

Table of Contents

Foreword

Executive Summary

Introduction
Key benefits
Recommendations

1. Introduction

2. eLearning for Higher Education

2.1 Context
2.2 Motivators
2.3 Practice
2.4 Benefits
2.5 Challenges & Opportunities

3. Strategies & Recommendations for Achieving Leadership in eLearning for Higher Education

3.1 A Collaborative Vision of eLearning in Irish Higher Education
3.2 Strategies & Policies for promoting eLearning in Higher Education
3.3 Recommendations & Proposed Structures for eLearning in Higher Education

Appendices

1. Working Group Members
2. Survey of Practice at Irish Universities (Online)
3. eLearning Website for Irish HE (Online)
4. eLearning Initiatives Worldwide (Online)
5. Key Elements and Activities in eLearning (Online)

Please note Appendix 1 is included with this document, Appendices 2 – 5 are published online.

References

Foreword

[To be added as required]

Executive Summary

Introduction

As part of the process towards developing a “University Sector” strategy, C.H.I.U. have defined a number of key areas for strategic action. One such area is “New Forms of Learning”.

In Sept 2002, a working group (the Group) consisting of a representative from each of the seven universities (See Appendix 1) was formed with the objective of determining how the Irish universities could achieve “Leadership in the Use of ICT in Higher Education”. A reporting deadline of March 2003 was established for the Group. At its first meeting in Sept 2002 the Group refined its brief as:

In the context of positioning Ireland as a leader in the use of ICT in higher education:

- *Craft a vision of what it would take to achieve that leadership position in terms of outputs, resources, alliances etc.*
- *Identify the strategy, structures and partners required to deliver on the vision of leadership.*
- *Present the Plan to Achieve Leadership*

ICT in teaching and learning (typically referred to as eLearning) has, to date, not always realized its full potential. There are a number of reasons for this, including the lack of attention to pedagogy and the fact that many of the initiatives tended to be undertaken on an isolated, one-off basis. E-Learning must not be seen as a peripheral activity but must be embedded in the core business of our universities. For any e-learning initiatives to be successful, they must be part of an overall strategic thrust. If we are to avoid the mistakes of the past, we must ensure that pedagogy takes precedence over technology and educational process over information content.

The Group undertook research which examined best practice worldwide, major international initiatives, technology, pedagogy and the current status of the use of ICT for teaching and learning in Irish Universities. This research provided a context within which models and recommendations were studied. In the course of its work the Group consulted a number of parties including the HEA, IDA, Enterprise Ireland and a range of companies involved in eLearning and ICT.

Key Benefits

By adopting new forms of learning, universities can find solutions to some of the challenges they face. Specifically, the well executed deployment of ICT in higher education when blended with traditional forms of learning has the following benefits:-

Improved Quality and Effectiveness of Education.

Planned and appropriate use of ICT in third-level institutions:

- Provides opportunity for enhancing the student experience.
- Provides easy access to large volumes of the scholarly and research literature.
- Enhances student achievement of high-level educational objectives

Access

The leading edge use of ICT in third-level institutions can greatly improve access by:-

- Reaching out to large numbers of students who cannot avail of existing programmes.
- Delivering programmes in highly flexible and convenient formats.
- Making viable the development of new programmes that currently would not attract sufficient students in the catchment area of each university.

Increasing / Maintaining Revenue.

Universities in Ireland, already underfunded by comparison with international standards, face a number of challenges to their revenue in the coming years. In addition to the decline in traditional (school leaver) student numbers due to demographics, the universities will face competition for their heretofore captive student population from high quality 'virtual universities' gaining market share in Ireland. By embracing new forms of learning and collaborating to produce a high quality student experience, Irish universities can retain their traditional market, increase their share of professional development at post-graduate level and, through distance education, capture market share abroad.

Leadership in the use of ICT in higher education also has huge direct benefits to the 'knowledge economy agenda'. By leading in the adoption of new forms of learning, the universities can act as a catalyst for the development of the entire eLearning industry sector in Ireland.

Recommendations

Recommendation #1: Change Management

The optimisation of the use of ICT for education in Universities will involve significant organisational and cultural change. *It is recommended that Heads of University and senior management must take ownership and actively lead the change agenda as a strategic priority.*

Recommendation #2: Build Local Capability for eLearning Support

Based on the review of practice at Irish Universities (see Appendix 2) there has been significant development of eLearning within some Irish universities, in terms of strategic policies, structures, academic practice and technology infrastructure. *It is recommended that each University should further build capability for eLearning that complements existing and new teaching and learning methods.*

Recommendation #3: Establish active C.H.I.U. Steering Group for eLearning activities

It is recommended that C.H.I.U. establish an eLearning Steering Group. This group, made up of key representatives from each of the Universities, would report to C.H.I.U. and would assist in the development of policy and the dissemination of best practice in the field of eLearning.

Recommendation #4: Establish CHIU University Community Portal on eLearning

It is recommended that C.H.I.U. set up a University community website, HEAnet hosted, to provide an access portal to information about eLearning and to stimulate collaboration and sharing of eLearning resources. The Working Group has made a start on the creation of such a website - see Appendix 3.

Recommendation #5: Provide Access to on-line Journals & Databases

It is recommended that the Universities exploit all opportunities for joint purchasing of online journals and online aggregated journal databases.

Recommendation #6: Establish mechanisms to support shared learning object repositories

It is recommended that digital repositories be created to facilitate sharing (storage, access and retrieval) of eLearning content, multimedia documents and assets.

Recommendation #7: Foster the development of Joint Course/Programme

It is recommended that the Universities develop a common on-line course which would provide a professional qualification for lecturers in the teaching and learning in higher education with a strong emphasis on eLearning techniques. This course should be developed as a best of breed eLearning programme.

Recommendation #8: Stimulate collaborative eLearning Research

It is recommended that the Universities, through an active collaborative programme of research, establish Ireland as a centre of expertise in eLearning pedagogy and technology.

Recommendation #9: Establishment of an eLearning Agency

It is recommended that C.H.I.U. establishes a ELearning Agency with clear objectives of increasing access and improving quality in a cost effective manner for the Higher Education and Further Education sectors. Backed and supported by State development bodies and industry, such an agency could provide the catalyst for building a world class leadership position in eLearning for Ireland. To achieve this, the Universities working with the Institutes of Technology should make a joint bid in response to the HEA tender for the “The provision of an eLearning service to enhance the Irish higher and further education and training sectors through the application of technology”.

