

Joint SFEFC/SHEFC E-Learning Group: Final Report

Contents Page

Foreword: a view from the Councils	2
Foreword from the group convener	3
Executive summary	7
Introduction	8
Pedagogical issues – learning and e-learning.....	11
Economics of e-learning.....	15
Markets for e-learning	17
Supply-side issues	21
Role for the funding councils	30
Conclusion	33
Annexes	
A: Membership of the Joint SFEFC/SHEFC E-Learning Group	35
B: Remit of the Joint SFEFC/SHEFC E-Learning Group.....	36
C: Impact of ICT on various learning processes.....	37

Foreword: a view from the Councils

Digital media are having the greatest impact on the presentation and transmission of knowledge since Caxton invented the printing press. Most people agree that this technology will have a similarly profound impact on learning. But few are sure, notwithstanding much experimentation and practice, how the technology will evolve and how it can best be harnessed to support learning.

The value of this report is to remind and reassure us, in the midst of this uncertainty, that learning is what matters: the technology is or should be subordinate.

I am immensely grateful to Alan Tripp and the group for their work which we hope will help further and higher education institutions to reflect on and develop their approaches to e-supported learning. It will also help other stakeholders such as the Councils themselves to decide their role in supporting institutions.

Finally, in such a fast moving scene, I welcome a key recommendation of the report that it should be updated in 18 months time.

Roger McClure, Chief Executive, Scottish Funding Councils for Further and Higher Education

Foreword from the group convener

Introduction

I was very pleased to be asked to convene the joint SFEFC/SHEFC E-Learning Group, because I was convinced of the importance of this issue for the future of the Scottish further and higher education sectors. This view was strongly shared by all the members of the group.

In the course of the group's discussions, we kept returning to the possibility that e-learning may become a mainstream embedded feature of Scottish further and higher education. As the main body of the report indicates, we do not think such transformational change is imminent or inevitable. But we found it very helpful to explore such a model. The group therefore agreed that this foreword should be used to speculate about what such a future might look like. We are acutely aware that such speculation is almost certain to be wrong in many respects; we may have been too radical, but we think it is equally likely that we have not been radical enough.

Flexibility

Technology, or even e-learning, is not really the issue. Fundamentally, we believe students in the future are going to need and demand greater flexibility – in the mode of delivery, in the choices which are available to students, and in the ways in which students interact with each other and with their teachers. For example, we might imagine an education system in which:

- students are able to begin a wide range of courses, at all levels in FE and HE, at any time of the year, and to enrol part-time or full-time for flexible periods of weeks and months, rather than for several years at a time, because curricula are available in flexible modes; learning is available for enrolment 'just in time' and not solely on a certain date in September or October;
- students are able to construct their own learning pathways through flexible combination of modules, building up individual programmes which retain high academic standards and are quality assured; learning is customised 'just for me';
- students are able to gain access to a full range of learning programmes irrespective of where they live; rural communities are no longer disadvantaged compared with urban communities in the range of educational opportunities with which they can engage; and
- students are able to assess their progress in learning by undertaking short, relevant and well-designed assessment at any stage in their learning, and receive rapid feedback on their learning progress and pointers to remedial study to address any shortcomings.

Enhanced functionality

Expansion of e-learning will depend on the exploitation and rollout of new technologies and infrastructure. We can imagine a future in which:

- Scotland's IT infrastructure is well developed and allows broadband connectivity from every home, community centre, public library and workplace, and via mobile communication devices, providing near-universal access to learning opportunities;
- students routinely use desktop and studio video-conferencing using internet protocols to conduct group discussions, tutorials and masterclasses with staff and students in their own and other institutions in Scotland and across the world;
- all provision in Scottish FE and HE institutions is structured within managed learning environments (MLE) which hold student records from enrolment, through their courses, to completion and beyond; students can access the MLE from campuses, homes and workplaces to enrol, pay fees, track their progress, choose options, reserve library books, contact lecturers for advice, visit course-specific chat rooms to discuss issues with staff and fellow students, and undertake assessment; staff can access the MLE to track student progress, send messages to classes, alter timetables, record assessments and print out results certificates; institutional managers can use the MLE to monitor resource utilisation, transfer records to funding and qualifications agencies, and generate a wide range of management information; and
- all learning institutions in Scotland (including private providers) operate agreed data protocols which allow learners to build up and access a lifetime learning log which tracks and records all certified learning, including continuing professional development, and allows this to be mapped against a comprehensive online set of professional competencies for every occupation; students can use this log to identify priority training needs and to find local providers able to meet these needs.

New models of production and delivery

The development of e-learning technologies could lead to changes in the organisation of the delivery of learning, including an enhanced role for third party providers such as consortia of institutions or spin-off providers of specialist services or commercial organisations, in at least some aspects of the delivery process. We can imagine a time when:

- Scottish FE colleges and HE institutions have agreed consortia arrangements for the production and updating of online learning materials; for each subject area, central content creation is concentrated in a small number of 'centres of excellence', providing economies of scale and access to specialist learning technologists

and multimedia production facilities; content is produced in the form of reusable learning objects which can be combined in a multiplicity of ways, allowing each institution to customise materials to meet the needs of its own students and address its own curriculum priorities; all teaching staff are skilled in techniques of selecting and collating content from a wide range of sources and presenting them within a coherent and appropriate curriculum;

- the availability of a wide range of online learning materials, which are well designed in both pedagogic and technical terms, leads to a higher quality learning experience for students, manifested by increased motivation, retention, achievement and student satisfaction;
- many Scottish institutions are part of international or global consortia which share curricula, learning materials and assessments, ensuring that Scottish students have access to world-class learning facilities and that their qualifications are recognised throughout the world; and
- Scottish employers are able to fully capitalise on the potential of their employees because high-quality training opportunities are made available within the workplace through cheap, unobtrusive and flexible technology backed up by professional tutors.

New forms of competition

Scottish FE and HE institutions will face new competitive pressures in the future. These may be triggered by e-learning developments, but their success will depend on whether they offer attractive benefits in flexibility, cost, choice and quality to learners. It is possible that:

- overseas educational providers, both public and private sector, may achieve significant market penetration of the Scottish educational scene if they are perceived by learners to offer more flexible modes of delivery, attractive branding of awards (either academic or corporate), high-quality learning materials, effective academic, pastoral and administrative support for learners, or lower prices for equivalent educational services; there is a risk that many Scottish institutions may find only niche markets as local tutorial and support arms of multi-national providers; international discussions on trade in services (GATS) may further increase these competitive pressures;
- Scottish institutions may, acting individually or in concert, succeed in creating a strong brand based on the high quality of Scottish education backed by first-rate services to learners, and hence create substantial new export markets;
- a few entrepreneurial Scottish institutions may form consortia, in partnership with private sector bodies, to offer corporate training

and continuing professional development to the majority of Scottish employers. Such consortia may achieve significant cost savings through economies of scale in the production of learning materials and the use of a network of part-time tutors and moderators; such developments would focus income generation from private sector training in fewer FE and HE institutions; and

- the market in overseas students in Scotland may dry up because students choose to study online with well-respected global institutions rather than pay fees, travel and living expenses to study in Scotland.

Some of the possibilities above are more likely than others; some will take five years, others 10, while some may never arrive. Nevertheless, we believe they may provide pointers to the issues we need to consider in trying to position Scottish education to respond to the possibilities of e-learning. Whether we like it or not, the future for learning and for Scottish educational institutions will look different from the past.

In this report we examine these issues, make our best judgement of the likely way forward and make recommendations for how the FE and HE sectors in Scotland should respond.

I would like to thank the members of the e-learning group, and the Councils' secretariat, for their help and support in the creation of this report.

Colin Bell – an appreciation

We were all very saddened to hear of the sudden and untimely death of Professor Colin Bell, who was a member of the group throughout its existence. Colin made a major contribution to the work of the group, not only because of the wisdom and experience which he brought to bear, but also for his good humour and his evident concern for the welfare of Scottish students and the future wellbeing of Scottish education. I would like to record the appreciation of all the members of the e-learning group for Colin's investment in the group, and extend our sympathies to his friends and family.

