Chapter 10
Around the corner

Mostly throughout this book we have been surveying the current scene with a view to what's likely to happen over the next five years or so. What about the next ten, fifteen and twenty five years? Here, we look ahead to the brave new world of education in the 21st Century.

First we consider the likely impact of a number of technological developments. The ideas are presented as brief notes with some references that are very suggestive of how things might progress. We conclude by highlighting the inter-related "great debates" that are the current concerns of the educated world and whose outcomes will help shape the coming world of education.

The technological developments we look at include:
• the creation of seamless systems;
• intelligent agents; o electronic publishing;
• universal systems for "managing knowledge";
• virtual reality and virtual presencing.

The great debates we look at are concerned with the role and form of HEIs in the context of globalisation and the need for sustainable development.

Links for Chapter 10
IBM itself is a member of the IMS metadata standards steering group and has particular responsibility for advising on the metadata standards that would be used for curriculum management and student data systems. See IBM's Higher Education web-site.

"Intelligent tutoring" will develop so that instruction becomes more individualised and more conversationally informed. Intelligent agents will converse with users who wish to get to know you, to know what you want to learn, to know what your interests are. Already these sorts of developments are being developed and piloted by the Media Lab at MIT.
Electronic publishing
It is likely that publishing will be further transformed and web publishing will become the norm. Texts will be accessed and printed out on demand; there will be electronic metadata means of charging for these services. There will be electronic means of assessing research activity in terms of numbers of citations and the number of times publications are accessed. All these possibilities were anticipated by Ted Nelson in his Project Xanadu (Nelson, 1990). As an example of developments, the Bath Information and Data Services (Bids), used by 70% of UK universities, has more than a 1000 journal titles online from Elsevier Science, along with titles from OUP, Blackwell's, Academic Press and John Wiley.

Universal systems for "managing knowledge"
As well as intelligent agents there will be a number of tools and systems developed to support what is now known in the business world as "knowledge management". There will be the development of increasingly sophisticated metadata systems, offering multiply faceted views of data and data about data. There will be increasingly sophisticated ways of visualising and mining data, including ways of exploring the "cyberspace" of the Internet. See for example Martin Dodge's web site, "The geography of cyberspace"

The European Commission has established the 5th Framework Programme for research and development concerning Information Society Technologies

Gordon Pask was prepared to consider the possibility that our current generation of computing devices might one day metamorphose into a system "like a brain and carry out operations that are mindful". Pask asked, "How do we view ourselves and our society, confronted with the prospect of being transformed beyond our imaginations? Have we wit enough to fear the future? Have we wit enough to overcome that fear?". See also the Pask memorial web site

"Using a constellation of low-Earth-orbit satellites, Teledisc and its partners will create the world's first network to provide affordable, world-wide,'fiber-like' access to telecommunications services such as broadband Internet access, videoconferencing, high-quality
voice and other digital data needs. On Day One of service, Teledisc will enable broadband telecommunications access for businesses, schools and individuals everywhere on the planet”.

Virtual reality and virtual presencing The use of 3D visualisation where people represent themselves and others as avatars is already being explored in gaming and socialising in MUDs (Multi-User Dungeons). See, for example, the website for "Worlds Ultimate 3D Chat Plus"

It is possible with other technologies such as laser holographic projections and immersive virtual reality to achieve full virtual presencing, for example one might attend a committee meeting and experience sitting at a table with colleagues when, in fact, one was sitting with holographic projections and colleagues elsewhere are experiencing a similar phenomenon. Such developments are already being explored at MIT's Media Lab.

Globalisation and related issues
At the transnational level the great debates about the future of higher education inevitably overlap with other great debates, such as how to address world poverty and the need for sustainable development. Associated with the problem of world poverty, there is the problem of world literacy levels. When as many as 80% of the worlds population cannot read or write, how are educational opportunities to be delivered? What is the role for HEIs and a (possible) virtual, global university in all this? There are at least two main ways in which the Internet may be expected to play a significant role: it may serve as the key medium for delivering quality information and educational materials to the parts of the world where it is most needed; it may provide the forum and the many sub-forums for planetary conversation to takes place, a medium for supporting political debate locally, nationally, and internationally. Re the latter, for examples of current developments, see Democracies Online.