1. Introduction

The European Commission, in its recent communication *"The Role of the Universities in the Europe of Knowledge"* highlights the importance of universities, in stating:

"Given that they are situated at the crossroads of research, education and innovation, universities in many respects hold the key to the knowledge economy and society"

As we transition to a knowledge economy/innovation society, the challenges are much more significant and daunting than those faced in the past. Our universities will be required to evolve from the role of active supporter in the 'investment driven economy' to that of leader in the 'knowledge economy'. They must be at the leading edge in the development of human capital.

These demands on the universities come at a time when there are significant challenges facing higher education. As noted in the foreword to the Skilbeck Report (Skilbeck 2001):

"...much of the current worldwide debate in the field of higher education is dominated by the imposing challenges of the new century. These include the impact of new technologies particularly in the communications field on higher education institutions and traditional modes of delivery; the changing demography in the student population particularly in the developed world; and the sources of funding for the ever increasing costs of investment in higher education."

As a response to a number of these challenges, Conference of the Heads of Irish Universities (C.H.I.U.) established a working group (the Group) of representatives from the seven universities to examine "New Forms of Learning". The Group was tasked with examining how the Universities might achieve leadership in the use of information & communications technologies (ICT). Since the initial meeting in Sept 2002, the group has worked to craft a vision of this leadership position and to outline the structures and policies required. As part of this process, the Group consulted with the Higher Education Authority (HEA), the IDA, Enterprise Ireland and industry.

The Group, having carried out a comprehensive review of the literature and developments in this area, share the following view of the future expressed by Chris Duke in *"Managing the Learning University"*:

"New ICTs, and especially the emergent technological convergences, point towards a very different configuration of higher education within a decade. No university management can simply ignore this ... It is evident in the literature and in widespread institutional behaviour ... that the future lies in the main, not with extremes and polarities, but with blended, hybrid or mixed-mode models". (Duke, 2002)

The Group concludes that 'New Forms of Learning', if adopted wisely, can enable increased access; can support and help fully realise student potential; can greatly facilitate lifelong learning. In addition, leadership in the use of ICT in our Universities can act as a catalyst and help position Ireland as a world leader in the fast growing eLearning sector.

Irish universities, working in close collaboration, now have an opportunity to create the structures and mechanisms to augment and enhance traditional forms of learning and teaching. Recent developments in technology and communications can help improve the efficiency, effectiveness and reach of education. As noted in the Skilbeck Report (Skilbeck 2001):

"Moreover the technological challenge is really about ways of maximising student learning, not simply installing electronic systems. It will require

institutions to abandon old rivalries and learn to work together. On-line developments are particularly worrying in this respect since only through more collaboration among universities and with media organizations can wasteful duplication and variable quality of courses and course materials and resources be avoided. This concern applies as much to on-campus programmes for full time students as to the more traditional category of part-time adults studying off-campus”

1.2 Structure of the remainder of this document

The remainder of this document comprises Sections 2 and 3, followed by Appendices and References.

Section 2 begins by examining the context for the “vision of eLearning”. It will then outline the driving forces behind the current move towards eLearning by considering the key motivators associated with implementing ICTs in HE. Current practice in eLearning will also be considered at both a national and international level and the benefits of eLearning described. The section will conclude with an exploration of the challenges and opportunities associated with eLearning in HE.

Section 3 discusses a collaborative vision and strategy for the development of eLearning in the Irish Universities and elaborates on a series of key recommendations for the Irish Universities to achieve world class status in eLearning.

The Appendices are mostly published online and available in printed form on request from the offices of C.H.I.U.

2.0 eLearning for Higher Education

2.1 Context for the “Vision for eLearning”

The last decade has seen the growing importance of enhancing educational programmes using Information and Communication Technology¹ (ICT). Governments around the world are strengthening their commitment to the use of these technologies, especially multimedia (Davis 1997, 1998). The three main reasons underpinning the adoption of such technologies in education are the potential to provide improvement in:

- the quality of the learning experience ;
- access to education and educational resources;
- the cost-effectiveness of the educational experience.

In the past the adoption of ICT within mainstream higher education programmes has been sporadic, rather than ICT being implemented as part of a planned, orchestrated support infrastructure. The employment of such technologies has tended to consist of ‘one off’ projects, which were initiated and driven by individual academics or departments. Over the past five years, however, the US, UK and other European countries have increased investment in WWW / Internet based educational technologies and services in an effort to establish a more structured and strategic approach to the use of these technologies. In the UK, substantial investment has been made in ICT in Higher Education under both the Teaching and Learning Technology Project (TLTP) and the Computers in Teaching Initiative (CTI). The former of these projects, TLTP, was evaluated by Coopers and Lybrand, the Tavistock Institute and the London Institute of Education. Their evaluation report concluded that:

“ ... existing products need to be embedded into teaching and learning structures for students. *This requires the addressing of issues such as cultural change within departments, time for academics to work ICT based learning into their teaching curricula, staff development and training and even a fundamental change in the role of teachers in some higher education institutions*” (Somekh 1998)

In order to co-ordinate the usage of ICT and to ensure best practice in this area, universities have established within their own institutions what are effectively ‘Learning and Instructional Technology Centres’. These centres tend to have as their central concern the assistance of teaching staff in the application of ICT within educational programmes and the adoption of best practice in this area. Examples of such centres in the UK and USA include University of Bristol’s Institute for Learning and Research Technology [ILRT] <http://www.ilrt.bristol.ac.uk/>, University of Exeter’s Learning and Technology Support Centre [LaTiS] <http://latis.ex.ac.uk/projects.htm>, and University of Virginia’s Teaching and Technology Initiative [TTI] <http://cti.itc.virginia.edu/tti/>. A key feature of these successful ‘learning centre’ initiatives is that in order to achieve the desired outcomes in this area, a holistic, educationally led approach to ICT enhanced learning is required: ICT-enhanced learning needs to be well integrated both within the university’s academic community and within the organisational infrastructure.

The provision of these centres and improved access to ICT resources goes some way to addressing the adoption of ICT in HE. However the long term success and impact of such centres is dependent upon establishing a critical mass from the ability to collaborate and create a greater awareness and skills pool across the university sector. Structures and ‘living networks’ which encourage and support collaboration across Higher Education are vital. Similarly it is

¹ Information and Communication Technology (ICT) has become the commonly used general term which includes such technologies as multimedia materials and delivery, computer software and hardware, databases, telecommunications, Internet technologies and the World Wide Web.

essential to address the 'soft' factors within each institution without which effective innovation will be impossible e.g. academic time and reward, cultural change at the departmental level, etc (Somekh, 1998).