Alan Tripp, Convener of the SFEFC/SHEFC E-Learning Group

Executive summary

- 1 The purpose of our report is to advise the sectors and the Councils about their approaches to the development of e-learning.
- 2 In summary, our conclusions are that:
 - e-learning is fundamentally about learning and not about technology. Strategic development of e-learning should be based on the needs and demands of learners and the quality of their educational experience;
 - the economics of e-learning mean that progress is likely to require collaborative approaches to create sufficiently large cohorts of students;
 - the Councils need to help to create an environment within which institutions can develop their approaches to learning, using ICT based approaches where they add value, by continuing to invest in institutional and national infrastructure, strategic and collaborative developments and ensuring that quality assurance and improvement arrangements support e-learning approaches; and
 - that e-learning has the scope to transform how institutions operate and serve the needs of Scotland, but if this is to happen it will require a fundamental shift in how they organise the development of courses and support for learners.
- 3 We believe that this field has the potential to change very quickly and that the sectors and the Councils will need to return to consider this issue again within the next 18 months.

Introduction

Background

- 4 The Scottish Further Education Funding Council and the Scottish Higher Education Funding Council decided in the summer of 2002 to create a Joint Working Group to advise the Scottish FE and HE sectors and the Councils on the potential implications of e-learning. The membership of the group is listed at **annex A** of this report. We were given an initial remit which developed over the life of the group. In its final form, our remit is attached at **annex B**.
- 5 Although we believe that this report addresses our remit, much more work could be done to explore many aspects. For example, we have not attempted to analyse in detail the scope for overseas marketing of Scottish FE and HE provision in different parts of the world; nor have we conducted a detailed cost analysis of production and distribution processes for e-learning. We give more detail of these and other potential areas for future activity in later sections of our report. At this stage, we felt it was more important to identify some key strategic issues for institutions and the Councils, which would help them to decide whether and how such future activity might be conducted.
- 6 We are in no doubt that a strategic analysis of e-learning is timely and relevant. The Scottish Parliament's Enterprise and Lifelong Learning Committee noted in its 2002 Report on Lifelong Learning:

"E-learning encompasses a variety of forms of learning using information and communication technology as a delivery mechanism. At a simple level, it is possible to send coursework by email rather than by the traditional distance learning use of postal services. At a more sophisticated level, developments in software and computer technology mean that learners can study online, and interact in a variety of ways with subject content, tutors and other students. We consider that this kind of learning has the potential to address some barriers to learning, including geographical barriers. However, we recognise that the kinds of people who will wish to use this form of learning are likely to be self-motivated and familiar with learning and their own learning styles. We recognise that learning of this kind cannot simply replace traditional face-to-face teaching methods. Nonetheless, it has potential to overcome some barriers and we recognise the important and in some instances world-leading work which has been done in Scotland in this field. It is vital however that best practice in developing and managing e-learning is shared."
- 7 In its response to the ELLC Report, the Scottish Executive acknowledged the potential benefits of e-learning, noting "The Executive will continue to encourage the Funding Councils to support best practice in the use of new technologies in all aspects of the delivery of further and higher Education". The Executive's position was further developed

in its Lifelong Learning Strategy document, *Life Through Learning: Learning Through Life*, published in February 2003:

"An important aspect in attracting people into learning is making learning more accessible. We need to make learning available in new and interesting ways. There are challenges here for providers. One such area of challenge is posed by **e-learning**. It offers the potential of bringing learning to potential learners wherever they are. It offers the potential of changing in some ways the relationship between learning providers and learners. It is able to package learning in new ways eg by combining games technology and learning. It can be blended with other forms of learning to ensure that learners have a comprehensive experience in learning in a way that suits them. E-learning can build on the way in which more and more people are making use of the internet as a place to shop, communicate and find information.

E-delivery is in itself only a tool which can be used to make learning more flexible, convenient and accessible. Providers must work to ensure that packages are designed using high-quality materials and with appropriate attention to the principles of good teaching. This will ensure that individuals have an effective learning experience and are able to measure their progress in relation to learning outcomes and apply what they have learned. Providers should also ensure that appropriate support mechanisms are available both on and off-line to support the learning process and range of preferred learning styles. The opportunity to learn through assistive technology has significant potential in supporting students with disabilities and learning difficulties. While there has been a lot of hype about e-learning, the reality is that few people have any experience of it. If we are to make learning accessible in new ways then it has to be learning that is attractive and of good quality so that people want to learn more."

- 8 In March 2003, the Executive's Framework for Higher Education in Scotland drew attention to the work of this group in relation to the HE sector:

"The use of ICT needs to become pervasive, and Scottish HEIs need to exploit further the potential of e-learning and other technological developments to support learning, with institutions sharing their experience....[We will] ask SHEFC to support and encourage the sustainable development of e-learning in Scotland in partnership with the sector and other stakeholders including through consideration of the recommendations made by SHEFC's e-learning group in its forthcoming report."

- 9 Scottish Enterprise has recently invested £2.3 million in setting up the Interactive University. This is an independent not-for-profit organisation located at Heriot-Watt University. In England, significant funding (£62 million) has been invested in the creation of UK e-Universities

Worldwide. And many other countries are also actively considering, or developing, national initiatives in e-learning.

- 10 We are very aware of the risks involved in forecasting, especially in an area of rapid technological change such as IT. New technologies or markets may appear which will quickly make some of our concerns redundant, or significantly alter the economics of e-learning, or create new opportunities. To cite just one recent example of a lack of foresight in IT, the telecommunications industry did not predict the enormous take-up of text messaging on mobile phones, despite their position as the producers of the technology!
- 11 Despite these risks, we strongly support the Councils' decision to commission this work at this time. Like it or not, the world of further and higher education is changing. The impact of IT on the design, delivery and management of learning is already significant, and we expect it to grow. Students, employers, and other stakeholders are changing their expectations of FE and HE and, over time, will expect our institutions to increasingly reflect the nature of modern society, including the incorporation of modern communications technology. As we indicate in this report, e-learning is a complex phenomenon, and careful thought is needed to distinguish between what can be done, and what should be done. We hope this report will be helpful to the Council, FE colleges and HE institutions, as well as to a wider readership.

Pedagogical issues – learning and e-learning

Definitions of e-learning

- 12 What is e-learning? There are many possible definitions. Most of these, unsurprisingly, include references to technology. For example, we found the following definition helpful:

Networked access to digital learning materials and communication systems to deliver and support learning.

- 13 However, when we examined this and other definitions in more detail, we quickly found a need for further ‘unpacking’ of such statements. For example, networking implies both a distribution system (especially when linked to institutional intranets and the wider internet) but also has connotations of collaboration and interactivity. Digital learning materials mean not only texts, but also a wide range of other materials including simulations, images, sound and video, and also (more mundanely, but often crucially) email and other simple messages which allow rapid and tailored information and guidance. Delivery typically refers to the use of IT networks to allow rapid transfer of information, but for many purposes the use of books, and ‘snail mail’ postal services, may be at least as appropriate as means of transferring information. Finally, support for learning can take a wide variety of forms, ranging from didactic processes such as explaining, tutoring and assessing, to less obvious (but equally important) processes such as efficient course administration, reservation of library books and the processing of awards.

Learning and teaching

- 14 A key point to stress is that our concern is fundamentally with learning, not with teaching. The two are of course closely linked but we feel it is very important to place learning and learners (or, in other terms, markets and customers) at the heart of our thinking. Otherwise, there is a risk of giving too much emphasis to supply-side issues or of seeing things solely from a producer perspective.
- 15 Thus, although later sections of this report will necessarily consider issues such as content development and delivery methods, in considering these producer issues we should not lose sight of the key purpose of supporting more effective learning by students. This means, for example, that whenever we consider the potential use of e-learning, we need to consider the extent to which it will address the needs of students, and how students will be equipped with the technology, the IT skills, and the learning skills, to make full use of such opportunities.

