to the topic, but the marking criteria are standard.

By development of distance learning programmes, the Department has demonstrated support for lifelong learning among health information staff.

There is recognition of experiential learning, and students can enter the MScEcon Health Information Management programme without an undergraduate degree, provided they have sufficient experience. The programme now has Certificate and Diploma exit points and modules may be taken independently. The Department is keen to support forms of continuing professional development for librarians and information professionals, who may not wish to undertake formal continuing professional development. The Department has delivered a series of management workshops in two regions of England for health librarians. These workshops were based around materials in modules for the MScEcon Health Information Management and the MScEcon Management of Library and Information Services, and a Certificate scheme for Management of Health Library and Information Services has been developed to support practitioners who wish to follow up the workshops by formal recognition of knowledge and skills.

Learning technologies and virtual learning

There is little evidence (unsurprisingly) for the effectiveness of learning technologies such as the Web in encouraging or hindering reflective practice (National Virtual Classroom Report; personal communication) though some studies have proposed evaluation measures.[44] There is some debate about the transfer of classroom-based activities to interactive distance learning, with some contending that multimedia requires a fresh approach. The challenge is often the common problem accompanying introduction of any new information system—users need time to become familiar with the system, to improvise, and adapt the system to their own way of doing things. It is possible that technologies can enhance learning: an ESRC-funded research project is examining that possibility in the primary, secondary and FE sector.[45]

Learning technologies, virtual learning and the UWA experience

The approach taken by the Department at UWA has been to use learning technologies where such technology helps the learner in ways that are difficult to support using conventional print-based materials, and where that support can be provided cost-effectively. There is little point in developing expensive multimedia materials if these materials become out-of-date very quickly. The Department endorses the work of the Learning and Teaching Support Network centre for Information and Computing Sciences (LTSN-ICS) in promoting collaboration on knowledge sharing among higher education institutions on learning technology developments. The total number of distance learning students in the Department for all programmes is over 500, and hence the technology used must be reliable and affordable.

Future directions

One of the interesting aspects in preparing this paper was reviewing the 1996 UWA survey, to examine whether views on curriculum content and delivery had changed significantly. One theme, which surfaced first in the 1996 survey, was the importance of formal research methods teaching, and the history of that development encapsulates many of the themes discussed. In the 1996 survey, students were asked to rank curriculum development priorities. The top priority, reflecting the massive interest in the Internet, was Internet applications, and second equal were research methods and case studies on particular system applications. Our response for Internet applications was to integrate use of the Internet into assignment work, as well as develop a module on electronic publishing. More case study material on system applications is also included in module materials now. For research methods, the response concerned not just the teaching of research methods, but also appreciation of the importance of research, practice in appraising research and support of the student in empirical research. Our experience is that student-centred learning requires a holistic approach to design of the curriculum and its delivery. The curriculum content, the method of delivery, the approach to learning and the assessment methods used are intertwined closely.

Earlier discussion focused on several themes such as problem-based learning, lifelong learning,

interactive learning, and the use of learning technologies. Lifelong learning skills in seeking and appraising the research evidence are encouraged from the start of the programme, and the third core module, introduced in 1998, on exploiting research information, formalizes some of the searching and appraisal skills students have already developed.

An active, skills-based approach to learning for research methods is appropriate when learning how to use quantitative and qualitative data analysis software. Availability of support in the form of tutorials which can be downloaded from the Web makes this so much easier than it was in the past, although there is still the need to provide some supplementary tutorial (and help-desk type) support. For the less numerate student, working through SPSS on their own could be a very daunting experience, and that is one of the reasons we aim to develop early 'numeracy and statistics' support modules for all the programmes, so that students (hopefully) view the statistics element as an integral part of their lifelong learning and not just a discrete element to be endured.

There has been an increasing emphasis on research methods, and appreciation of research within the curriculum over the past five years. In January 2002, the UK Economic and Social Research Council gave formal accreditation to the MScEcon Health Information Management as a research training Masters programme. This accreditation means that students, on completion of the MSc are deemed ready to go on to an ESRC-recognized PhD programme. Not all the students will want to do this, but they have that option. All students, whether they exit at Certificate, Diploma or Masters level, will now have an appreciation of the process of evidence-based practice. ESRC accreditation is only given to programmes which are managed well, and provide the necessary support in personal and employment-related skills, as well as the research training.

Conclusions

The critical success factors for the development of distance learning programmes in health information management and health informatics seem to be:

- Recognition, and integration of learning in the workplace into the curriculum and assessment methods. Learning should be relevant to the students.
- Providing opportunities for face-to-face learning with other students, and complementing the face-to-face interaction with computer conferencing. Students need to meet each other and learn from each other, particularly when they often work in isolation in their own organizations.
- Assessing student needs fully before implementing new learning technologies or educational methods. Delivery of learning should match student needs.

Learning support is critical, and this is often undertaken by specialists who have the appropriate qualifications and experience in educational methods and technologies for distance learning. Their role may less visible but it is vital. The recent ESRC recognition for the UWA MScEcon Health Information Management is a tribute to all the staff concerned as development of distance learning programmes is most definitely a team effort.

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INNOVATIONS ONLINE

We regret that due to lack of space there is no Innovations Online series in this issue. The December issue will carry the second part of Peter William's paper "Surfing for Health: user evaluation of a health information website. Part 2 Fieldwork"