Education for sustainability
Of particular interest for the HE sector is Second Nature "a non-profit organisation working to help colleges and universities expand their efforts to make environmentally sustainable and just action a foundation of learning and practice. Education for Sustainability (EFS) is a lifelong learning process that leads to an
informed and involved citizenry having the creative problem-solving skills, scientific and social literacy, and commitment to engage in responsible individual and co-operative actions. **Second Nature** focuses on colleges and universities because they educate our future teachers, leaders, managers, policy makers and other professionals”.

**Governance and sustainability** Of more general interest is the United Nations Development Programme (UNDP), which has a Management Development & Governance Division (MGDG) with the aim of "sharing knowledge for good governance".

The UNDP's has a vision of development "that centres on people's choices and capabilities and that does not undermine the well-being of present or future generations. The UNDP has termed this approach sustainable human development, meaning development that not only generates economic growth but distributes its benefits equitably, that regenerates the environment rather than destroys it and that empowers men and women rather than marginalises them ... Such development depends on good governance, including the empowerment of individuals and communities. The challenge for all societies is thus to create a system of governance that promotes, supports and sustains human development, especially for the poorest".

**Global knowledge development**
In the early summer of 1997, there was a conference in Toronto entitled Global Knowledge Development 1997. The conference was supported by the World Bank and other institutions. As part of the lead up to the conference and as a follow on, a mailing list discussion group was formed (gkd97). A number of issues associated with globalisation, sustainable development and the impact of new technologies have been discussed. Discussions are archived at the [Global Knowledge Partnership web site](http://westworld.dmu.ac.uk/vu-rbl/sections/ten.html).

A particularly clear and focused voice in the gkd97 discussions is that of **Michael Lootes**. Lootes has developed the Humanity Libraries Project (formerly known as Humanity CD-ROM Project). The project aims to achieve "massive information diffusion to developing countries to help solve poverty, to increase human potential, and to provide education to all".
Chapter 9
Changing cultures in higher education

By the culture of an educational institution, we mean, as do social anthropologists, the shared beliefs, attitudes and ways of behaving that give a social group its identity. In traditional HEIs, there is a well-established culture. Roles are reasonably clearly defined. Participants in the community have strong expectations about how they and others should behave: students study, lecturers teach and do research, support staff support, administrators administrate and managers manage.

Under the impact of new technologies and other changes in higher education roles, expectations and potentially whole cultures are changing and being re-engineered or reconfigured. As is to be expected from a move towards greater use of RBL (as defined in Chapter 2), both those who teach and those who are taught are likely to be greatly affected. Here we will examine these assumptions in a little more detail drawing on evidence and examples.

As well as examining the changes in established roles we will also need to consider new roles that are evolving or are created de novo as processes and systems change and new needs have to be met. The chapter is organised as follows:
• we review in fairly general terms the changes of role and expectation that are occurring, for teaching staff, students, support staff, managers and administrators;
• we present brief case studies illustrating how RBL can be successfully "embedded" as a significant component in traditional courses;
• we look in more detail at staff development needs, drawing on the authors' own experiences of delivering courses about RBL to academic staff.

Links for Chapter 9
Amongst other useful sources dealing with "culture change" in HEIs we particularly recommend:
the National Council for Open and Distance Education's (Australia) web site
Embedding RBL at De Montfort University The UK's Teaching and Learning Technology Programme (TLTP) was launched in 1992 by the Universities' Funding Council (UFC), with an eventual budget greater than thirty million pounds. The aim of the project is "to make teaching and learning more productive and efficient by harnessing modern technology", (TLTP Central Web Site

The"Electronic Campus" web-site includes the in-house development of RBL materials for on-line delivery and institution-wide use of CAA and CMC.
Chapter 8
Integrated systems

Introduction
In this chapter we will examine developments towards integration and the creation of virtual learning environments. This integration has a number of facets and in particular we will focus on: the growth of integrated course delivery systems the development of standards to enable the exchange and integration of teaching material developed in a variety of contexts the integration and re-use by teachers of educational objects developed by others and the development of an "educational economy" to support this process.