Blended learning

- 16 This term, and similar terms such as hybrid learning, are widely used in educational literature to refer to a rather common sense (but still very important) observation – namely, that in almost all cases to date, e-learning forms only part of a wider repertoire of teaching and learning approaches. On pedagogic grounds, it would be generally both perverse and impractical to employ ICT as the sole means of communicating with students or delivering learning. Education is a social process and social interaction between students and teachers is an essential part of high-quality learning.
- 17 Even within the most formalised parts of educational processes such as assessment, there are many things which computers cannot yet do, such as assessment of verbal performance or aesthetic design. And there are many aspects of assessment which people currently do better than computers, such as offering guidance and explanations which are tailored to students' particular learning needs.
- 18 We believe that, on pedagogic grounds, the issue is not a choice between conventional and e-learning delivery methods, but a choice of the most appropriate balance between the use of these different methods in different contexts. This is a process which involves the professional judgement of educators, taking into account the changing needs, demands, interests and capabilities of students. However, we believe that there is significant scope to enhance the quality and reach of education by appropriate and well-planned developments of e-learning.

The educational process

- 19 There is a wide spectrum of processes involved in education in the FE and HE sectors. Within each such process, there is significant scope for e-learning to improve quality and effectiveness. The costs and benefits of IT investment in such processes are highly variable, in technical complexity, in 'entry costs' and in the potential impact on institutional culture. The roles of institutions, national agencies and the Councils in promoting or sponsoring IT investment may also be different for different aspects of the educational process.
- 20 **Annex C** summarises the potential impact of ICT on different aspects of students' educational experience, from enrolment, to delivery of study materials, to support for tutorials, to careers advice and guidance. It is indicative rather than exhaustive, but it serves to illustrate the complex and differentiated nature of educational processes and the scope for specific IT-based enhancements to each process.
- 21 Broadly speaking, there are some inherent characteristics of e-learning which provide potential educational advantages. These include:

- e-learning can provide new ways to support interactions between staff and students, or between groups of students, irrespective of distance, which can promote more effective learning;
 - once created, materials can be made available at all times, in many places, with very small marginal costs for each additional user;
 - e-learning can enhance the scope for student-centred learning, through customisable access to materials, and enhanced interactivity, allowing choice of routes, learning styles, timing, repetition and self-pacing; and
 - e-learning provides potentially rapid and easy access to a rich, diverse range of multimedia materials and resources, including simulations which would otherwise be impractical, uneconomic or unsafe to experience.
- 22 However, these advantages will only be realised if products and services are developed and implemented in appropriate ways, and in particular if their implementation is informed by an appropriate sound pedagogy. Some of these advantages are equally available through more conventional (paper-based) resource-based learning – for example the use of study guides to allow self-paced learning – while others exploit particular features of digital technology – for example, the low costs of transmission and duplication of materials.
- 23 We are also aware of the risks of ‘doing e-learning badly’, for example by producing large amounts of screen-based texts and ‘page-turner’ approaches. Our view is that such non-interactive approaches tend to arise when technology, and not pedagogy, is allowed to drive the process.
- 24 We believe that the effective development and deployment of e-learning across an institution can be greatly facilitated by a systematic approach to issues such as technical support, specialist learning technology skills, centralised production, and product maintenance and upgrading. This does not always sit well with the traditional ‘cottage industry’ approach to course development, in which individual academics, or small teams, collate and present their own materials in distinctive ways. While we recognise the value and importance of innovation by individual members of staff, we are also aware of the need to support such efforts by appropriate systems and structures at department, faculty and institutional level. This is partly a matter of economies of scale, but also a matter of recognising that individual innovators can be isolated or frustrated by the lack of institutional support.
- 25 We believe that, if an institution wishes to actively promote educational innovation in the use of e-learning, this must include both ‘bottom up’ and ‘top down’ features. There is no substitute for individual flair and creativity in devising novel and exciting ways to present course materials. But effective use of e-learning also requires institutions to put

in place a range of policies, procedures and development activities – in short, to adopt a strategic approach to the deployment of e-learning.

26 We believe that institutions have much to gain by such an approach. Developing a clear and consistent institutional policy on matters such as the selection of virtual learning environments, and the specification of online materials, will help to create a coherent technical infrastructure for e-learning, and will minimise the effort for staff in complying with technical standards.

27 Where an institution plans to make significant use of e-learning, we believe it may be appropriate to extend the strategic approach to a systematic review of the entire curriculum. For example, staff in all programme areas could be encouraged to identify those learning outcomes where ICT-based delivery can add most value. The institution might then seek to concentrate its investment of staff time in the co-ordinated production of materials to support those curriculum areas. We believe this approach might deliver economies of scale and ensure that the creative efforts of staff are focused on activities which can generate greatest benefits for student learning.

28 **We therefore conclude that FE and HE institutions should:**

- **ensure that development of e-learning is led by student needs rather than technological potential or excitement;**
- **develop systematically policies, systems and infrastructure to both support and discipline the creativity and flair of individual academics. This may require centralisation of some existing processes of course development; and**
- **prioritise the curriculum areas, and/or aspects of the educational process where e-learning approaches would add most value and focus their development on these areas. Some possible examples are identified in a later section of this report.**

Economics of e-learning

- 29 Although we have not carried out a detailed economic analysis, we are sceptical of the claim that e-learning will automatically reduce costs in the FE or HE sectors. The strongest economic case for e-learning appears in the domain of large-scale corporate training, where large numbers of people (often geographically dispersed) have similar well-defined training needs based around a coherent and well-bound knowledge base. The introduction of e-learning methods, typically on a company intranet, can demonstrably lead to major cost savings in travel, staff time, and trainers' fees. But this is not the normal context of Scottish FE or HE delivery.
- 30 The experience of the SCHOLAR programme at Heriot-Watt provides a helpful illustration. This suggests that the cost of producing good quality interactive e-learning materials is around six times higher than the cost of developing course notes for traditional HE delivery. This is uneconomic for a single course in a single institution (although there may be spin-off benefits through improved student attainment based on the higher quality of systematically produced learning materials). However, the equations may look very different as part of collaborative models of production and delivery, and we return to this subject later in this report.
- 31 For any individual institution, we believe that investment in e-learning is unlikely to lead to major savings in running costs unless it is linked to radical change in business and educational processes. This would involve strategic transformation of an FE or HE institution, re-engineering of the processes of course design, course management, content development, course delivery and assessment. In such a transformed context, the conventional economics of a college or university would cease to be applicable and this might lead to very different cost structures. The nearest equivalent to such an institution in the UK is the Open University (which is far from being a purely 'e-learning' institution, although it has moved some way in this direction in recent years). An institution which is fundamentally designed as a vehicle for e-learning would require a wholly different approach to estates, staffing structures, and running costs compared to conventional institutions. While it may be useful to consider the merits of such an institution, we do not believe that this is a likely pathway for the evolution of most existing FE or HE institutions in Scotland in the short to medium term.
- 32 We believe that, typically, existing institutions will wish to engage in more incremental development of e-learning, to achieve some or all of the pedagogic benefits cited above. Responding to increasingly demanding students – who will expect access to more sophisticated ICT based access to learning and support – and to academic colleagues wishing to provide the best possible environment for their students, will lead to pressure on institutions' resources. It is a matter for each

institution to decide for itself whether investment of existing funding in new forms of course delivery can be justified by reaching new markets or improving the quality of educational provision. However, we believe that moves in this direction will require institutions to look for scope to re-engineer IT infrastructure and support systems, and as we suggest above, centralisation of some aspects of course development to achieve economies of scale in production systems and efficiencies through systems integration. In some cases collaborative solutions will offer possibilities.

