Linking Thinking

Self-directed learning
in the digital age

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The views expressed in this report do not necessarily reflect the views of the Department of Education, Science and Training.

Contents

Executive Summary

[Learning] is the only thing that never fails. You may grow old and trembling in your anatomies, you may lie awake at night listening to the disorder in your veins, you may miss your only love and lose your monies to a monster, you may see the world about you devastated by evil lunatics, or know your honour trampled in the sewers of baser minds. There is only one thing for it, then—to learn. Learn why the world wags and what wags it. That is the only thing which the poor mind can never exhaust, never alienate, never be tortured by, never fear or distrust, and never dream of regretting. Learning is the thing for you. Look at what a lot of things there are to learn—pure science, the only purity there is. You can learn astronomy in a lifetime, natural history in three, literature in six. And then, after you have exhausted a milliard lifetimes in biology and medicine and theo-criticism and geography and history and mathematics, why, you can start to make a cart wheel out of the appropriate wood, or spend fifty years learning to begin to learn to beat your adversary at fencing. After that you can start again on mathematics, until it is time to learn to plough. (White, 1938, p. 254)

Overview of the Study

This study was undertaken to explore the extent to which and ways in which Information and Communication Technologies or ICT (basically global networks of computers and other associated digital devices) have impacted on learning. Instead of looking at learning in formal education and training settings, I have chosen to consider the dynamics of independent self-directed learning, especially that which is undertaken by adults.

The study comprises four parts:

- Part I, consisting of two chapters, sets the scene by dealing with the dual themes of the digital revolution and self-directed learning. The study is framed by these two overarching themes and by the interplay and interaction between them;

- Part II, consisting of six chapters, analyses the six major conditions that must be met in order for people (or for that matter organisations and communities) to be able to participate in the digital world. These are:
  - Connectivity: An essential precondition for online engagement;

> – Competence: Developing a range of vital skills;
> – Content: Ensuring affordable access to quality digital resources;
> – Credibility and confidentiality: The basis of trust in the unseen;
> – Capturing information: Locating needed information in the boundless domain of Cyberspace; and
> – Collaboration: Realising the transformative potential of technologies.

It is argued that these six 'threshold issues' are cumulative, with each one providing the context for those that follow it in sequence;

- Part III presents a six-part model of online learning, where each, although inextricably intertwined with the others, requires separate approaches and solutions. The six components are;
  - Engaging with online learning;
  - Locating information and resources;
  - Evaluating the quality of digital resources;
  - Assimilating information;
  - Reconceptualising understandings; and
  - Networking.

- Part III concludes with a chapter that examines the support that may be provided to self-directed learners in each of these various elements of the online learning process.

- Part IV, a single chapter, revisits the dual themes of self-directed learning and the digital revolution, and places them into the context of discourses about lifelong learning and the development of a Learning Society more generally.

The study was not specifically intended to generate practical advice for government policy makers, administrators or even for teachers, trainers or educators. Moreover, because the focus was on independent self-directed learning without any formal institutional support or affiliation, it was also not intended to review or comment on the significant advances that have been and are being made in educational practice. Nonetheless, it is hoped that the insights gained will be useful to those grappling with the question of how best to incorporate ICT into educational plans and programs.

Although there is a great deal of 'hype' about hypermedia, there can be little doubt that we are in the midst of one of the most dramatic movements in human history, and that in significant measure this is due to recent advances in Information and Communication Technologies (ICT). It may be true that computers in various forms have been with us for half a century and communication technologies for even longer; however, their transformational

effect arises partly from combining them in unique and unprecedented ways, and partly from their increasing ubiquity and ease of use.

Few if any aspects of our contemporary world have escaped entirely the influence of this digital revolution. Business, commerce, government, health, recreation, travel, research, information seeking and learning have all, in a relatively short space of time, been touched by the advance of digital technology. In fact, these impacts are so pervasive and far-reaching that it has become commonplace to speak and write about the 'digital revolution' and associated concepts such as the 'information society' and the weightless 'knowledge economy'.