Virtual learning environments
A recent feature of the web has been the development and growth of virtual learning environments (VLE's) or course delivery systems. Typically these systems will include course materials, assessment facilities, conferencing and chat software as well as management tools for student administration and monitoring. Some systems will also include authoring tools. These systems are known by a number of names for example "online delivery applications" or by their proprietary names such as WebCT, LearningSpaces or TopClass.

They are all relatively new but their popularity is increasing rapidly. WebCT for example claims that in February 2000 it had over 5.2 million student accounts in over 1150 institutions in 51 countries [http://www.webct.com].

Links for Chapter 8
WebCT claims that in February 2000 it had over 5.2 million student accounts in over 1150 institutions in 51 countries.

A comparison system An essential reference source for anyone considering the adoption of a VLE is Dr Bruce Landon's 'Online delivery applications: a web tool for comparative analysis' (Landon, 1999) The site is designed to help educators evaluate and select online deliver applications. The site contains detailed information on, and specifications of fourteen such
systems. It enables you to make a direct comparison of the feature sets of any two applications as well as providing a full comparison table of all applications. The various features of these systems are weighted so that the comparisons made are more useful than a simple counting up of ticks on a chart. The web-based tool for making these comparisons may be downloaded for personal or educational use. Institutions can therefore undertake their own evaluations of specific systems and compare their findings with those already published. In addition the weightings for various elements can be changed so that institutions will be able to undertake evaluations using an instrument that reflects their own priorities.

IMS is now an initiative of EDUCAUSE an organisation with membership from many leading US academic institutions and supported by many of the largest computer and software companies, publishers and other content providers, US Government departments and international representatives. In the UK this representation is co-ordinated through the Joint Information Systems Committee (JISC).

ARIADNE The European Union Commission has funded an important project, Ariadne, involving a range of partners across Europe. "The project focuses on the development of tools and methodologies for producing, managing and reusing computer-based pedagogical elements and telematics supported training curricula." (Ariadne 1998). This involves the development of an international system of interconnected knowledge pools (KPS) and producing tools and basic methodologies for maintaining and exploiting the KPS in a wide variety of educational and training contexts. The project is now in its second phase where the tools and methodologies are being refined, tested and evaluated. IMS and Ariadne

Partners in Ariadne and IMS have recognised that it would be inappropriate to develop competing metadata systems, indeed to do so would contradict the underlying principles of both projects. They have therefore agreed to co-operate under the auspices of the IEEE LTSC Committee. The proposed common core shall be designed in view of fostering the interchange and reuse of educational resources across linguistic and cultural barriers and shall strive to remain commercially, pedagogically and culturally
neutral. (Ariadne 1998). Extending the EOE One aspect of the concept of a community of users is that institutions are actively encouraged to take the basic EOE database shell and use it for their own purposes. The shell can be customised in order to meet different users needs. It is hoped that a network of EOE will be developed on the web, encouraging and extending the original concept. A copy of the database and instructions for use and customisation can be downloaded from the main EOE website.
Chapter 7
Using the internet: computer aided assessment

The assessment of students' work in Higher Education is one of the most important aspects of teaching and learning but it can also be one of the most resource intensive. If Communications and Information Technology is to produce real savings in staff time and resources then Computer Aided (or assisted) Assessment (CAA) systems will play a key role. The Internet has given a new 'lease of life' to some forms of CAA as well as stimulating the development of others.

This chapter examines the following:
• CAA and the World Wide Web;
• the purposes of assessment;
• the range and types of tests now available;
• some future developments.

Links for Chapter 7
Over many diverse topics, LSA scores have agreed with human experts as well as expert scores agreed with each other. Details of the work of the LSA group at Colorado University can be found here.