33 We therefore conclude that:

- **the economics of e-learning will require collaborative approaches to the design and delivery of the curriculum to create sufficiently large cohorts of students to make viable its substantial use in the Scottish system;**
- **there may be scope for transformation of institutions towards radically new models of operation, but this is an unlikely pathway for the evolution of most institutions; and**
- **institutions will need to continue to respond incrementally to demands from the increasingly sophisticated and demanding student population, and should therefore consider how they re-engineer their IT infrastructure and course production systems to make economies of scale.**

Markets for e-learning

- 34 We believe strongly that e-learning should be market-oriented and not technology-led. Simply because it is possible to produce an online version of a course, does not necessarily mean that new learners will appear who were previously unattracted to the provision on offer. However, we recognise that e-learning may indeed lead to changes in the market for learning, and it is therefore important to analyse a range of possible market segments.

Overseas students

- 35 Much of the recent interest in e-learning has been stimulated by the possibility of marketing UK FE and HE to overseas students (or by the fear that foreign e-learning providers will 'poach' some of our traditional home or overseas markets). There are many examples of foreign providers (notably in North America and Australia) creating online trading arms for some of their courses, especially in business and IT related programmes at HE level. Many Scottish institutions already offer provision in overseas countries, with varying degrees of reliance on e-learning approaches. Significant breakthroughs in overseas markets are likely to require broker or partnership models. Within the UK, there have recently been two major developments aimed (at least in part) at such markets. These are the UK eUniversities Worldwide (funded by the Department for Education and Skills in England through the Higher Education Funding Council for England) and the Interactive University (a joint initiative of Heriot-Watt University and Scottish Enterprise). We believe these bodies are important strategic developments which may provide viable models for the development of new markets for Scottish institutions.

Rural, remote and under-represented students

- 36 The original model of the UHI Millennium Institute, which was set up to provide higher education in the Scottish Highlands and Islands, placed heavy emphasis on the use of IT to deliver education to rural communities. More recently, UHIMI has begun to emphasise the importance of non-technological factors in its provision and the key roles of local tutorial support and peer-group interaction. The Open University also has a high penetration in many Scottish rural communities, making use of the postal system and local tutorial centres as well as online discussion groups.
- 37 There have been other experiments in using online delivery to meet the needs of rural communities. For example, North Highland College has developed an online vocational qualification aimed at the hospitality industry in the Highlands; their experience suggests that, compared with traditional open learning, learners found that this programme offered more flexible access, reduced isolation, and promoted motivation. The College found that this approach was not cheap but it yielded benefits to learners. Stirling University has developed a blended learning course in

Family Health Nursing, designed to meet the needs of health practitioners living in remote areas. Some FE colleges in the Glasgow area have developed IT-based approaches to increasing participation by under-represented groups in socially deprived areas, on the grounds that IT-based provision can allow colleges to extend their 'reach' into communities and that the development of IT skills can promote employability.

- 38 One challenge facing the use of e-learning in such contexts is that, almost by definition, learners in these categories tend to have poorer access to IT, either because the physical infrastructure is less developed or because they have lower incomes and hence less access to computers at home.

Students with special needs

- 39 E-learning presents both opportunities and challenges for meeting the needs of students with disabilities. The use of ICT in learning environments presupposes that students are able to interact effectively with the equipment and its applications. Students with visual or motor disabilities may find it difficult to use computers without extra support. The use of assistive technologies can be very helpful in addressing the needs of many students with disabilities or special needs, provided that these are deployed effectively and that web sites are designed appropriately.
- 40 JISC has set up the TechDis service to provide advice to the FE and HE sectors on matters relating to the use of ICT by students with special needs. This has also been the subject of a major initiative in the FE sector, prompted by the Beattie Committee report *Implementing Inclusiveness; Realising Potential* on access to information and expertise in the use of enabling technologies to support students with disabilities and additional support needs in post-16 provision. SFEFC has funded a range of programmes associated with this report, including the creation of a specialist centre (the BRITE centre) based at Stevenson College in Edinburgh.

Continuing professional development

- 41 Ministers have highlighted the importance of providing ongoing training and CPD opportunities for Scotland's workforce. We have already noted that many large corporates have invested heavily in e-learning. We do not believe this represents a major new market for Scottish FE and HE institutions, since most corporates either operate their own training programmes, or contract with large private-sector providers. Given the structure of the Scottish economy, a major strategic challenge for the sectors is to engage with staff development within small and medium-sized enterprises. There have been some interesting pilot projects to engage SMEs with e-learning (such as the Glasgow Telecolleges Group's European-funded project) and there is some evidence that online delivery brings benefits such as more flexible

access. However, the level of engagement of SMEs with staff development remains small, and the technical costs and economic structure of IT-based solutions can add further difficulties. Organisations such as learndirect Scotland and the E-learning Alliance are seeking to develop this market and there may be opportunities for closer collaboration.

- 42 One area which has seen enormous growth in recent years is the use of IT vendor qualifications (Microsoft, Cisco etc) and the European Computer Driving Licence as alternatives to conventional academic qualifications. The Scottish FE and HE sectors are already heavily engaged in the delivery of such qualifications.
- 43 We also recognised that many professional and statutory bodies (PSBs) are taking an increasing interest in CPD for their members, and felt it was likely that many PSBs would invest increasingly in e-learning for this purpose. This could provide new opportunities for FE and HE institutions, but equally there is a risk that this might lead to a loss of market share if PSBs decided to offer such provision themselves, or via commercial partners.

Conventional campus-based students

- 44 We believe there is great scope for the use of e-learning to improve the quality of campus-based students' educational experience, and to ensure that Scottish students gain the IT skills which are needed for tomorrow's workforce. All FE and HE institutions have already taken steps to provide online resources to support their programmes, using the Web, intranets, and/or virtual learning environments. Many of the benefits have already been highlighted in earlier sections of this report. This is not primarily an issue of developing new markets, although it will be important to ensure that Scottish institutions are able to resist competition for home students by overseas e-learning providers. Rather, developments in this area are best considered as simply one means among many of promoting continuous enhancement of the quality of provision.

FE-HE transitions

- 45 One significant subset of conventional student populations may be those involved in higher education courses within FE colleges – ie those studying at levels seven or eight in the Scottish Credit and Qualifications Framework, typically on Higher National Certificate and Diploma courses. This group is significant for a number of reasons:
- Scottish Ministers have identified effective articulation between FE and HE as a strategic priority for the sectors, because it offers an important progression route for a large number of students in Scotland;

- many Scottish FE and HE institutions have developed strong partnerships to promote articulation;
- the Councils are already funding a major project by the Scottish Advisory Committee on Credit and Access to map articulation routes, to track students through the transfer, and to develop improved bridging arrangements between FE and HE institutions;
- JISC is already funding a range of IT-based projects aimed at improving the transfer of student data between college and HEI management information systems; and
- the SCHOLAR programme has demonstrated that it is feasible to develop online materials which can be used at these levels in both FE and HE institutions.

46 There may therefore be potential for collaborative e-learning developments at the interface between FE and HE institutions which might provide greater opportunities for improved student choice, more effective induction to HE institutions, and hence more successful transfer. Such developments would also support students transferring from HE to FE institutions.

Informal learning

47 A great deal of learning takes place outside the context of formal qualifications. This can include such diverse activities as the pursuit of hobbies, seeking medical advice on the internet, or engaging in professional (yet uncertificated) career development. Such informal learning plays an important part in personal development for learners. The HE and FE sectors have played an important part in providing such opportunities through evening or extension classes. In some niche markets, such as foreign languages, there has long been a corporate presence (Linguaphone, Berlitz, etc) which co-existed with the public sector. The internet and information technology may provide new opportunities and/or economies of scale which might alter the balance between public and private provision in this area.

48 **We therefore conclude that:**

- **the impact of e-learning will be different for each market segment, and that institutions must be alert to changing market needs; and**
- **there may be benefits from e-learning approaches to the supply of learning to some Government priority groups; however there are limits to the benefits of these approaches.**

Supply-side issues

- 49 This section will look at issues affecting the delivery of e-learning and assess the readiness of Scottish FE/HE institutions to participate in e-learning developments.