Yet the sweeping changes noted here, and trumpeted so enthusiastically in many contexts, must be tempered by the recognition that, although widespread, the impact of ICT has not been universal. To the extent that some individuals and groups do not have adequate access to, or the capacity to use, such networked digital technologies, they are effectively 'locked out' of significant economic, cultural, social and intellectual activities. This phenomenon is referred to as the 'digital divide,' although in reality there are multiple digital divides which must be attended to in order for the benefits of the knowledge economy to be reaped both individually and collectively.

Especially given the increasingly strong relationship between formal education and training and national policy objectives, it seems reasonable to assume that Governments might be keen to ameliorate the effects of the 'digital divide(s)' for a range of reasons including: enhancing global competitiveness of their economies, social inclusiveness in their societies and informed democratic participation by their citizens. However, at first glance, it might be less clear why (or, for that matter, how) they might support self-directed learning, which is often erroneously equated with the trivial, inconsequential or self-indulgent pursuit of hobbies or other specialised interests. In fact, however, self-directed learning is a vital aspect of the digital revolution. In particular, this study was undertaken because:

- Self-directed learning occurs without the ideological or pedagogical overlay of teaching in formal education and training settings, and thus provides a more direct route into understanding the actual dynamics of and relationship(s) between learning and technologies;

- Self-directed learning is the prototype of all learning and, since it has been extensively researched and documented in the pre-digital or offline world it seems potentially fruitful to explore whether and how it has been affected by digital technologies;

- There is a close relationship between self-directed learning and that which occurs in formal education and training settings, in the sense that self-

directed learning is often a precursor to, sometimes a consequence of, and increasingly accompanied by participation in formal courses of study; a relationship that seems likely to grow closer with the development and spread of digital technologies;

- Since evidence suggests that at least some forms of self-directed learning are particularly suited to the online environment, and indeed many recent technological advances are precisely targeted at supporting independent learning and use, there is clearly merit in exploring the linkages at a practical as well as a conceptual level;

- A great deal of learning about the uses and limitations of ICT is self-directed, with the result that it may be possible to gain some insight into why and how people learn about this increasingly important aspect of everyday life; and, finally,

- Within the context of lifelong learning, self-directed learning is one key way in which people keep up with change and, since we are currently experiencing an unprecedented level and pace of change on a global scale, it is plausible to expect the demands of a changing world to lead to greater amounts of self-directed learning.

While there may be relatively little that Governments acting alone can do either to encourage or to support self-directed learning, clearly there are steps that may be taken either to empower learners and amplify their capacities, or alternatively to strengthen the quality and availability of information provision. This turns out to be a domain in which Governments collaborate with businesses, professional associations, education and training institutions, information providers, communities of interest and other actors in order to provide the best possible conditions for the emergence of a society of learners. Such conditions start with a firm commitment to the ideal of access to, and strong support for the intrinsic value of learning not only for economic competitiveness but also for personal satisfaction and growth.

The balance of this Executive Summary comprises three parts: the major findings or insights gained from the study; some suggested actions on the part of Government in order to support self-directed learners and learning; and, finally, possible lines of research, especially in the Australian context.

Main insights gained from the study

The nature of online learning
- Online learning offers the potential to engage learners who may have been marginalised, disadvantaged or excluded from traditional education and

training programs, although new challenges of access and equity are presented by the digital domain itself.

- The boundaries between online learning and other life activities are becoming increasingly indistinct because technologies are becoming seamlessly woven into work, leisure, shopping and banking, social activities and other domains of people's lives.

- A particular strength of the online environment is the availability of information 24 hours per day, 7 days per week, without geographic boundaries or restrictions. This potentially liberates users from historical limitations of time and space, although simultaneously it confronts information providers with compelling challenges in ensuring continuous access and learner support around the clock.

- Online learning is becoming increasingly commonplace, and its popularity is bound to increase as young people who have grown up with digital technologies enter adulthood.