Hot potatoes supports the following:
• multiple-choice
• fill-in-the-gap
• short-answer,
• jumbled-sentence
• crossword-puzzle

Cloze test example from Hot potatoes

Email also facilitates the unauthorised sharing of answers and work amongst students. In the UK the Joint Information Systems committee (JISC) is funding investigations into this area.
Chapter 6
Computer mediated communications for collaborative learning

In this chapter we try to answer some questions related to:
• what do we mean by computer mediated communication;
• what are the opportunities offered by computer mediated communication for human to human interaction;
• how it can be used in the learning process and how it affects the nature of learning
• how the roles of the teacher and students change;
• learning collaboratively, what works and what doesn’t.

We have already seen that the Internet's greatest potential for education is its capacity to bring people separated by space and time together online and to give them access to learning resources from around the world. This form of communication mediated by the computer offers great opportunities for interaction that is essential to the learning process. Bates (Bates, 1995, p.52) makes the distinction between individual interaction and social interaction:

'There are two rather different contexts for interaction: the first is an individual isolated activity, which is the interaction of the learner with the learning material, be it text, television, or computer programme; the second is a social activity, which is the interaction between two or more people about the learning material. Both kinds of interaction are important in learning'
Bates, 1995

Interaction with a myriad of resources on the Internet is described elsewhere in this book and in particular in Chapter 5. We will focus here on human to human interaction.

Links for Chapter 6
MOOs have immense potential for use in educational environments where the need for virtual 'face to face' communication. An example is the BioMOO used as part of an online course in Principles of Protein Structure offered by Birbeck College, University of London. The BioMOO is a virtual meeting
place for biologists to meet other biologists and colleagues from related fields to brainstorm, to hold seminars and conferences. More information about the BioMOO.

Interesting web sites for information and links to educational MUDs/MOOs covering a range of topics and several languages can be located here and here.

Internet discussion lists have been around since 1975. One discussion site directory, Liszt currently has 90,095 mailing lists. Many of these discussion groups are maintained via special software programs such as Listserve, Major domo and Listproc. Basically these programs hold subscription lists of e-mail addresses and allow all those on the list to send mail to all the others on the list through the same single e-mail address.

Some interesting information about educational focused discussion lists can be found at here and here.

The UK Open University Knowledge Media Institute has successfully used Internet based audio delivery for several large scale applications including a series of expert lectures and seminars, based on the concept of talk radio, and a Pub Quiz.

In the U.K the development of high bandwidth ATM Metropolitan Area Networks (MANs) which link educational and other relevant organisation in a particular Metropolitan area are paving the way for testing ATM videoconferencing. For example the Scottish Higher Education Funding Council (SHEFC) has supported the use of the Scottish MANs by providing funding for ATM video conferencing studios to be installed in most Scottish HEIs.

One-way video-streaming on the WWW is now being used in institutions such as to broadcast lectures directly to distance learning students on their computer desktop.
Chapter 5
Resources on the world wide web

In the previous chapter we discussed some of the major development issues to be considered when producing web based teaching materials. One important consideration is whether suitable materials exist already and if so can you use or adapt them? We have seen that one of the major strengths of the web is the ability to use existing resources and materials by linking to them. Equally you will find on the web a vast array of materials that you may not wish your students to access directly but are of great use to you in researching and developing your teaching materials. Either way in order to make use of these resources you need to first of all locate them and, given the wealth of resources available, have some means of evaluating them.

This chapter:
• examines the range and variety web based resources relevant to educators;
• considers how we assess the appropriateness of what has been located.

The final section of this chapter is about the future of searching, storage and management of information on the web.

Links for Chapter 5
The OCLC - Online Computer Library Center is a non-profit computer service and research organisation whose network and services link more than 24,000 libraries in the USA and 63 countries.

The Library of Congress Perhaps one of the best places to start is the world's largest repository of knowledge. A visit to the site's statistics section provides some indication of the interest and usage of this site.

US National Library of Medicine The National Institutes of Health gives free access to the US National Library of Medicine's MEDLINE bibliographic database, which covers the fields of medicine, nursing, dentistry, veterinary medicine, the health care
system and the preclinical sciences. The database covers more than nine million references to articles published in 3800 biomedical journals published in 71 countries. To access full articles one must use either traditional methods or register to join a service and pay a fee. An alternative access path to 11 free databases hosted by the NLM is via the Internet Grateful Med site.