From a technological perspective, the two main drivers for ICT enabled education have been:

The power, simplicity of use and ubiquity of World Wide Web technology and the almost exponential growth and relatively low cost of Internet connectivity

2.2 Drivers for eLearning in Higher Education in Ireland

Skilbeck notes in *The University Challenged* that in the past three or four decades universities have expanded and diversified. He remarks that at the turn of the millennium, universities are faced with a continuing demand to change and adapt:

'Individuals are seeking advancement while whole societies are looking to higher education and research to underpin economic growth, improve the quality of life and strengthen the social fabric. Universities have a vital role in helping to set new goals and directions for human development while maintaining a rich and ancient cultural heritage.' (Skilbeck, 2001)

The demand for change is fuelled by many components and championed by a range of stakeholders. Change is particularly prompted by advances in technology, which impact hugely and are to a great extent responsible for the fact that the university now finds itself at the centre 'of a vast network of intellectual, social, economic, cultural relationships, increasingly global in their reach.' (Skilbeck, 2001)

The motivators for action regarding the initiation or extension of the use of ICT in Higher Education stem particularly from legislative expectations, policy, and socio-economic expectations. The purpose of this section of this report is to outline key features which have created the impetus to move towards the wider utilisation of ICT in Irish HE today.

2.2.1 Drivers for eLearning - Legislative Expectations

The wider uptake of ICT in university teaching should reflect the 'Objects' of a University as cited in the Universities Act, 1997 (Department of Education and Science, 1997). The Objects, which are reflected in other legislative documents, such as the Education Act, 1998 and Qualifications (Education and Training) Act, 1999, outline the need for universities to advance knowledge and promote learning; promote quality; facilitate lifelong learning; contribute to the realization of national economic and social development; and to promote equality of opportunity

2.2.2 Drivers for eLearning – Policy - Quality, Access, Equality of Opportunity and Lifelong Learning

Quality is a consistent concern within HE. The recently published C.H.I.U. document, *A Framework for Quality in Irish Universities, Meeting the Challenge of Change*, outlines the quality assurance and quality improvement (QI / QA) process in Irish Universities, in terms of its context, goals, broad principles and procedures (C.H.I.U., 2003). A discussion on how ICT can improve the 'quality' of teaching and learning within a university is explored in detail in Section 2.4 of this report.

Closely related to 'quality' as a goal for universities are the concepts of access, equality of opportunity and lifelong learning. Patrick Clancy in his report *College Entry in Focus, A Fourth National Survey of Access to Higher Education* recognizes that though the 'higher education system has offered a diverse range of opportunities to an increasingly large percentage of the

young population. The distribution of these opportunities has, like the distribution of wealth, been extremely uneven.' (Clancy, 2001). He goes on to highlight that 'as more and more people participate in higher education the implications of non-participation are becoming more acute' (Clancy, 2001). The question of 'who goes to college' is a particularly pertinent one which has received much recent publicity.

Access to HE in Ireland is primarily through the second level 'points' route. As *Learning for Life, the White Paper on Adult Education* suggests, 'There are limited opportunities for alternative entry points for adults generally in the system. This is one of the reasons why Ireland has amongst the lowest mature student participation in higher education in the industrialized world' (Department of Education and Science, 2000). *Learning for Life* highlights that according to the OECD, *Education Policy Analysis, 1997*, only 2% of new entrants to degree level programmes in Ireland in 1995 were aged 26 or over.

One strategy towards the tackling of the access issue is to encourage the provision of more flexible approaches to HE. This flexibility, which is vital to lifelong learning, access and equality of opportunity, may partly be facilitated by the use of ICT. As noted in the National Development Plan:

'Training activities to support lifelong learning will involve the provision of more open, flexible, opportunities for acquiring skills. These will build on the following components which are already underway:

- Multimedia Learning Centres in Training Centres;
- Training delivered through the Internet'

(National Development Plan, 2000–2006)

Because of this flexibility 'the National Adult Learning Council and the HEA will be asked to explore mechanisms to provide financial support for initial course development work targeted at strategic areas, maximising the use of ICT and broadcasting in delivery.' as a particular priority. (Department of Education and Science, 2000). This topic will be discussed further in Section 2.4 .

Coupled with access is the requirement of universities 'to facilitate lifelong learning through the provision of adult and continuing education' (Universities Act, 1997). The development in all institutions of what Skilbeck calls a, 'lifelong learning mentality' is vital. The Department of Education and Science has identified as a high level goal within its *Strategy Statement 2001-2004* the promotion of 'lifelong learning'. It suggests that it will endeavour to achieve this goal through a number of strategic actions, one of which is the provision of ICT in support of learning (Department of Education and Science, 2001).

2.2.3 Drivers for eLearning - Socio-Economic Expectations

As noted previously, the development and impact of ICT is one of the key forces driving economic change. The HEA in *Creating and Sustaining the Innovation Society (2002)*, notes that:

'As we move into a new millennium, we see the higher education sector playing a more prominent role in advanced national economies and societies, which strengthens the traditional role and contribution of the sector. Higher education is now a provider and facilitator of wealth creation through the endowment of human capital and the generation and exploitation of new knowledge.'

(HEA, 2002)

Universities are no longer seen, nor can they any longer afford to see themselves, as secluded from society. They are now expected to be partners in society's development. This partnership is reinforced by the Universities Act where universities are committed:

to promote learning in its student body and in society generally,

to support and contribute to the realisation of national economic and social development,

to educate, train and retrain higher level professional, technical and managerial personnel.

(Universities Act, 1997)

The financial investment which the State has made in Higher Education has 'fuelled the growth of the economy and yielded an impressive private dividend to the individuals who participated' (Clancy, 2001). As Clancy notes, 'there has been a widespread recognition that education is a determinant of economic success for the individual as well as for society generally' (Clancy, 2001). Ireland has enjoyed considerable, indeed unprecedented, economic growth in the 1990s with an almost doubling of its GDP and increase by almost 50% in employment. The Fás *Irish Markets Review, 2002* notes that 'The phenomenal rate of economic growth could not have been sustained without corresponding increases in both the quantity and quality of the workforce' (Fás, 2002).

Universities are obliged to support and contribute to the realisation of national economic and social development. Such development is prompted by strategies expressed in documents such as the *National Development Plan (2000 – 2006)*, *Implementing the Information Society in Ireland* (Department of the Taoiseach, 1999), and the proposal for *Creating and Sustaining the Innovation Society* (HEA, 2002). The NDP recognises the significant role that education can play in the achievement of national goals. It states that:

'There is a clear consensus that investment in education and training has a very high rate of return and that it accounts for a significant proportion of the observed variation in economic growth rates around the world. Many studies have demonstrated the contribution of the rising educational levels of the labour force to Ireland's economic success.'