- The blurring of boundaries between entertainment on the one hand and education on the other may prove to be one of the defining convergences of our age, with dramatic implications for both domains but particularly for education.

- Online learning is particularly suited to the acquisition of specific facts or reasonably coherent bodies of information, especially in rapidly developing fields. In its current form it is less well suited to learning highly contextualised information; large quantities of textual material (although it is unsurpassed in its capacity to store and retrieve large quantities of information); the development of certain practical skills; and areas that involve and depend on direct face-to-face human contact including emotional and affective learning.

Access

- There are many impediments to online participation for any purpose, including learning. These include technological barriers (lack of connectivity, old or non-compliant equipment, absence of appropriate software), financial barriers (inability to afford connections or pay-per-view Websites) and educational/psychological barriers (lack of confidence, lack of competence, lack of knowledge of what is available).

- The first and most obvious barrier is the issue of connectivity or, in other words, having access to robust affordable telecommunications or broadband technology and equipment that is capable both of connecting to the Internet and engaging with the information and activities to which it gives access.

- Computer terminals provided in shared spaces such as shopping malls, public libraries and government offices do not represent a viable long-term solution to people's need for easy, convenient, confidential and reliable access to the Internet, any more than public telephones would nowadays be regarded as having the same levels of convenience or flexibility as, for instance, mobile phones.

- Not all households with computers are able to connect to the Internet, and even when they can, this does not guarantee that everyone who lives there has equal access since the dynamics of household relationships mean that some members may enjoy less computer usage than others.

- Unless we are prepared to tolerate entire cohorts of people who are marginalised and disadvantaged (such as those of lower socio-economic status, people in some rural and remote areas, those with limited prior education, those for whom English is not their first language or people with certain disabilities), steps need to be taken to ensure adequate access for all Australians.

- Many people's access to the online world is via their place of employment. Since the majority of Australians work for small and medium enterprises (SMEs), special steps need to be taken to ensure that SMEs have access to needed technologies and expertise, and that employers develop an enlightened attitude to the use of such technologies for non work-related informational needs.

Competence and ICT literacy

- There is at present a generational divide between young people and older Australians with respect to their familiarity and comfort with digital technologies. It is vital that older Australians are not systemically left behind and accordingly there needs to be a national policy position with respect to developing their technological fluency (or ICT literacy).

- Neither the confidence nor the competence to use digital technologies is universal within the Australian community. In order to avoid the phenomenon of 'information haves' and 'have nots,' a coherent national strategy is required for ICT literacy education.

- The ability to make use of online resources entails more than simply ICT literacy; it also necessitates the ability to be discriminating about the information that is encountered online. It is therefore equally vital to have a national strategy on information literacy. This has been described in the United States at least as 'a basic human right.'

Content

- A significant issue concerns the availability and affordability of information. Given the relatively unconstrained development of the World Wide Web, there is a real possibility that commercial interests will capture a great deal of the intellectual content and charge for access to it; a state of affairs that runs the risk of placing useful information beyond the reach of many potential users.

- A large proportion of available online content is generated, owned or sponsored by Governments and their various departments and agencies. Accordingly it is vital for Governments at all levels to develop guidelines on the public availability (and accessibility) of digital resources.

- Libraries continue to be the first point of reference for many adult self-directed learners with respect both to their inquiries and their technology needs. Libraries should therefore be seen as a vital part of the informational infrastructure of the country—well captured in the United Kingdom by the concept of the 'People's Network,'—and, in addition, librarians should be skilled to assist their clients with technological as well as informational skills.