The Internet Public Library This isn't a library in the traditional sense, but a meta-library; a library that refers to and stores information about publications and other institutions rather than the original sources themselves. You can't take a book out or read a newspaper in the reading room, but in a sense you can go one better and read it wherever you can go online. This library refers to online books, magazines and serials in every subject category. Every entry is written by a trained librarian and provides an abstract, web address (URL), publisher, language, frequency, type (e.g. magazine, journal, e-zine) and the subjects covered. The mission statement establishes its credentials in no uncertain way, "The Internet Public Library is the first public library of the Internet ... Our mission directs us to serve the public by finding, evaluating, selecting, describing and creating quality information resources". For those using or directing others to use the web as a source of information this might be an excellent place to start. One of the sections at this site is called 'Great Libraries on the web', and a link or two away is the Rare Book, Manuscript and Special Collections Library of Duke University, USA. This resource is special in that you get as close, digitally, as you can to the real object.

The WDVL: The Virtual Library of WWW Development The Virtual Library of WWW Development is one of the best sites on the web for finding web-focused materials. It's worth visiting the home page for this 'library', to see the structure.

The Electric Library This particular library demonstrates some very good features of libraries on the web, as well as pointing the way for future developments. For example, it is very large, with real resources, i.e. the actual articles rather than references to them. In its own words, "the Electric Library currently contains 9,463,735 newspaper articles, 711,632 magazine articles, over 446,016 book chapters, 1,523 maps, 129,727 television and radio
transcripts, and 98,859 photos and images". However, whilst the search engine is powerful, and lists finds in terms of relevance, date, size and reading difficulty, a click on a link only takes you to a page asking you to subscribe to a paying service.

Many e-journals have adopted a form of open peer review, typified by this statement from the Journal of Interactive Media in Education, "All JIME articles are integrated with a structured web discussion space. Reviewers and authors debate a submission, after which open peer review is invited. An edited version of this discussion is preserved with the final publication, providing a forum for subsequent commentary and links to related material."

The Zine and E-Zine Resource Guide site takes you to Mike Gunderloy's "How to Publish a Fanzine". The author raises issues about the theory behind e-zines, their history, the different genres, the place of e-zines that exist to review e-zines and personal reflections on the implementation and history of zines.

Reuters' site doesn't just advertise its commercial arm, but provides news reports complete with audio and movies, so it's a true multimedia resource.

'Chat' Discussion groups and newsgroups are asynchronous, that is, conversations between posters doesn't take place in real time, but in chat groups they do. One advantage of the format is its immediacy of communication, and conversely it lacks the opportunity for consideration between replies. There are no archives to the chat system, unless you choose to save everything to your own computer, so searching of archives is not an option. One of the web's best directories for chat sites is, again, Liszt Exploratorium - one of the most interactive museum sites on the web.

The Collaborative Laboratory We've already discussed the idea of a virtual library that encompasses more than one physical location. The same idea can be applied to the virtual laboratory, a space in which real experiments can be performed in real but physically separate places, and such sites are becoming commoner.

An ambitious project for the use of a virtual laboratory has been
proposed by St. Cloud State University. The lab, called Virtual Psychology Laboratory, will provide teachers, students and researchers with a tool that supports the analysis, modification and re-execution of archived experiments.

One example of a Java rich site is the thermodynamics lab at University of Oregon. This is an ideal example, as it uses a straightforward model that is easy to code to describe visually a subject that instills fear and loathing in many students. Another good example that possesses all the characteristics of simulation mentioned above is the virtual cardiology lab where high school students and others can take the role of a medical student. They evaluate patients with differing complaints, using tools such as an echocardiogram to visualize the heart's four chambers.

It would be unfair to close any discussion of virtual labs without mentioning one of the earliest on the web, the Virtual Microscope demonstration of the British Open University. This isn't a demonstration of the way in which a microscope works, but an illustration of the effect of using polarising filters in the examination of thin sections of rock.