The HEA also recognizes that 'Education (particularly higher education), learning, research and technology will be at the centre of this transformation of Ireland from an Investment Driven economy to an Innovation Driven economy.' (HEA, 2002). In addition, the Government Action Plan for *Implementing the Information Society in Ireland* noted that, in order to ensure that Ireland may maintain and build on its economic success of recent years, and ensure that all of society can participate in the Information Society, 'it is vital that Ireland becomes both an early mover and a global player in the Information Society' (Department of the Taoiseach, 1999).

Because the Universities now have a more direct role in the economy, they are also potentially more exposed to the opportunities and threats of the open marketplace. In the past they faced little or no competition from outside the sector. Today, the Universities are only one player - albeit a very significant one - in the knowledge economy. While the new technologies provide opportunities for the Universities, they are seen by the corporate sector as removing the barriers to entry to the higher education marketplace.

Any economic and social development in Ireland in the future will have, to a greater or lesser extent, an ICT aspect to it. If Ireland is to continue to enjoy the economic growth to which it has become accustomed, steps must be taken to ensure that the 'the education system is equipped to increase its use of information and communications technologies and to meet the rapidly changing information technology skills needs of the economy' (National Development Plan, 2000-

2006). A timely and preferably collaborative response regarding ICT from HE providers, coupled with an effort to strengthen links with industry and community, should assist Ireland in its ambition to build on its economic success to date.

2.3 eLearning Practice

Each of the Irish Universities has addressed the application of ICT to teaching and learning in an individual way which reflects the unique culture of each institution. However, the Universities have much in common and there is considerable scope for shared practice and collaboration.

This section of this Report serves to provide an overview of current practice in the area of ICT, initially in the Irish university sector and, subsequently, from a global perspective. Specific details regarding the work which is currently taking place in each Irish institution may be found in Appendix 2. Prior to examining current practice, a brief introduction to the concept of eLearning / ICT is provided.

2.3.1 eLearning Practice - An Introduction

eLearning may be defined as 'the use of electronic technology and media to deliver, support and enhance teaching, learning and assessment' (<http://www.ilrt.bris.ac.uk/projects/eLearning>). At a basic level this could involve the use of MS PowerPoint as a presentation tool in a lecture; at the opposite end of the spectrum one might have a virtual campus providing 100% on-line courses.

It may be useful to fill in some of the gaps in this continuum and to divide ICT into two levels, namely, local network eLearning and Internet based on-line learning.

2.3.1.1 Local Network eLearning

Local network eLearning might involve the use of basic hardware and software at a local level within teaching and learning. This might incorporate:

- Using MS PowerPoint as a presentation tool
- Having a number of PC's in a lab networking and using particular software where the tutor can show her screen to everyone, show one student's work to the class etc
- Use of interactive white boards
- Use of audience response technology (ART)
- Use of brainstorming software
- Use of CD Roms e.g. tutorials on CD
- Etc

All of these systems work on a local level and do not require any Internet access. Also they tend to rely on 'stand alone' pieces of hardware or software.

2.3.1.2 Internet based on-line learning

Internet based on-line learning is learning which is accessed through the Internet often through a Virtual Learning Environment (VLE). VLE's have the capacity to host, manage, track and deploy a learning experience. Most VLE's provide basic "templates" within which content is arranged, without the requirement of high levels of technical skills or programming ability. Examples of VLE's include WebCT (www.webct.com) BlackBoard (www.blackboard.com) and TopClass (www.wbt.com).

VLE or other Internet based on-line learning often involves the following elements:

- On-line materials – e.g. copies of PowerPoint lecture notes, articles from journals, databases, information on learning events and conferences, noticeboards, FAQ's, past exam papers, prerequisite materials, links to other web-sites, etc.

Electronic Learning Objects - e.g. interactive tutorials, quizzes, multiple choice tests, video materials, animations, sound clips, simulations, games etc
Asynchronous Communication – interaction, on-line but at different times (non-real time interaction) e.g. discussions, presentations, debates, buzz groups etc
Synchronous Communication – interaction, on-line in real time e.g. on-line lecture, Internet relay chat, real-time audio, video conferencing, etc.

Appendix 5 gives more detail on the key elements of an eLearning environment and the eLearning activities engaged in by students and their teachers.

2.3.2 eLearning Practice - Irish Universities

Though there is some variation in terms of the structures which support ICT in teaching and learning in Irish universities, there are common features which may be identified. One of these features is the establishment in each Irish university of a centre/hub which addresses the area of ICT in the institution. These 'learning centres', 'centres of teaching excellence', or 'learning technology units' are concerned with assisting and supporting staff in the initiation and development of information technology and digital media innovations in teaching and learning. Many of the centres may be seen as a 'one-stop-shop' for university staff who are planning, developing, implementing and evaluating eLearning on campus. In addition, all the centres are part of a larger network of both service and academic departments within the university: these departments might include, Computing Services, Teaching Development Units, AV Centres, Education Departments, Quality Promotion Departments, Libraries, Language Labs and individual academic departments, faculties and schools.

In terms of personnel many, if not all, of the universities, have identified either a Dean, a Director, support officer, a teaching/learning technologist, or some other designated member of staff to oversee, co-ordinate and support these activities.

2.3.2.1 Ethos and underpinning values

What is typical of all centres is a commitment to quality and excellence. Coupled with this commitment is a student-centred, pedagogically-focused, innovative approach to learning.

In addition, many of the centres have long term educational goals. These may include:

- encouraging and supporting students to take greater responsibility for their learning.
- providing increased flexibility for students participating in the learning process.
- promoting IT to facilitate increased emphasis on interactive teaching across a broad range of courses.
- acknowledging and accommodating a diverse range of learning styles.

2.3.2.2 Aspects of current practice

Current practice in the implementation of ICT across the Irish HE sector involves a variety of combinations of some / all of the following activities:

- use of VLE's within undergraduate and postgraduate courses
- delivery of entirely on-line courses
- provision of on-line resource material e.g. on-line journals, on-line databases etc
- use of AV technologies and simulations
- web conferencing
- on-line tutorials and chat

video-conferencing
audience response technologies

The range of on-line courses offered across the universities is also significant. These include:

- Healthcare Informatics
- Remote Access to Continuing engineering Education (RACeE) programme – postgraduate qualification
- MSc in Internet Systems
- Masters in Project Management
- Diploma in Community Development
- Certificate in Health Services Management
- Graduate Certificate in Technical Communication
- Certificate in Management.
- Graduate Diploma in ICT in Education
- Irish Studies online, at undergraduate and postgraduate levels
- Masters in Technology Management (Atlantic University Alliance)
- Formation of the Lónra higher education network across the BMW region with technology equipped outreach centres

A number of universities outside of Ireland are engaged in similar ICT initiatives to those currently taking place in Irish HE. Some of these initiatives are at a more advanced stage than projects in Ireland and may provide useful background for Irish institutions as they continue to develop their ICT supported teaching and learning pursuits. Further information is available in Appendix 4.