Suggested actions by Governments in supporting self-directed learners

In the light of these insights, a number of actions are suggested for consideration by Government; however, in introducing this section, two points must be made in particular. First, it is acknowledged that a number of policies already exist that are both directly and indirectly relevant to the needs of informal and self-directed learners; a reasonably comprehensive overview of educationally focused policies from various jurisdictions across Australia and a number of settings internationally has been undertaken for DEST by Global Learning Services. Second, the nature of self-directed learning and of digital technologies is such that—especially in combination—they inevitably throw up issues and challenges that cannot be met by any one portfolio, or any one level of Government. Accordingly, the following are suggested for the consideration of a range of Government departments and agencies, in particular those with an educational or cultural mandate; joined-up problems necessitate joined-up or 'whole of Government' responses:

- There is a case for the development of a national elearning strategy for the dual purposes of enhancing Australia's competitiveness (including the global employability of people) and ensuring a robust, well-informed democracy in an era of increasing information. Such a strategy would require not only bipartisan support but also support both from State/Territory and Federal Governments.

- In the interests of social justice, a joint task force should be established between DEST and the National Office for the Information Economy (NOIE) concerning the provision of adequate technology access for all Australians. A great deal of work has already been done by the Human Rights and Equal Opportunity Commission (HREOC), the Council on the Ageing (COTA), and the 'Access, Participation and Skills' Division of NOIE; however, stronger linkages with educational authorities and departments may be desirable, perhaps through AICTEC.

- It is vital to support initiatives for Small and Medium Enterprises to get online. Again, there are some significant NOIE projects in this regard, which should be supported—from an educational rather than a strictly commercial perspective—by the Australian National Training Authority (ANTA) and the relevant State and Territory TAFE authorities.

- As government information is increasingly placed into the digital domain as a way of informing people of their rights and satisfying various statutory obligations, this places a concomitant onus on Governments to ensure that all citizens have access to the technology required to access, obtain, download and understand the needed information.

- The National Goals of Schooling refer to both ICT and information literacy as fundamental accomplishments for school-aged children, and many TAFE and Higher Education providers have similar statements in relation to their students. However, there is as yet no comparable statement for the population as a whole, and there is merit in developing such national policy positions. In particular, the Government could endorse the Australian Library and Information Association's 'Statement on Information Literacy for All Australians.'

- There are two consequences of these actions. The first is that high quality professional development must be provided for teachers at all levels in the formal education system. This already appears to be the case within the schooling sector and for TAFE teachers, but the national coverage of university faculty is very variable. The second consequence is the need for extensive training for librarians and other information professionals who, as previously mentioned, are commonly at the forefront of public demand for support not only for information access but also for learning about and help with using technology.

- As more citizens become connected, Governments need to act to support the development of robust, beneficial online communities. This may include the provision of appropriate training, software and technical support to community-based groups undertaking activities and programs such as those designed to enhance independent living for older people, reduce the use of harmful substances, and support schemes that improve employment opportunities and limit dependency on welfare.

- State and Federal Governments should model best practice in terms of the accessibility of their sites, and should develop, promulgate and subscribe to national standards with respect to site design, similar to those developed by the Government of Canada. In particular, it is incumbent on Government departments and agencies to ensure that their sites are accessible to a variety of users, including those for whom English is not their first language, people with various disabilities, and those with older or less sophisticated hardware and software.

- Since Government sites are amongst the most often visited and heavily used in any community, there is an unparalleled opportunity to create interactive features and functions (such as drop down menus, quick quizzes or links to online support groups) that are educative or which provide access to available learning opportunities.

- A great deal of effort is currently being expended in the creation of educationally relevant resources. In both the schools and TAFE sectors, significant attempts are being made nationally to reduce duplication of effort and to share resources, for instance through the 'Learning Federation' and more generally via Educational Network Australia (EdNA) Online. In the case of Higher Education, however, there does appear to be some wasteful duplication of resources, perhaps due to excessive competition between institutions. There might be merit in establishing a body analogous to the Joint Information Systems Committee (JISC) in the UK, which not only spans Further and Higher Education, but which also has a remit to identify and bring under a unified umbrella the Distributed National Electronic Resource.

- Given the global reach of electronic providers, there is some concern that there does not appear to be any formal governmental participation in the Association of Commonwealth Universities Observatory on Borderless Higher Education (OBHE), although a number of Australian universities, IDP Australia and the AVCC are all subscribers.