The World-Wide web Virtual Library has a site concerned with the evaluation of information sources. Most of the URLs on this page point to pages written by information specialists, librarians or researchers in the field, and therefore we consider them to be reliable, of good coverage, objective and current.

The Virtual Photographic Studio puts the user in a simulated photographic studio where the position and pose of a model may be changed, where the position and directionality of the light may be changed, and where each "photograph" taken may be stored for later review. This studio gives students much more opportunity for experimentation than the real thing at little cost.
Chapter 4
Using the internet: course development and delivery

In Chapter 2 we looked at general principles of course design and overviewed the stages in course development. This chapter provides an overview of some of the key issues that need to be worked through when developing a web-based course. It describes tools that may assist in this process of course development and delivery. We will address issues such as:

• when should faculty staff be developing resource based learning for their students?
• what resources will be required?
• what are the major constraints staff face? and,
• how should they go about developing web based RBL materials?
• what delivery issues need to be considered?

These issues will also apply to some extent if you planning to make available materials on the web to support conventional face to face teaching.
Chapter 3
Technologies of delivery and interaction on the internet

In the previous chapter we examined resource based learning and provided a brief overview of some key learning theories. We saw that our models of learning require interaction and a "learning conversation" to take place. This learning conversation may occur directly between the teacher and the student or be mediated through a variety of RBL materials. We also saw that, as an ideal, good RBL will not only accommodate a variety of learning styles but will also ensure that effective learning strategies and approaches are followed. We suggested that the World Wide Web with its ability to include a range of powerful media forms and its interactive capability enables us to support a sophisticated range of interaction and provide a rich environment for teaching. How then can the Internet support such interaction? In order to address this issue, we need to examine the nature of the Internet more closely.

This chapter will examine the nature of the Internet in more detail and will focus on a number of interlinked issues relating to the use of the Internet for teaching and learning:
• what is the Internet, and what is its relationship with the World Wide Web?
• what resources - sources of stimulation - may be delivered to users via the Internet? And;
• what is the nature of the interaction that is enabled, or impeded, between users and the Internet?

Some of the content may appear quite technical but we strongly believe that if teaching staff are to fully exploit the possibilities offered by the web and to engage in constructive dialogue with developers and technical specialists, it is necessary to have a broad overview of the possibilities and limitations of the web.

Links for Chapter 3
Two Famous Battles
Whilst there may not be any VR sites for any of Napoleon's battles, there is one site that does have 360 degree panoramic...
images of two famous battles - of Gettysburg and Chickamauga, two of the American Civil War's bloodiest battlefields. QuickTime VR images were put together from over 975 individual snapshots, creating 46 panoramic images and a spectacular visual representation of these historic scenes. The site's host tells us that his great, great grandfather was a private in Company D of 79th Pennsylvania Volunteer Infantry at the battle of Chickamauga.

Sound has other functions than to relay news: at the New York Public Library, Schomburg Center for Research in Black culture, Louis Armstrong Jazz Oral History Project you can listen and see jazz musicians talking about their favourite subject. The sound and images make the names on the record sleeve into something else, and inhabit the subject area with real human beings.

FlyLab is an educational application for learning the principles of genetic inheritance that we'll use here to demonstrate several useful characteristics of computers, the web, Java and meaningful interaction. Typically, the way to use small fruit flies to learn about genetics is to breed them in small bottles, knock them out with chloroform or ether (killing most in the process), pick the types you want (short or long, hairy or bald, black or yellow) using a microscope and a pair of tweezers, mate these, wait a week, and count the variations that result.
Chapter 2
Learning, teaching and course design with resource based learning

In this chapter, we discuss RBL in much greater depth and examine its implications for learning and teaching and course design. We do this because in our experience staff in HEI’s welcome the opportunity to engage in discussion about fundamental conceptual issues.

First, we review:
• what is meant by RBL;
• advantages and disadvantages of RBL;
• different forms of RBL.

In the later parts of the chapter, we present
• some theoretical models for understanding learning and teaching and effective pedagogy;
• a framework for course design.