In addition to establishing ICT projects within individual institutions, there are a number of examples of inter-university, national and international initiatives in this area also. Again links and further information are included in Appendix 4.

2.4. Benefits of eLearning

eLearning offers Irish Universities the possibility to completely transform their educational processes and develop world class teaching and learning systems. eLearning offers these possibilities because, as noted previously, it offers: (a) the potential to greatly increase the quality of teaching and learning and (b) the flexibility to greatly facilitate access to third level programmes. For these reasons, governments around the world are strengthening their commitment to the use of eLearning at all levels of educational systems. (Davis 1997, 1998).

2.4.1 Benefits - Quality

eLearning can greatly enhance the quality of the programmes offered by Irish universities by:

Providing opportunities for enhancing the student learning experience through programmes which can be adapted to a greater extent to the particular needs of the learner and which can, in many cases, provide greater stimulus and incentives.

Providing easy access to large volumes of the scholarly and research literature - ICT database and multimedia technology can provide access to extremely large collections of up-to-the-minute resources, from case studies to raw data in a variety of media formats, from research reports to collections of literary and historical texts. Information in electronic format also benefits from being more easily manipulated, analysed and synthesised than corresponding information in conventional analogue formats.

Greatly facilitating the use of a wider range of pedagogical approaches that encourage greater learner participation or “interactive engagement” in the learning process. Approaches such as collaborative learning, problem-based learning, project work, etc, whilst not

necessarily requiring eLearning technologies, are much easier to implement with an effective ICT infrastructure.

Facilitating increased communication between students, between teachers, and between students and teachers. Teachers can quickly become aware of emerging issues within their courses and respond flexibly. The communications technologies can also be used to support collaborative work amongst students and "team teaching."

Facilitating the incorporation of courseware, learning objects and other forms of computer-based teaching and learning materials.

Enabling students to adopt a more active, responsible role in the learning process thus encouraging them to become autonomous, life-long learners.

Providing tools for testing and activity tracking, which can be used for formative evaluation as well as assessment purposes.

2.4.2 Benefits - Flexibility and Access

Changing lifestyles and demographics will require a more flexible approach to the delivery of education. The flexibility and ease of access which is enabled through the new technologies, will allow those constrained by social conditions, family commitments, working hours, or location, to avail of higher education.

Due to the flexibility it offers, eLearning can:

Reach out to large numbers of students who cannot access existing programmes, including students resident outside Ireland

Deliver programmes in highly flexible and convenient formats which enhances their attractiveness to significant student groups and

Make viable the development of new programmes that currently would not attract sufficient students in the catchment area of each university.

The flexibility offered by eLearning is one of its most obvious advantages. While most interest tends to focus on the flexibility that eLearning provides to make programmes available to off-campus students, it should be noted that eLearning's flexibility could also be harnessed to make on-campus programmes more attractive to students. Possibilities include 'blended' programmes with elements of both "traditional" and eLearning; the 'extended' classroom; integrating work-based and experiential learning; etc.

However, it is in the provision of off-campus courses that eLearning offers possibly the greatest financial opportunity for Irish universities. This is particularly the case for post-graduate programmes which could be offered internationally. A particular opportunity, of course, will be in programmes on Irish Studies, Anglo Irish literature, Irish History, folk music, culture and ethnography which could find a ready audience among the Irish Diaspora and which Irish Universities are uniquely positioned to deliver via eLearning.

2.5 Challenges and Opportunities

Moving from the current situation to one of world-class standing in eLearning presents significant challenges and opportunities for the Irish HE sector. Other nations have invested considerably in eLearning developments over the past several years in terms of institutional and national infrastructure, staffing and expertise, software development, evaluation studies and policy

decisions. The situation in Ireland by contrast, has been one of “one-off” initiatives within individual institutions with low levels of funding, with consequent limited return and impact in either teaching and learning practice, or positioning on the international stage. It is clear now that a strategic, policy orientated approach is necessary sector-wide if Ireland is to succeed in reaping the potential benefits of ICT in HE.

2.5.1 Challenges and Opportunities - eLearning in HE.

The positioning of eLearning initiatives within the universities is crucial in facilitating development. If, as has to some extent been the case, eLearning is regarded as an “add on” component, removed from the core activities of institutions, it is likely to make little headway. In order to exploit the full potential of ICT, eLearning must become embedded as a key part of the standard repertoire of teaching tools and methods at the disposal of academic staff. Equally eLearning must be perceived by students as a valid means of facilitating effective learning.

Embedding such new technologies into the culture of an organisation is a challenge for the universities of today. With institutions opting for VLE's for both distance and, more recently, on-campus courses, staff and students need to prepare for and adapt to the change in modes of learning. Implicit, in change of this nature, is the need for training, support for students and teachers (both pedagogical and technical), and the integration/adaptation of existing structures and systems. In addition, another potential stumbling block for institutions is the natural instinct of both staff and students to resist change. However if both groups can tolerate the initial challenging phase of coming to grips with new technologies and new systems, the benefits for all, in terms of quality and flexibility will, in time, outweigh the effort.

2.5.2. Challenges and Opportunities - “Catching up” and collaborating

A challenge to Irish universities regarding ICT in HE is the fact that work to date in this sector has lacked co-ordination. However, regaining “lost ground” is still possible. In order to ‘catch up’ Irish universities, and other players in third level education, need to participate in the major international organisations, projects and discussion fora that are shaping the future direction of eLearning. Irish universities would be best served if their efforts to participate on a global scale were collaborative in nature. The current lack of a single voice representing the interests of the whole community is evident, particularly at the policy shaping level. eLearning offers universities the opportunity to define themselves as a collective community and to reap the associated benefits.

Working collaboratively could aid the widespread adoption of the “best practice” approaches to teaching and learning. Even working within traditional subject disciplines there is great scope for sharing practice, resources and ideas (as is the case in the UK LTSN subject centres, for example). Generic issues also can be highlighted by multi-disciplinary linkages and the availability of a “community of practice” of teaching staff. A repository of ideas, case studies and development materials would provide an excellent catalyst for this type of development.

Collaborative approaches to purchasing are already in place in a number of examples (e.g. CHEST Ireland, some journals, etc) and these could be extended to other areas with substantial bargaining power with suppliers, by necessity, negotiating sector-wide deals.