- Since public libraries, museums, art galleries and archives offices are such major repositories of the national heritage and of other digital resources, there may be merit in forming an alliance between educational and cultural authorities at all three levels of government, and in providing funding to allow for the digitisation of relevant resources. It must be noted that additional funding will almost certainly be required to ensure continuing updating and maintenance of such sites.

- A major issue confronting educational providers, cultural institutions, business, industry and governments alike is potentially the problem of digital resources becoming obsolete through degradation of storage media or changes in technology. Accordingly it is incumbent on Governments to

provide leadership to, and to act in partnership with, these various stakeholders to ensure continuity of digital resources.

- Cyberspace does not belong to any single group and, because it is simultaneously everywhere and nowhere, it does not lend itself to conventional terrestrial legal mechanisms. Nevertheless, it is vital to create a sense of trust in the technology for learning purposes, and to protect the interests of the relatively powerless and marginalised against the might of large players, especially multinational corporations or those who might seek to exploit the digital domain unfairly or to compromise learners' access to needed information.

Possible additional research in the Australian context

There are already many relevant, high quality research reports and discussion papers in existence in various jurisdictions in Australia, generated by a variety of agencies. Significant bodies of expertise already exist, for instance, within the Department of Education Science and Training, the Access, Participation and Skills Division of the National Office of the Information Economy (whose mission is: 'Encouraging all sectors of the community to actively participate in the information economy'); the Australian National Training Authority; EdNA Online; the National Library of Australia and the State Libraries; Australian Universities and State/Territory Departments of School Education and TAFE. However, it is difficult to obtain an authoritative overview of current research and accordingly greater attention needs to be paid not only to providing integrated portals and directories and other 'one stop shops,' but also to improving links and sign-posting between sites.

In addition, consideration should be given to undertaking or commissioning research into the following issues that do not seem to be part of Australia's current policy context:

- What are attitudes towards and usage of technologies for everyday learning? This could comprise an extension of the 'State of Play' data currently produced by NOIE but similar to the 'Attitudes to E-learning' study undertaken by market research firm MORI in the UK. This could be undertaken through a partnership by DEST, NOIE and ANTA.
- What are the costs of undertaking online self-directed learning projects on top of hardware, software and telecommunications charges? To what extent do such costs inhibit people from undertaking self-directed learning activities online? This project could be undertaken by NOIE in conjunction with Adult Learning Australia (ALA), the Council on the Ageing (COTA), the National Centre for Vocational Education Research (NCVER) and the Australian Council on Social Services (ACOSS).

- What is the additional potential for sharing online resources including teacher education materials? This could be undertaken by a consortium of State/Territory and Federal Governments perhaps by Education.au

- What is the potential for the development of a Distributed National Electronic Resource? This could be undertaken in conjunction with the National Library of Australia, the Joint Information Systems Committee (JISC) in the UK and the National Science Foundation (NSF) in the United States.

- To what extent are self-directed learners concerned about or troubled by issues of potentially fraudulent information or insecure websites? This could involve collaboration between education providers with, for instance, the sophisticated crime section of the Australian Institute of Criminology (AIC).

From this study, four findings stand out in particular. The first is that the truly transformative potential of ICT for learning derives not only from the access that it provides to unprecedented treasuries of digital resources, but also from its capacity to create global online learning communities. The second major insight is that because digital technologies embody characteristics both of windows and of mirrors, they offer a unique opportunity for self-directed learning by combining the best of external input with the best of personal reflection. The third major insight is that Governments and other authorities have only limited power, if any, to 'control' the digital domain through traditional legislative means, and that we are likely to witness an increasing demand for self-regulated online communities and access to what has been dubbed the 'information commons.' The fourth and final insight is that if we are committed to the vision of becoming a truly democratic Learning Society, it is vital to embrace certain aspects of the digital revolution, to ensure that everyone has at least minimal levels of access and competence, and to recognise that new paradigms of teaching, learning and information provision are likely to prevail in the future. Since these changes are so far-reaching, new multilateral partnerships will be required that involve all levels of government, business and industry, the education and training sectors as well as the media and community groups; not only nationally but indeed globally.