We do this in the belief that RBL cannot be effectively implemented and evaluated without such explicit frameworks and guiding principles. Without the application of these principles the possibilities offered by the Internet for learning and teaching will not be fully realised.

It can also be argued that, with learning technologies, we should be aiming for better not "the same for less". Good quality RBL can enhance and improve learning by the effective use of different media and by individualising instruction in a variety of ways. The development of "hypermedia", a term coined by Ted Nelson (Nelson, 1990) present particular challenges and opportunities. Media-rich, non-linear, interactive environments may lead to effective learning for some individuals on some occasions, sometimes not. We need a principled understanding of why this is so. Therefore it is important to be aware of research findings concerning individual differences in styles and strategies of learning and in attitudes and approaches to learning.

Links for Chapter 2
The UK’s TLTP initiative was mentioned at the beginning of this chapter. Through it, a wealth of learning materials have become available, albeit, as noted, of varying quality. The TLTP central web site has links to the 75 plus projects that have been funded to date.
Chapter 1
A changing context - education and the internet

The educational world is changing rapidly. We are seeing the use of the Internet and Communication and Information Technology (CIT) becoming an important part of the learning and teaching strategies of many universities. Some are seeking to become global, virtual institutions, others are using the Internet as part of a mixed economy, combining traditional modes of delivery with online teaching. This chapter reviews some of the developments that are influencing the growth of resource based learning (RBL) and the Internet in order to set the scene for the rest of the book.

We will be examining the following:
• the growth and development of the Internet;
• some key changes in the world of education;
• an overview of resource based learning, universities and the Internet.

These themes are explored in more detail in later chapters.

Links for Chapter 1
We are already seeing the emergence of a number of web sites providing resources, links, professional development information and the opportunity to conference for teachers: The National Grid has a Virtual Teachers Centre and other sites have been developed through:
• universities e.g. Teachernet;
• European funding grants e.g. European school net;
• computer and telecommunications companies with a particular interest in the schools market, e.g. Research Machines, Campus World;
• the broadcasting companies who are becoming particularly active in the schools market e.g. the BBC. The European Commission is funding a European schools network currently involving a number of schools and organisations in ten countries.

It is clear that the Internet is likely to be a key delivery option for many institutions. The Western Governors initiative is a good example. Developments in Africa: The African Virtual University Virtual universities are also making an impact in areas with less
well developed infrastuctures. In Africa for example, the World Bank funded African Virtual University has run a small number of pilot courses.

An obvious way to use the Internet might be to deliver complete modules or courses. A number of sites now act as clearing houses, listing courses available over the Internet from institutions around the world. The World Lecture hall, for example, now lists hundreds of courses available via the Internet. Another site, ED/x, serves as a global resource for information on on-line learning.
Email the authors

The authors would be very interested to hear from you and although the book is a collaborative effort individual authors were responsible for co-ordinating different chapters. Please email Steve Ryan in the first instance and he will pass your comments on.

Email Steve Ryan
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**Bernard Scott** is a Senior Lecturer in De Montfort University's Centre for Educational Technology and Development. During the 1970's Bernard worked with Gordon Pask studying styles and strategies of learning and helped develop conversation theory as a framework for understanding learning and teaching. Bernard went on to train and practice as an educational psychologist. In 1990, he returned to full-time research and consultancy in higher education and worked at the Liverpool John Moores University and the Open University's Institute for Educational Technology before joining the CETD, De Montfort University, in 1996. His research interests include theories of learning and teaching, knowledge and task analysis, learning styles and strategies and reading skills.

**Howard Freeman** is a Senior Lecturer in educational media in the Centre for Educational Technology and Development (CETD) at De Montfort University. He was a Chartered Biologist and Member of the Institute of Biology. Howard has supported academics in the production of a wide range of CAL and multimedia learning materials and has developed his own sophisticated authoring support software. Current interests include research and development in the use of concept mapping software (Conceptmapper, Webmapper) as part of the analysis, specification and delivery of multimedia, network and WWW-based learning materials.