Collaborative working would also allow for:

- The sharing of course development costs with the possibility of individual universities taking responsibility for elements of programmes within their areas of greatest expertise;
- Co-operation in the provision of student support
- Common marketing including the 'branding' of Irish Universities as a marque of excellence

Greater levels of cooperation and collaboration are also essential if Irish HE is to protect its market share in the international arena (by, for example, jointly developing and/or marketing

eLearning supported courses), and defend itself against external competitors operating within Ireland. Whilst many of the original developments of “virtual universities” failed in practice to present a credible “threat” to Irish higher education institutions, a number of such organisations are becoming increasingly important and are having marked success in particular countries, in particular sectors of the potential student population. Regulations regarding degree awarding powers are also subject to change with international trade negotiations and this does present an issue for Irish universities, particularly given the need to seek a more diverse student body to address both issues of widening participation and demographic changes. If the seven universities do not collaborate to establish a strong eLearning presence both at home and abroad, then foreign universities (particularly UK and US based institutions) who are entitled to offer their programmes in Ireland will pose a long term threat.

2.5.3 Challenges and Opportunities - Educational quality before technological capability.

Universities are not merely about the transmission of knowledge, rather they are concerned with the provision of high quality learning that fosters individual growth, personal and professional development. eLearning, however, runs the risk of focussing attention on the information content instead of the educational process. This crucial issue can be neglected in the initial wave of enthusiasm with which organisations embrace new technologies. Thankfully, we in Ireland, are in the happy position of being able to learn from the weaknesses and failures of eLearning projects elsewhere, and to glean from these early experiments a wealth of practical experience.

2.5.4 Challenges and Opportunities – Student Retention

Many initial forays into eLearning have yielded high dropout rates. Student retention is one of the key issues currently receiving much attention in Ireland and it would be particularly ironic if a new development was to lead to a worsening situation, rather than the improvement that is currently sought by university management and government. How eLearning is used, the levels of support available and the quality of the materials will be decisive in this regard.

2.5.5 Challenges and Opportunities - Standards

Over the last several years there have been significant changes in the eLearning industry with growth and consolidation of key players, buy-outs and collapse of others. This has inevitably led to the situation that some of the early adopters of the new technologies suffered from developing materials and courses that were tied into proprietary formats which have subsequently either disappeared or been superseded. Though this is unavoidable in such an early developmental environment, it should be seen as an opportunity to insist that content developers and course providers adhere to the emerging standards for file formats, metadata (content description) and software interoperability. Such standards are now beginning to be adopted by the key players in industry and the education sector. Over the next few years we should see these standards becoming more refined and beginning to have a real impact.

2.5.6 Challenges and Opportunities – Academic Staff Development

As discussed earlier, eLearning will only have an impact in Higher Education if there is sufficient “buy in” from existing academic staff. Staff development is a vital component of any such culture change and of course the wider issue of professional development of teaching staff at third level is the subject of much current discussion. eLearning should be discussed within this context, rather than treated as a separate, standalone issue. The suggestion of a collaborative, multi-institutional staff development programme, possibly even supported through eLearning technologies has been mooted.

2.5.7 Challenges and Opportunities – eLearning and Cost

A number of prominent commentators have, in the past, made very optimistic predictions about the cost-saving potential of new teaching and learning technologies. In addition, various international agencies, including UNESCO, the World Bank and the European Union, have played a key role in promoting the use, and enhancing the profile of the new teaching and learning technologies. The impression is often given that such technologies will *ipso facto* lead to improved quality in teaching and learning at reduced cost. As MacKeogh has noted "In recent years, a largely uncritical consensus appears to have developed among policy makers about the benefits of technology in education." (MacKeogh, 2001).

Amongst the benefits cited for eLearning, is that of increased productivity and improved cost effectiveness. However, the potential for increased productivity will only be realised through extensive integration of the technologies into all aspects of the teaching and learning situation. The use of online courseware, specifically, for example, is only merited where there is genuine educational added value or where the scale of deployment justifies the substantial investment required for its production. Whether the use of new technology for the teaching and learning will lead to substantial cost reductions is a matter of some debate and in recent times the discussion has subtly shifted focus from "cost reduction" to "increased efficiency".

2.5.7.1 eLearning and cost: Resources

Some years ago, after reviewing a number of technology-based educational systems, Green and Gilbert wrote:

"We have yet to hear of an instance where the total costs (including all realistically amortized capital investments and development expenses, plus reasonable estimates for faculty and support staff time) associated with teaching some unit to some group of students actually decline while maintaining the quality of learning" (Green and Gilbert, 1995).

More recently, Bates has noted that:

"to assume that investment in technology will lead to reduced cost in higher education is to misunderstand the nature of the educational process in higher education and the relationship of technology to that process. Indeed, the introduction of new technology is more likely to lead to *increased* rather than reduced costs" (Bates, 2000).

At the core of any major development, of course, is the need for adequate levels of resourcing. eLearning is an expensive endeavour, at least in the short term, and this must be acknowledged by institutional management and funding bodies. The requirements involve hardware, software and staff, and is not simply resolved by purchasing a licence for a particular package. Implementing an eLearning strategy on the scale of a university, with several thousand students requires recognition that this is a "mission-critical" activity that cannot evolve in an ad-hoc mode. Funding must be in the form of recurrent, core support with appropriate build-in for equipment replacement, software renewal and support staff. Apart from ensuring a high quality of service, in terms of software, hardware and access, there is also the issue of supporting the development of new, multimedia materials. These will require, in many cases, specific skills such as programming, or graphical design, as well as hardware and multimedia production facilities. Currently few Irish universities are sufficiently well provided for in any of these areas. Failure to address this issue may well be the limiting factor in the growth of eLearning.

2.5.7.2 eLearning and cost: Time

The cost of supporting online learners is one area that has received particular attention. Rumble suggests that "The biggest and, I suggest, least costed ingredient in the costs of online learning is the cost of supporting learners online" (Rumble, 1999). Effective eLearning requires adequate academic staff development so that the processes of learning in this mode and in a "blended" hybrid of eLearning and "traditional" classroom methods are fully understood. There is a need

for understanding from management that eLearning can place a significantly increased burden on teaching staff in terms of time commitment to develop materials and to deal with increased volume of communication and higher demands for learner support. Course management and design procedures and protocols need to be developed with a view to shifting the emphasis in teaching towards greater student engagement and peer support. In addition, effective time management protocols may facilitate more effective use of class contact time.

2.5.7.3 eLearning and cost: Conclusion

Previously enthusiastic supporters of eLearning, while maintaining hope, have become more sober in their prognostications. To quote John Daniel² in the preface to a recent UNESCO publication on educational technologies, "Impressive advances in technology over the past few years provide new hope that technological solutions, intelligently applied, can allow greater access, higher quality, and lower cost per learner. To achieve massive improvements through technologies will require learning from past mistakes and careful analysis of how to innovate broadly and durably." (Haddad and Draxler, 2002).