Infrastructure

- 50 Following the recent JANET reprocurement exercise, HE institutions now typically have one Gigabit per second connections to JANET and FE colleges typically have 34100 Megabit per second connections. This investment has resulted in a world-class IT network which means that bandwidth is no longer in practice a limiting factor in the use of online learning for students based at main campuses. However, there remain significant challenges in network connectivity for multi-site campuses. The sectors' connectivity to outside users at home and at work is also dependent on the wider rollout of broadband connections in the UK, and to the availability in homes and workplaces of high-specification computers. This means that most institutions have to operate with a mixture of connectivity models, and cannot assume that all learners have access to campus-level networks and equipment. While institutions will wish to fully exploit the capabilities of their technical infrastructure, it is important to ensure that delivery models for distance learners do not make unrealistic assumptions about their access to technical infrastructure.
- 51 In addition to external connectivity through JANET, the FE and HE sector has invested heavily in ICT infrastructure inside institutions. This resulted in enhanced internal networks, increased numbers of PCs, and the deployment of virtual learning environments.
- 52 We believe that these investments mean that Scottish colleges and universities are well placed to exploit the potential of ICT. We recognise that further periodic injections of capital will be required to maintain and enhance the JANET network, and that institutions face a challenge in meeting the capital and recurrent costs of maintaining and replacing ICT infrastructure. There is evidence of a 'motorway effect' in which demand from students rises to match the increased availability of PCs. This is likely to mean that the costs of maintaining and upgrading institutions' IT infrastructure will grow in both absolute and relative terms.

Staff development issues

- 53 The evidence from a range of quality assurance processes (particularly the sector-wide reviews conducted by HMIE and QAA) indicates that Scottish colleges and universities have highly professional staff who are committed to supporting student learning. However, relatively few of them have received formal training in the pedagogy of e-learning. It is not a trivial matter to come to grips with this new style of curriculum design and delivery, particularly in a cultural context in which academic staff have considerable autonomy in their teaching style. A survey of FE

staff development needs in 2002 suggested that while most college staff are now comfortable with the use of IT for personal productivity (eg word processing and email) many still lack the skills and expertise which would make them confident users of IT to support student learning.

- 54 Staff training in e-learning is a sub-set of a broader issue of training and qualifications in teaching and learning. Within the FE sector there is a well-established framework of TQFE and associated professional development awards. It will be important to ensure that these qualifications are reviewed and updated at appropriate times to include skills associated with e-learning; in this regard we welcome the recent approval by the Scottish Qualifications Authority of a new professional development award in e-learning. Within the HE sector, there is no equivalent national qualification framework for teachers. There is a range of national development agencies, including the Learning and Teaching Support Network and the Institute for Learning and Teaching, aimed at supporting professional development in this area. It seems likely that these agencies will be reorganised in the near future, and it will be important to ensure that the emerging body can provide co-ordinated support for staff development in e-learning.
- 55 Support for staff development is also a major activity for other national agencies such as the Scottish Further Education Unit and the Joint Information Systems Committee. JISC has also created Regional Support Centres (two in Scotland) whose role is to support FE colleges in making best use of JISC services and other IT resources.
- 56 Effective staff development requires a delicate balance between stimulating changes in practice, and responding to the expressed needs of staff. It is of course primarily a matter for each institution to determine its own policies and priorities for staff development in general, and development in the use of IT in particular. As and when institutions give a greater focus to e-learning, it is likely that additional staff development needs will emerge. Not least of these will be the need to engage with those members of staff (particularly more experienced staff) who may feel that e-learning is 'not for them', and who may require encouragement and support to be able and willing to deploy ICT as an effective part of their repertoire of teaching skills.
- 57 We believe that it would be helpful for the sector to clearly acknowledge the need for specific staff development in support of e-learning, in order to avoid the impression that staff can 'muddle through' the implementation of such a complex activity. A distinction needs to be drawn between pedagogical skills (which all teachers might be expected to deploy) and technical, design and programming skills (which are likely to be relevant for only a minority of specialist staff). Further thought should also be given to the impact of e-learning on the staff development needs of non-teaching staff (such as senior managers, librarians, network managers, guidance staff and careers advisors) and the emergence of new professional groups such as learning technologists. The framework of professional development awards

provides a good structure for this in FE. While it may not be appropriate for HE to adopt the same mechanism, we believe there is a need for HE to introduce a more systematic approach to the identification of skills needed by staff, and to the development of those skills in an effective manner.

Content

- 58 Within debates about e-learning, it is common to hear that 'content is king'. This suggests that the creation of high-quality learning materials can be a major source of value added in e-learning. But there is also a persuasive argument that the real value comes not from the content (which, after all, has traditionally been available in books) but from the ways in which staff can add value to content, such as the interaction between staff and students for guidance, assessment and remediation. Increasing amounts of material are becoming freely available on the internet, although this material varies enormously in its quality and reliability, and can also pose problems with intellectual property rights. JISC has made major investments, such as the Resource Discovery Network and Subject Gateways, in providing structured access to high-quality materials, and other initiatives like MIT's Open Courseware project are also contributing valuable public-domain resources. Through the work of JISC, academics also have access at discount prices to high-quality commercial datasets (such as census returns and Ordnance Survey data) as well as online journals, although even with discounts the price can still be a barrier to access by small institutions.
- 59 It may be helpful to distinguish between curriculum material (learning points which make up a syllabus and can be assessed) and the way in which this material is organised, illustrated and presented to students. High-quality online content requires both of these issues to be addressed. Taking this broad definition of content, we believe that, at present, there is a shortage of high-quality online content across the FE and HE curriculum. However, we believe that the traditional 'cottage industry' models used in academic institutions do not necessarily promote efficient production, distribution and exploitation of content. The production and ongoing maintenance of high quality multimedia or interactive content production needs specialist skills which most academics do not possess. Nor do most institutions operate very rigorous costing models for the investment of academics' time in the production and collation of learning content. Although new tools are being developed which allow academics to 'drop' materials into pre-existing structures and templates, these are not yet well embedded and their use is by no means routine in colleges and universities.
- 60 We believe that, at least for some materials, it may be useful to commission content once, which can then be deployed across a very wide range of academic programmes or institutions. Suitable candidates might include:

- generic core materials which are used in a range of disciplines (such as mathematics);
- subjects where there is a strong demand for more flexible and varied modes of delivery across a range of providers (such as medical curricula, which are currently being developed in Scotland as part of the IVMEDS international consortium); and
- subjects where there are major national curriculum changes planned, which all institutions will have to implement – current examples include social work, and the implementation of the HN Review. For these areas there is at least at first sight a strong case for national collaborative development of materials using e-learning approaches for appropriate parts of the curriculum.

61 For the kind of approach suggested here to happen effectively, materials will have to be well-designed, linked to a range of curricula, and created in ways which are compliant with a range of technical standards. The model of ‘re-usable learning objects’ (in which learning materials are developed in small episodes to achieve specific learning outcomes which are relevant for a range of courses) may be helpful as a means of encouraging flexible deployment. There would also need to be some assurance that academics would actually use such materials. For this to happen, the materials have to be of high quality, and capable of being customised for use in different contexts. Staff would also need assurance that such materials are sustainable, ie that they will continue to be available and that they will be kept up to date. But we feel that a major issue may be the cultural context of deployment and the extent to which institutions can (or should) determine what and how their staff teach. Within the academic community, there is a strong culture promoting individualistic use of multiple information sources (textbooks, journals, handouts and increasingly web sites) in order that students are exposed to a range of views.

62 This is less problematic in the FE sector, partly because of the greater degree of commonality in curricula, and the greater use of explicit learning outcomes in curriculum specifications. SFEFC has already commissioned the production of some centrally-produced materials and has arranged reciprocal access to similar materials funded by the Learning and Skills Council in England. This has been valuable as a ‘pump-priming’ exercise to provide some exemplar materials which can be used within every college’s virtual learning environment, but it was never expected to deliver the strategic benefits of sector-wide collaborative provision discussed in previous paragraphs. However, this experience has provided valuable lessons about technical and pedagogical design, and project management, which would be able to inform any new ventures in collaborative development of learning materials.