**Daxa Patel** was a Principal Lecturer in operational research in the School of Computing and Mathematical Sciences before becoming IT in Teaching and Learning Manager, in the Division of
Learning Development in De Montfort University. Daxa developed De Montfort University's first IT in Teaching and Learning Strategy in 1994. Since then she has been responsible for a number of major research and development initiatives in this area. She initiated (with Steve Ryan) an institution-wide project to facilitate the embedding of resource based learning into the curriculum. She has been involved in several national (TLTP) and European projects related to the use of CIT for resource based learning. Her work in the last two years has focussed on a major review of University processes. Her research interests include the impact of CIT on the teaching and learning process, re-engineering and the management of change in HE.
Introduction

"The Virtual University - the Internet and Resource-Based Learning" is published by Kogan Page Ltd. You can order this book from their website and from bookstores or online retailers such as Amazon or BOL.

This book examines ways in which Communications and Information Technology (CIT) is having a major impact on Higher Education and, in particular, how the Internet is being (and can be) used to support teaching and learning.

CIT is now enabling the increased deployment of resource based learning (RBL). A major theme of the book is that of quality. We claim that RBL can only be done well (with or without the extensive use of CIT) if supported by appropriate models of learning and teaching and principles of course design.

Good pedagogy (to use a term commonly used in discussions of RBL) can help to avoid the shortcomings that are apparent in many RBL and Internet based courses.

This argument applies across a wide range of institutions and courses, from the wholly on-line university seeking a global market, to the "conventional" campus based institution, where there is a more moderate but increasing use of RBL and the Internet.

For many of the topics covered the authors are able to draw on their personal experience as professional educational technologists working in a higher education institution (HEI).
A Virtual Seminar

"The Virtual University - the Internet and Resource-Based Learning"
This online seminar will focus on key themes of the book. All of the authors will be participating and taking responsibility for different parts of the seminar. An overview of the book is given below.

Who will benefit? The seminar is aimed at teaching staff in Higher Education Institutions (HEIs), typically very busy people, who wish to be informed about the changes happening around them and who wish to reflect on their implications critically and deeply. It should also be of interest to a number of other individuals in HEIs and other institutions (schools, Further Education (FE) colleges, businesses, and government agencies) where there is a concern with education and training. As well as teaching staff, we have in mind managers and administrators, library staff and other support staff, for example, staff concerned with computing, networking and course design and delivery.

Time commitment from participants 8 hours per week

Fee The cost, including a copy of the book associated with the virtual seminar, will be £120 per person, less 10% discount if you book more than one place on this or any of our other seminars or workshops.

Seminar presenters
Steve Ryan is Head of the Centre for Educational Technology and Development (CETD), Department of Learning Technologies at De Montfort University Leicester, UK. Steve is particularly interested in the application of CIT to education and training. Steve has been responsible for the development of a number of open and distance learning packages and is currently developing Internet based courses, running workshops and researching conferencing systems.

Bernard Scott is a Senior Lecturer De Montfort University’s CETD. During the 1970’s Bernard worked with Gordon Pask
studying styles and strategies of learning and helped develop conversation theory as a framework for understanding learning and teaching. His research interests include theories of learning and teaching, knowledge and task analysis, learning styles and strategies and reading skills.

Howard Freeman is a Senior Lecturer in educational media in the CETD at De Montfort University. Current interests include research and development in the use of concept mapping software (Conceptmapper, Webmapper) as part of the analysis, specification and delivery of multimedia, network and WWW-based learning materials.

Daxa Patel developed De Montfort University’s first IT in Teaching and Learning Strategy in 1994. Since then she has been responsible for a number of major research and development initiatives in this area. She has been involved in several national (TLTP) and European projects related to the use of CIT for resource based learning. Her work in the last two years has focussed on a major review of University processes. Her research interests include the impact of CIT on the teaching and learning process, re-engineering and the management of change in HE.

To book a place Please contact Brenda Parish: Email: b.m.parish@open.ac.uk or Tel: 01908 653055.
The Virtual University
The Internet and Resource-Based Learning
Steve Ryan  Bernard Scott
Howard Freeman  Daxa Patel