In a letter to the *Vermont Mercury* in August 1846, American academic, engineer and soldier Alonzo Jackman claimed that through the advent of a Transatlantic Telegraph between England and America, 'all the inhabitants of the earth would be brought into one intellectual neighbourhood.' Perhaps the same claim could be made today with even greater conviction: the question is whether it is an intellectual neighbourhood in which—individually and collectively—you and I would be proud to live?

Prologue

*A glass web spans the globe which is transforming commercial, social
and cultural life in ways we do not fully understand. The emergence
of new digital information spaces alongside the existing physical
places of public life is posing challenges for policy and service
developers. We are seeing the creation and re-recreation of markets
and economic activity; of political and public discourse; of cultural,
research and learning work.* (Dempsey, 1999, p. ix)

Back to the future?

The Great Library of Alexandria, despite being destroyed by fire more than
1600 years ago, continues to exert a compelling influence on people's
imaginations. A variety of reasons have been advanced for this: perhaps it
was its location opposite the Lighthouse of Pharos at the crossroads of
Europe, Asia and Africa; perhaps it was the dramatic circumstances of its
disappearance; or perhaps it was Ptolemy's sheer audacity in attempting to
assemble all the world's wisdom in one place. Whatever the cause, it has
been enough to inspire the nations of the world, led by UNESCO, to recreate
the 'Bibliotheca Alexandrina,' (Bibliotheca Alexandrina) the ancient centre of
learning and scholarship that once housed nearly a million manuscripts from
all corners of the globe. And it has also been enough to inspire the University
of California, another famous seat of learning, to dub one of its digital
repositories the 'New Library of Alexandria.'

What is it that impels a modern institution to style itself after an ancient
predecessor? One common reason is the desire to appear learned and
venerable; another is to imply continuity with the noble aims and legendary
achievements of its earlier counterpart. Yet another is the more mundane, but
nonetheless very human impulse to cope with change by seeking parallels
with the familiar past. In the chapters that follow, I will return frequently to
the impact of the past on the present; not simply the historical antecedents of
the computer, the Internet and the World Wide Web, but the way in which
our past experiences—collectively and individually—shape and temper our
understanding and use of new technologies.

Even though I have lived through and witnessed the electronic revolution
over the past couple of decades, it is still difficult to recognise what a
dramatic impact digital technologies have had in a comparatively short time.

I can still recall when the height of administrative sophistication was the IBM Selectric typewriter, with its interchangeable 'Golf Ball' fonts, when printers were huge tractor-feed monstrosities that sat inside insulated capsules in the corner of the office, and when computers were housed in special rooms—sometimes even special centres—attended by white-coated support staff and with huge card readers chattering by their sides. I can recall when multi-media learning meant sitting in a study carrel with a personalised 35 mm slide projector and a cassette recorder, when handouts were duplicated in fading purple ink on Gestetner spirit duplicators, and when an entire university would have a single facsimile machine housed reverentially in the university librarian's outer office.

Today, powerful desktop, laptop and even palmtop computers are widely available. Handouts are held in electronic reserves and printed out—often at home or at work—on laser printers. Learners can access and view movie quality videos and simulations in the privacy of their own home or in a local library, and it is possible for people in different corners of the globe not only to look at and listen to each other through their personal computers, but to work together collaboratively, in real time, to produce a shared document. For the early pioneers of technology in learning, many of the present (and likely future) applications must seem like science fiction. Are we witnessing the inevitable progression of developments that have the roots in the past, or are we, in Kuhn's wildly overused term, undergoing a genuine paradigm shift?