Quality and standards

- 63 There are several aspects to this issue. The first relates to the impact of ICT on the quality of students' educational experience. At a minimal level, the growth of e-learning will increase the volume of traffic and usage of IT services. But student use of IT for e-learning will also pose wider challenges to current support systems. The use of email to encourage interaction between staff and students can provide flexibility but can also create a burden on staff if questions are to be answered promptly. If email becomes the default medium for some forms of communication, we need to ensure that all students have reasonable access to this medium. There may be value for institutions in considering the role of service standards for issues such as turnaround times, accessibility, access to machines, and so on. More generally, e-learning is likely to increase the demands on computer services staff and may make network functionality even more mission-critical. SFEFC has funded the development of self-evaluation standards for ICT services, and we commend this initiative as a way of integrating ICT services within the broader quality assurance and enhancement framework of institutions. It may be appropriate for a similar analysis to be conducted within HE quality processes.
- 64 The quality of students' educational experience is also partly determined by issues such as the clarity of learning materials, access to feedback on assessment, the scope for self-paced learning, the coherence of curricula, and the selection of appropriate delivery modes to address different forms of learning. These issues apply whether e-learning is a major or a minor aspect of students' experience, and are properly dealt with within institutions' normal processes of course validation, monitoring and review. We believe there is scope to do more to embed scrutiny of e-learning in these processes, both within institutional systems and at the national level of quality assurance processes operated by Her Majesty's Inspectorate of Education (for the FE sector) and the Quality Assurance Agency (for the HE sector).
- 65 A further important aspect relates to the academic standards associated with e-learning. The credibility of academic awards is arguably the main asset of the Scottish FE and HE sectors, and must be safeguarded. Any form of assessment outside examination conditions raises issues of authentication (who is submitting this work?) and plagiarism (is it their own work?), but there are particular difficulties in addressing these issues in an e-learning context. SFEFC has recently co-funded a project with the Scottish Qualifications Authority to produce guidance on moderation of online assessment, as well as a college-based project which will shortly produce good practice guidelines. It may be appropriate for the HE sector to consider, with the Quality Assurance Agency, whether the existing Code of Practice on academic issues needs to be revised or extended to take account of the implications of e-learning on academic standards.

Proprietary and open-source solutions: the role of academic innovation

- 66 We recognise that academic innovation in the area of e-learning can lead to profitable spin-off products and companies, and that it also contributes to the broader culture of scholarship within our institutions. We also recognise that current commercial solutions in areas such as virtual learning environments and assessment engines may not fully meet the ideal specification of academics. When this is coupled with the well-recognised 'not invented here' syndrome, it is not surprising that there is a tendency for academics (particularly in the HE sector) to build their own solutions. However, these may operate well in their native environment but are typically not well documented, and may not be compliant with broader technical standards. As a result, such 'lone inventor' innovations tend not to be sustainable, scalable or disseminated; this is a wasteful use of resources.
- 67 At the other end of the spectrum, senior managers (particularly in the FE sector) are typically more concerned with issues such as the existence of sustainable technical support, and hence tend to favour commercial solutions for the management and delivery of e-learning. This can be effective, but equally it can give rise to large recurrent costs and tie the college into a dependent relationship with a single supplier. (This situation is already well established in the case of office productivity software, where the market leader is Microsoft. Microsoft has recently developed a range of pricing policies aimed at giving college and university purchasers more flexibility and better value for money.)
- 68 The open-source movement provides a middle ground between these approaches, in which the involvement of a large development community provides support for academic developers and helps to develop a sound approach to technical standards. However, it is very difficult to predict whether open-source or commercial solutions for e-learning will gain market dominance. And for smaller institutions, engagement with open-source development may place great demands on the availability of technical skills and development time among their staff. JISC has funded a range of projects aimed at technical development of appropriate software, and participation in these projects is enhancing the technical capability of staff in Scottish FE and HE institutions.
- 69 We do not feel that this Group is well-placed to offer a view on the relative merits of different software solutions; this is a matter best left to institutions and technical advisory bodies such as JISC. However, we feel that the 'lone inventor' approach is the least likely to be successful, and hence would advise institutions to be cautious about resourcing very small-scale development which is not (at least in some sense) integrated with broader developments on technical standards and solutions. We also welcome JISC's approach of working in partnership with commercial vendors of VLEs, and believe this represents a sound division of labour. We believe there may be scope for greater

collaboration between industry and academic institutions in developing and exploiting such platforms in mutually rewarding ways.

Institutional structures

- 70 As indicated earlier, we do not expect that many Scottish institutions will wish to undertake radical transformation based on a wholesale migration to e-learning delivery modes. We think that most institutions will adopt more incremental models in which they either gradually incorporate some aspects of e-learning, or create a 'new markets arm' aimed at delivery of e-learning to highly targeted groups. In the latter case, there may be scope for greater collaboration between institutions and the Enterprise Network, on the grounds that such 'new market arms' may create jobs and revenues (including export revenue potential) for Scotland. SFEFC and Scottish Enterprise are currently jointly funding a pilot programme of support to colleges based on roll-out of SEN's 'Digital Advantage' programme. This pilot will be completed later in 2003 and it would be valuable to review at that time the scope for further business development support to FE and HE institutions.
- 71 However, we also believe that there may be room in Scotland for a small number of more radical delivery models. Our view is that, to be truly effective, this would require re-engineering in virtually all aspects of the institution. It would certainly not be cheap or easy, and if this is to be entertained we recommend it is preceded by very careful planning and specification.

National initiatives

- 72 We received detailed briefings on the development of UK eUniversities Worldwide (funded by the Department for Education and Skills in England through the Higher Education Funding Council for England) and the Interactive University (a joint initiative of Heriot-Watt University and Scottish Enterprise). We believe that both of these bodies provide potential routes for Scottish institutions to develop online courses for new markets. Both bodies are likely to have well-developed platforms for delivery of e-learning, and considerable expertise in the processes of designing, developing and delivering online provision. The use of such centralised learning technology support facilities could deliver economies of scale compared to individual institutions creating and maintaining this skill set. Both bodies are developing overseas partnerships with local agencies with marketing, tutorial and assessment functions, although there are significant differences in their approach.
- 73 UK eUniversities Worldwide is explicitly restricted to HE provision; all Scottish HE institutions (except St Andrews) are members of the UKeU. It has only very recently introduced its first three programmes, and hence it is very early to make judgements about its long-term success. SHEFC has taken an explicit decision not to top-slice institutional funding to provide venture capital for the development of UKeU courses. However, there may still be opportunities for further discussion with the

UKeU on how best Scottish institutions can be encouraged to participate in appropriate developments.

- 74 The Interactive University was created very recently but already has 30 learning partners in 14 countries because it inherited Heriot-Watt's existing courses and partnerships. It currently serves 3000 international students and, through incorporation of Heriot-Watt's SCHOLAR programme, 45,000 students in Scottish schools and colleges. A key feature emphasised by the IU in its approach is the need for partnership in the delivery of education with overseas local educational institutions. The IU is open for wider participation by both FE and HE institutions in Scotland, but at this early stage there is limited detail available on the form of profit-sharing and costings which new participants would face. The Interactive University is a private company limited by guarantee without shareholders. The IU aims to provide knowledge, learning and business services to its academic providers at cost, with the explicit remit of maximising the return to participating universities and colleges. Several Scottish HE and FE institutions are actively engaged in negotiations with the IU. We believe that there may be opportunities for the Councils to facilitate such discussions, either informally or through some more strategic dialogues with Scottish Enterprise and the Board of the IU.
- 75 The missions of both the UkeU and the IU relate to exploiting the potential to sell educational courses in overseas markets and return profits to the institutions. There could, however, also be potential for both to support developments focused on Scotland – for example, collaborative developments or institutional transformation – but this would require further discussion with these organisations, and for them to diversify their missions. (Of course, if e-learning products designed to capture overseas markets were developed, there would be nothing to prevent them also being used locally.)
- 76 We would strongly encourage institutions to consider what the expertise of these national initiatives can bring to their own development, and to seek to exploit the capacity they provide to develop new learning materials.
- 77 We also recognise that other national bodies play important roles in promoting e-learning. These include development agencies such as JISC, as well as government-sponsored bodies such as learndirect Scotland and the Scottish Qualifications Authority.
- 78 **We therefore conclude that:**
- **there will be a continuing need for national investment in the JANET network to support e-learning;**
 - **the costs of maintaining and upgrading institutions' ICT infrastructure will continue to grow;**