² Previously Vice-Chancellor of the UK Open University and currently Assistant Director-General for Education, UNESCO

3.0 Strategies & Recommendations for Achieving Leadership in eLearning for Higher Education

3.1 A Collaborative Vision of eLearning in Irish Higher Education

Ireland should aspire to be a world class centre for eLearning. Nationally, Ireland, and the Irish HE sector is at a critical stage in the development of elearning, where there is an opportunity to “leap-frog” other nations, exploiting the outcomes of their past experience (and past failures) in this area. However, this opportunity will not continue to be available for long. In surveying eLearning practice across the HE sector, examples of excellence in eLearning expertise, activity and research have been identified. Such excellence provides an ideal basis from which to develop eLearning expertise and establish an international leadership position. It is vital therefore that decisive action is taken now to build upon and extend our eLearning capability.

The future vision of eLearning in the Irish HE sector is one of a vibrant, dynamic and creative environment that facilitates wider participation and a richer student learning experience. It envisages a range of technical and professional services to support academics in devising, (re)using, developing and delivering eLearning experiences, either within blended or predominately distance learning scenarios. The vision supports a student centred approach, where academics choose and integrate the most appropriate learning strategies for their courses. Such eLearning is pedagogically driven to support active student learning with a focus on high levels of student engagement. The vision supports the empowerment of academic and university staff to exploit the benefits and opportunities offered by eLearning.

The vision is also a collaborative one which incorporates significant sharing of teaching and learning resources and materials across the entire HE community. Leadership in the use of ICT in higher education also has huge direct benefits to the ‘knowledge economy agenda’. By leading in the adoption of new forms of learning, the universities can act as a catalyst for the development of the entire eLearning industry sector in Ireland.

3.2 Strategies & Policies for Promoting eLearning in Higher Education

In order to realise this vision, eLearning, needs to become fully integrated within university policy and practice, impacting on teaching, learner support, staff training and professional development, libraries, infrastructure, and beyond. Specific areas of policy, that have already begun to be addressed in most institutions include the following.

Staff Development Policies: Staff who wish to implement eLearning will require appropriate pedagogical and technical training as part of their career development programme. Such skills training could be offered as a combination of local university courses/workshops as well as being offered collaboratively across universities.

Academic Recognition Policies: If academics are expected to use eLearning techniques and in some cases develop eLearning resources, some form of appropriate academic recognition for this work needs to be provided. Such recognition will typically vary between universities e.g. for promotion purposes, for relief from other academic duties etc.

Infrastructure Policies: In order to achieve eLearning access and support, policies are required which would direct the selection and use of eLearning tools for content authoring, learning management systems (LMS), assessment tools and evaluation tools, as well as network and computing provision.

Incentive Policies: To achieve a critical mass of eLearning usage within a university, incentives need to be offered to encourage the adoption of eLearning techniques. These incentives could be in the form of direct payment, support grants, temporary reduction in other academic duties, provision of extra eLearning development support etc.

3.3 Key Recommendations & Proposed Structures for eLearning in Higher Education

University Level

Recommendation #1: Change Management

It is recommended that Heads of University and senior management must take ownership and actively lead the change agenda as a strategic priority. The optimisation of the use of ICT for education in Universities will involve significant organisational and cultural change.

Recommendation #2: Build Local Capability for eLearning Support

It is recommended that each University should further build capability for eLearning that complements existing and new teaching and learning methods. Based on the summary review of practice at Irish Universities (see Appendix 2), it is clear that there is significant capability within the Irish Universities. eLearning within the Universities is focused on improving the quality of learning for both on campus and off campus students, as well as providing more flexible access to learning resources and opportunities.

Within the universities, this would support the current 'blended' approach of on-line and face to face teaching and learning, which represents the majority of eLearning usage. This local eLearning capability should also support the growing number of eLearning courses which are predominately delivered off-campus. This locally available eLearning expertise and capability are vital in encouraging the cultural change which is required to successfully harness the benefits of eLearning within each University. This capability should incorporate 'eLearning group(s)' within each university which serve to focus initiatives and provide local support.³

However, achieving local capability for eLearning requires more than technical and pedagogic expertise and service. Top level eLearning strategies are required for change at individual, departmental and faculty levels. Areas that require to be addressed include academic recognition and reward; embedding eLearning in staff development, as well as curriculum development and review, quality enhancement, copyright and IPR issues.

A third aspect of local capability for eLearning is establishing the necessary quality controls and evaluation processes to assess the impact and penetration of the eLearning activities within the University. As eLearning is a rapidly evolving field, research and evaluation is required to ensure that the eLearning activity is informed by international best practice.

C.H.I.U Inter University Collaboration

Embracing new forms of learning provides significant opportunity. As evidenced by the international landscape, which is littered with failed attempts, scale and sustained momentum will

³ Because of the different organisational structures in each university, the organisational siting of eLearning units is not the same within each university. However, experience has shown that such units need to be pedagogically driven and be integrated into the centre of the teaching and learning practice in the university, with strong linkage to other services such as IT Services, library, staff development.

be amongst the key factors for the success of initiatives in this area. The CHIU members will require to embrace the need for strong collaboration, sharing expertise and resources (through, for example digital repositories and professional groupings). The first stage in this process is elaborated as follows.

Recommendation #3: Establish an active CHIU Steering Group for eLearning activities

It is recommended that C.H.I.U. establish an eLearning Steering Group. This eLearning Steering Group will have representatives from each University, assisting the development of policy and the monitoring of practice. The brief of the eLearning Steering Group will include:

- advising and informing C.H.I.U. and other groups regarding eLearning issues
- representing Ireland in the International eLearning arena
- promoting and supporting innovation in eLearning
- funding eLearning initiatives, particularly inter-university projects
- acting in the role of a catalyst for collaboration.

Recommendation #4: Establish CHIU University Community Portal on eLearning (Appendix C)

It is recommended that C.H.I.U. set up a University community website, HEAnet hosted, to provide an access portal to information about eLearning and to stimulate collaboration and sharing of eLearning resources. In the review work, a basic website was produced as part of the working group's research (Appendix 3) which should be further developed and supported as a valuable resource on eLearning,

Recommendation #5: Provide Access to on-line Journals & Databases

It is recommended that the Universities exploit all opportunities for joint purchasing of online journals and online aggregated journal databases. This work should be carried out in consultation / conjunction with representatives of Irish University Libraries. Such resources are very important in facilitating access to quality, on-line educational material for student learning and research.