- **staff development in e-learning will be a continuing need, and will require a more systematic analysis of the skills needed by different categories of staff as well as appropriate ways of developing these skills;**
- **there is a shortage of high-quality online content across the FE and HE curriculum, but that traditional models of course development will not be able to sustainably provide and support effective e-materials; there is therefore a need for more strategic approaches to the development and deployment of online content;**
- **there are examples where it may be of value to commission content once, to be deployed across a range of academic programmes or institutions;**
- **institutions should develop service standards for student access to e-learning resources and IT equipment;**
- **institutions, awarding bodies and quality assurance agencies should develop their guidelines or advice on the quality and standards issues associated with e-learning approaches;**
- **there may be scope for radical transformation of delivery models either through substantial shifts to e-learning models by significant parts of the sector; and**
- **there may be scope for the e-university or the IU to help with this transformation, although their current missions are explicitly orientated to capturing overseas markets.**

Role for the funding councils

- 79 As we have stressed elsewhere in this report, e-learning must be primarily about learning. In general, the Councils do not and should not take a micro-managing role in the development of or improvement of programmes – these are matters best left to individual institutions. Council intervention has generally taken the form of: providing broad expectations on quality assurance and improvement; seeking to provide institutions with the best possible information about local and national needs; and providing opportunities for discussion on strategic planning of new provision. We believe that this broad approach still remains appropriate – the distinctive features of e-learning (requiring new approaches to curriculum planning and delivery or more collaboration between institutions) do not require significantly different responses from the Councils. Areas where the Councils might be able to add value are discussed below.

National ICT infrastructure

- 80 The Councils should continue to invest in and develop the national infrastructure to support e-learning through their investments in JISC and the JANET network. As well as providing high bandwidth connectivity for the FE and HE sectors as a whole, this investment should be used to ensure that networks are robust and reliable, and that advice and expertise on the exploitation of networks should be available at a regional and national level. JISC also provides a range of other services to support learning, teaching and research, and the Councils should continue to encourage JISC to be responsive to the needs of all practitioner groups within the sectors.

Good practice advice and guidance for institutions

- 81 We believe it might be useful for the Councils and the FE/HE sectors to collaborate in creating institutional ‘toolkits’ for making decisions about strategic investment in ICT, on the lines of the recent *Guide to strategic investment in research infrastructure*, produced by the Scottish Universities Research Policy Forum and funded by SHEFC. This could draw on existing and emerging tools (eg to gauge future costs of network maintenance and total cost of ownership for computer systems) as well as provide structures which would help institutions to make realistic and comprehensive assessments of their ICT infrastructure and its ‘rate of return’ in student learning and other business processes.
- 82 We also believe that the Councils should consider with the sectors, as part of planning their general quality enhancement activities, whether good practice or enhancement activities specifically relating to e-learning should be a priority.

Strategic interventions

- 83 The development of specific courses using whatever medium is clearly a matter for individual institutions to manage from their main funding allocations rather than through significant use of top-sliced resources. However, it may be appropriate for the Council to intervene to help create the critical mass of demand or capacity of development resource, which would be beyond any individual institution and where there would be significant benefits across Scotland. Some possible examples are given in paragraph 60 above, where the Councils might support collaborative approaches within and across the sectors.
- 84 The Councils also might wish to consider the possibility of supporting, through some form of strategic change grant, institutions which are prepared to consider a more thorough-going switch to e-learning, as explored in paragraph 71 above. This could be justified if such developments were pilots from which the rest of the Scottish sectors can learn.
- 85 We do not believe that the focus of interventions by the Council should be on developing e-learning for the export market, although improvements in the export success of our institutions is to be welcomed. The primary purpose of the Council's funding from Government should be to provide learning for Scottish and EU students.
- 86 Specifically, we do not believe that the Councils should, at this point, top-slice resources for direct investment in the UK eUniversities Worldwide or the Interactive University. Any interventions by the Councils should be to support consortia, collaborations or, exceptionally, individual institutions to make the kinds of transformations discussed in this report. And leave it to them to determine which of these vehicles (or possibly another vehicle) provides the best technical support for their particular project, and themselves negotiate appropriate contracts with these agencies.

Targeting particular student groups

- 87 We have discussed earlier in this report the possibility that e-learning may have potential to facilitate access to learning by particular groups (for example, rural and remote learners or underrepresented groups). We note that the Councils already operate a range of funding mechanisms (such as funding premiums for students from under-represented areas, and 'rurality' premiums for remote colleges) aimed at encouraging institutions to engage with these groups of learners. Given the range of innovation, which is already taking place, we do not believe that there is any particular need or rationale for additional incentives to promote a particular form of delivery such as e-learning in this context.

National agencies supporting learning

- 88 The Councils support several national agencies whose role is to support learning, including the Learning and Teaching Support Network, the Scottish Further Education Unit and the Joint Information Systems Committee. The Councils should ensure that these agencies are well equipped to support institutions' own efforts in delivering effective e-learning. We believe a particular priority in this respect will be the development of appropriate staff development for e-learning.
- 89 The Councils also need to ensure that national organisations and initiatives on quality assurance and enhancement generally take appropriate account of e-learning. However, we believe it would be very unhelpful to suggest that quality improvement via the use of ICT was different in kind from other forms of quality improvement. The institutions and Councils should actively seek to embed e-learning development within their broader policies for quality. For example, there may be scope to review the ways in which institutions' e-learning strategy is scrutinised within standard processes of quality assurance (by Her Majesty's Inspectorate of Education in FE, and by the Quality Assurance Agency in HE). Institutions can also do more to embed ICT operations within their internal quality assurance and enhancement processes; SFEFC's recent funding of the 'Bootstrap' project to develop self-evaluation standards for IT services in FE colleges is a useful model here. The Councils and institutions also engage in dialogue with qualifications bodies to ensure that courses provide up to date and industrially-relevant learning experiences, and it would be appropriate to include IT skills within such broader discussions.
- 90 The Councils also need to work with awarding bodies to ensure that their systems and structures are well adapted to ensure the standards and quality of e-learning products without overburdening institutions.
- 91 **We therefore conclude that the Councils:**
- **should continue to invest in the national IT infrastructure to support e-learning;**
 - **should support, in partnership with the sectors, the development of good practice advice (such as the 'toolkit' referred to in paragraph 77) for institutions on e-learning;**
 - **should consider investing in collaborative/transformational e-learning developments, where they will benefit Scottish and EU students from their existing strategic funds; and**
 - **should ensure that national agencies which support learning are well equipped to help institutions with e-learning and continue to work closely with national bodies such as SQA and Scottish Enterprise with an interest in this.**

Conclusion

- 92 We hope that FE colleges, HE institutions and the Councils will find this report helpful in identifying a range of issues relating to e-learning. We can summarise our findings in terms of three broad messages.
- 93 The first key message is that e-learning is fundamentally about learning and not about technology. As a consequence, the development of e-learning should not be divorced from the sectors' broader agenda of continuous quality enhancement of learning and teaching. Rather, we would encourage institutions and the Councils to embed their consideration of e-learning firmly within this broader agenda. This will help to ensure (among other things) that we do not lose sight of the importance of the student perspective in the deployment of e-learning. Institutions should continue to focus primarily on learning (not technological developments) and look to see how ICT can support improvement in the effectiveness of learning.
- 94 Our second key message is the importance of clearly distinguishing between incremental and transformational change. We believe that all institutions, to a greater or lesser extent, will engage with e-learning over the next few years. This will happen simply because Scottish institutions are committed to quality improvement and meeting student needs, and both these factors will provide incentives for appropriate innovation in the use of ICT. But such developments will not by themselves bring about transformational change, or re-engineering of institutions. There may indeed be a case for supporting the development of new institutions in Scotland which are fundamentally designed to exploit e-learning. But we are not convinced that this can best be done by evolution of existing institutions, acting on their own. Rather, we suggest this should involve larger, perhaps national, collaborations including appropriate partnerships with organisations with expertise and capacity such as the UK eUniversities Worldwide or the Interactive University. Additional work will of course be required to scope out more detailed business models for such ventures. This should be based on clear articulation of the intended objectives and direction of travel, rather than on the creation of particular projects or structures which might then turn out to be inappropriate to meet needs we cannot yet anticipate.
- 95 Our third key message is that the Councils are not, and should not, be the primary actors in the development of e-learning. If e-learning is to become embedded in the mainstream business of institutions, this agenda must clearly be owned and directed by institutions themselves. Excessive intervention by the Councils, which does not have 'buy-in' from institutions, would risk skewing the development of the sector in ways which will not lead to sustainable change. While it is undoubtedly the case that many institutions would bid for ICT-based project funding, past experience suggests that such projects do not, by themselves, bring about embedding of innovation within mainstream activity. We

would therefore advise the Councils to take a cautious approach to this issue.

- 96 Finally, we believe that this field has the potential to change very quickly and that the sectors and the Councils will need to return to consider this issue again within the next 18 months.

Annex A

Membership of the Joint SFEFC/SHEFC E-Learning Group

Alan Tripp, member of SFEFC and SHEFC (*Convener*)

Prof Colin Bell, University of Stirling

Dr Michael Gray, Glenbrae Management Services Ltd

Sir Alan Langlands, Principal, University of Dundee

Prof Roy Leitch, Deputy Principal, Heriot-Watt University and Chief Executive of the Interactive University

Hugh Logan, Principal, North Highland College

Frank O'Donnell, Head of E-Business Group, Scottish Enterprise

Sue Pinder, Principal, West Lothian College

Tom Wilson, Principal, Glasgow College of Building and Printing

Tom Kelly, Association of Scottish Colleges (Observer)

David Caldwell, Universities Scotland (Observer)

Tony Coultas, Scottish Executive (Observer)

Secretariat

Laurence Howells, Director of Strategy & Corporate Affairs, SFEFC/SHEFC

Bill Harvey, Deputy Director, Quality & Learning Innovation, SFEFC/SHEFC

David Beards, Senior Policy Officer, SFEFC/SHEFC

Annex B

Remit of the Joint SFEFC/SHEFC E-Learning Group

The group will:

1. Examine the 'state of the art' of e-learning in Scotland and globally, and identify good practice that could be drawn on by the Scottish sectors.
2. Consider the contribution that e-learning might make in providing more flexible forms of delivery and enhancing the quality of provision, compared with other forms of distance learning. This comparison will include postal-based distance learning, flexible timetabling, outreach centres, collaborative delivery and franchising.
3. Consider the contribution that e-learning might make to increase the 'reach' of FE/HE, especially for rural and island communities and potential learners unable to participate in conventional delivery.
4. Identify and segment the characteristics of the potential markets for e-learning, including overseas students and continuing professional development. Value for money in pursuing these markets should be investigated.
5. Identify the potential impact on the economics of institutions. In particular to gain a clearer view of how economies of scale might influence the viability of developments. To establish the scope for collaboration amongst HEIs and FECs to achieve the scale of operation required for sustainability. To investigate specifically the costs and savings associated with the implementation of e-learning. Give consideration to issues of intellectual property rights (IPR), and to cost comparisons between the education and commercial sectors.
6. Consider the shifts in culture and ways of operating that will be required, and how these changes can best be managed. In particular, consideration should be given to the ways in which educational delivery processes in institutions must be re-engineered to facilitate e-learning.
7. Consider roles which the Councils might play in facilitating effective strategic decisions by institutions and the sector in investing in e-learning.
8. Make recommendations to the Councils and to other organisations within the sectors on the key actions to be taken. Identify in those recommendations who the key organisations and agencies for delivering these actions should be.

Annex C

Impact of ICT on various learning processes

Process	Scope for e-learning	Potential impact on learners	Potential impact on institutions
Enrolment and matriculation	Already linked to student records system; scope for more single-entry registration (library, fees, email, etc); scope for online enrolment by applicants	Can promote wider participation by reducing barriers to entry	Requires investment in 'back office' functions; can improve administrative efficiency
Course management	Online access to student handbook; email alerts for timetable changes and course admin; frequently asked questions on web/intranet; email access to tutors; online reservation of library books; personalised desktops	Can improve student understanding of course objectives and institutional procedures, and raise the quality of students' learning experience	May require technical integration of institutional systems, ready access to PCs by staff and students and clear policies on data entry; assumes staff have appropriate IT skills and motivation;
Guidance and support	Email access to tutors; web access to guidance materials; booking system to arrange meetings with tutors or counsellors	Can improve retention and completion by addressing problems more directly	Requires ready access to PCs by staff and students, clear policies on 'service philosophy' such as turnaround times for replies; assumes staff have appropriate IT skills and motivation
Tutorials	Collaborative work via interlinked laptops or whiteboards; scope for video-conferencing for distance learners	Promotes collaborative learning and improved staff-student interaction	Requires hardware investment and staff development

Process	Scope for e-learning	Potential impact on learners	Potential impact on institutions
Lectures	Web access during lectures; pop quizzes/instant surveys; remote/asynchronous access to video-streamed lectures	May enhance quality of lectures; establish whether students understand the material; flexible access to materials; improved opportunities for revision	Requires hardware investment in lecture rooms, technical support, and staff development
Laboratories	Data analysis; automated logging/recording of data	Improve conceptual understanding through real-time analysis; reduce time taken to write-up, allow more focus on principles	Already widespread; enhancement requires investment in hardware and staff development and redesign of laboratory practice
Self-study of core course materials	Course-specific web sites, simulations, learning materials on Virtual Learning Environments (VLE), etc	Scope for major enhancement of learning and more flexible remediation	Modest IT investment but significant ongoing staff development and curriculum design costs
Study beyond core course materials	Internet access; gateway web pages giving guidance to appropriate sources; training in search engine use; training in judgement of source quality	Scope for major enhancement of learning, but risks of plagiarism and use of poor-quality materials	Already widely used; requires minimal additional IT investment but scope for significant redesign of delivery and learning processes
Formative assessment	Self-assessment materials on VLE or intranet	Promotes flexible pace of learning; allows repeated practice of assessments; rapid personalised feedback; responses tailored to student learning needs; summary data on student progress to tutors; embeds use of IT skills; reduces turnaround time for assessment	Minimal additional IT investment; scope for reducing staff administrative burden; widespread implementation requires systematic policies and practice on design and delivery of assessment instruments

Process	Scope for e-learning	Potential impact on learners	Potential impact on institutions
Summative assessment	Email submission/return of essays; assessment materials on VLE or intranet	As above	As above; additional measures needed to satisfy external moderators, eg authentication, consistency of standards, prevention of cheating
Projects	Virtual space on intranet/VLE for project work; email collaboration; discussion groups; computer-aided design tools	May improve group communication and motivation	May require high level of moderation skills by staff
Collaborative teaching across institutions	Email, video-conferencing, discussion groups	May allow operation of small options/specialisms by economies of scale, teaching students in several institutions at one time	Requires well-established structure of institutional co-operation and clear processes for allocation of costs and fee income
Careers guidance; alumni contact	Email/web contact with careers service; online questionnaires; email alerts of relevant vacancies; ongoing advice to graduates	Improved access to careers information; monitoring of career development beyond graduation	Investment in technical infrastructure and staff development of careers staff