Recommendation #6: Establish mechanisms and service to support shared learning object repositories

It is recommended that digital repositories be created to facilitate sharing (storage, access and retrieval) of eLearning content, multimedia documents and assets. This reflects a growing international trend in the development and exchange of "learning objects" and is a key area for future research growth. In addition, the provision of such repositories (and their interoperability with other online collections) will foster the growth of collaborative programmes and strengthen the links within the teaching community.

Recommendation #7: Foster the development of Joint Courses/Programmes

It is recommended that the Universities develop a common on-line course which would provide a professional qualification for lecturers in the teaching and learning in higher education with a strong emphasis on eLearning techniques. This course should be developed as a best of breed eLearning programme. There are a number of excellent examples of multi-institutional programmes already established in Ireland. Indeed, a recent example of an entirely eLearning delivered course is the Masters in Technology Management run by the Atlantic University Alliance (NUI, Galway, UCC, University of Limerick). *It is recommended that further such initiatives be strongly supported and potential candidate topics be identified by the Steering Group.* As

mentioned earlier, one potential candidate is the provision of a collaborative course in teaching and learning methods.

Research

Recommendation #8: Stimulate collaborative eLearning Research

It is recommended that the Universities, through an active collaborative programme of research, establish Ireland as a centre of expertise in eLearning pedagogy and technology. Competition for research funding through European and other international initiatives dictates that Irish Universities should act in unison as a single powerful body, bidding for funds and carving out a position in the research landscape.

Industry and other Sectoral Partnership

A university sector led partnership with industry, backed and supported by the development agencies could provide the catalyst for building a world class leadership position in eLearning for Ireland.

Recommendation #9: Establishment of eLearning Agency to support and encourage University Collaboration across the HE sector as well as with industry.

It is recommended that C.H.I.U. establishes a ELearning Agency with clear objectives of increasing access and improving quality in a cost effective manner for the Higher Education and Further Education sectors. The new entity would seek funding from HEA, IDA, EI, DETE and industry partners. The agency would assist the HE and industry sectors to:

- Fund Research Initiatives at the seven Universities and partner institutions from the wider HE community
- Direct eLearning Pilot programmes with Industry
- Engage in Market Research / Identify Niche opportunities
- Commission & Buy Content
- Manage & Broker content
- Develop & Market Education Products internationally
- Maintain Quality

Appendix 1

C.H.I.U Working Group Members

Ms. Alison Farrell	Teaching Support Officer, Quality Promotions Office	NUI Maynooth
Dr. Patrick Felle	Director, Centre for Healthcare Informatics	UCD
Mr. Seamus Fox	Learning Technology and Teaching Coordinator, Oscail	DCU
Mr. Martin Hayes	Director, Computer Centre	UCC
Dr. Iain MacLaren	Director, Centre for Excellence in Learning & Teaching	NUI Galway
Dr. John O'Brien	Associate Vice President Academic	UL
Dr. Vincent Wade	Director, Knowledge & Data Engineering Research Group	TCD
Mr. Michael McGrath	Department of Computer Science	
Mr. Eoin O'Driscoll	Director Aderra Limited	C.H.I.U. Chair

References:

Bates, AW (2000): *Managing Technological Change: Strategies for College and University Leaders* Jossey-Bass, San Francisco

C.H.I.U. (2003): *A Framework for Quality in Irish Universities, Meeting the Challenge of Change* www.chiu.ie/Quality.pdf.

Clancy, P (2001): *College Entry in Focus, A Fourth National Survey of Access to Higher Education*. http://www.heai.ie/pub_rep/reps.htm

Davis, N (1997) *Future Trends*. in *From Globalising Education, Trends and Applications*, (Chapter 12) Routledge, 1997

Davis, N (1998) *Strategies for staff and institutional development for IT in education - An integrated approach*. in *Using IT Effectively in Teaching and Learning*, eds. Somekh & Davis, 1998

Department of Education and Science (1997): *Universities Act (1997)* http://www.education.ie/servlet/blobServlet/act_universitiesI_1997.htm

Department of Education and Science (2000): *Learning for Life: White Paper on Adult Education*. www.education.ie/servlet/blobServlet/fe_adulted_wp.pdf

Department of Education and Science (2001): *Strategy Statement 2001-2004* http://www.education.ie/servlet/blobServlet/dept_strategy_2001.pdf

Department of the Taoiseach (1999): *Implementing the Information Society in Ireland*. www.taoiseach.gov.ie/upload/publications/238.pdf

Duke, C (2002): *Managing the Learning University* Open University Press ISBN 0 335 20765

European Commission (2003): *The Role of the Universities in the Europe of Knowledge* http://europa.eu.int/eur-lex/en/com/availability/en_dpi_availability_number_2003_02.html

Fás (2002): *Review of Irish Labour Markets Trends and Policies* Fás, Dublin

Gardner, HE (1999): *Multiple Approaches to Understanding in Reigeluth, Charles M (Ed) Instructional-Design Theories and Models A New Paradigm of Instructional Theory Volume II* Lawrence Erlbaum Associates, Mahwah, New Jersey

Green, KC and Gilbert, SW (1995): *Great Expectations: Content, Communications, Productivity, and the Role of Information Technology in Higher Education*. *Change*: March-April 1995, pgs 8-18

Haddad, WD and Draxler, A (Eds) (2002): *Technologies for Education: Potentials, Parameters and Prospects* UNESCO, Paris and Academy for Educational Development, Washington

HEA (2002): *Creating and Sustaining the Innovation Society* www.heai.ie/Research/HEA%20Innovation.pdf

MacKeogh, K (2001): *National Strategies for the Promotion of On-Line Learning in Higher Education*. *European Journal of Education* Vol 36, Num 2, pgs 223-236

National Development Plan 2002-2006 (2001). <http://www.ndp.ie>

Rumble, G (1999): *The Costs of Networked Learning: What have we Learnt* Paper Presented at FLISH99 Conference Available at: <http://www.shu.ac.uk/flish/rumblep.htm>

Skilbeck, Malcolm (2001) *The University Challenged: A Review of International Trends and Issues with Particular Reference to Ireland* Conference of Heads of Irish Universities and Higher Education Authority, Dublin ISBN 0 904556 76 X Available at: http://www.heai.ie/pub_rep/index.htm

Somekh, B (1998) *Supporting Information and Communication Technology Innovations in Higher Education*. Journal of Information Technology for Teacher Education, Vol 7, No. 1, 1998

Trow, M (1999): *Lifelong Learning through the New Information Technologies*. Higher Education Policy Vol 12, pgs 201-217