Support may be found in the technology literature for both points of view. Some people have emphasised the radical novelty of the digital era, whereas others—librarians, educators, business people and members of the public among them—have been keen to portray the information explosion as basically an extension of the familiar, as 'more of the same.' This dichotomy fractures the literature; indeed it is impossible at present to detect a consensus about anything in the digital age except, perhaps, that the changes are here to stay.

There is considerable evidence that libraries, even virtual libraries, have sought to contain and domesticate the potentially incendiary effects of the digital revolution by trying to corral these new information forms under familiar categories and practices. As Heseltine so eloquently put it in his keynote address to the 1998 Conference on Information Landscapes for a Learning Society, 'the virtual library represents an effort, unconscious perhaps, to reproduce the essentials of the library of Alexandria in an electronic environment' (Heseltine, 1999, p. xvii). Libraries, however, are far from being the only entities to wish to 'manage' the digital world. Many businesses have adopted technologies—only, it seems, to do more or less what they have always done. Educational institutions too, from pre-schools to universities, are equally keen to fit digital information forms into comfortable and familiar paradigms.

When I embarked on this study, I began from the naive proposition that since digital technologies were the direct lineal descendants of (and largely just a logical progression from) technologies that had gone before, it was important not to get carried away by the hype surrounding them. While I still believe it is vital to maintain a healthy scepticism about some of the more extreme claims made, I have progressively come to the view that digital technologies—partly because of their increasing availability, partly because of their portability and usability, and partly because of the convergence of previously independent functions—are a great deal more powerful than I had previously assumed and that, in this particular context at least, they might well have the potential to redefine many of our approaches to learning and, as a consequence, to teaching as well.

I started this inquiry because I felt that something important was going on in the world of learning, and I wanted to understand it better. I had a sense, since borne out through my reading and discussions, that the gap between those at the leading edge of online and technologically assisted learning and the rest of us was widening. I was concerned that many of us run the risk of falling behind in understanding where technology is taking us and what it is capable of. At the same time, I had a sense, which likewise has been confirmed by my inquiries, that there is a great deal of the 'Emperor's New Clothes' in thinking and writing about the digital revolution. I was uneasy that, because of an apparent 'historical amnesia' on the part of many authors, combined with a tendency to make things sound more impressive, complex or impenetrable than they really are, we were in danger of coming to think that understanding the digital revolution is beyond most of us; that it is a domain best left to specialists or to anyone under 25.

I have found that there are, in the online environment, some fascinating new concepts and applications, some dramatic new potentials, and some wonderfully evocative uses of language (some of these last are dealt with in the Introduction to Part IV). At the same time, I have also come to the view that many of the issues being confronted and written about are perhaps not much different from those that have dominated the thinking of educators, librarians and learning researchers for the past two or three decades or even longer. For instance, there is an ongoing difference of opinion between those whose main concern is with how learners learn and how teachers teach; a fundamental and seemingly intractable difference in paradigm between the advocates of constructivism and of transmission as the basic principle underlying learning. Many of the ideas being dealt with by theorists and practitioners today are latter-day incarnations of enduring or recurrent problems in education; problems which might be elucidated through a familiarity with, or even an awareness of, the substantial body of scholarship that already exists concerning learning in its many forms and manifestations, including self-directed learning.

There are a number of challenges in discussing the impact of Information and Communication Technologies (ICT) on teaching and learning. The first is the challenge posed by the huge and growing body of literature about it. In days gone by, perhaps as recently as a decade ago, it was still possible for a researcher to have a reasonably good overview, if not a detailed knowledge, of the major trends and issues in a given area of education. Today, however, the volume of information is so great, and the speed of change so rapid, that it is virtually impossible to keep up with all the developments even within a fairly specialised realm. The digital domain is a particularly good example of this, since it seems to have captured the imagination of so many practitioners around the world, and there is correspondingly a great deal of literature about the field, ranging from the comprehensively researched to the anecdotal and speculative.

A second issue (and one which is discussed in the body of the report) is the highly variable *quality* of information about ICT in relation to education. If it is testing to deal with a large volume of information, perhaps even more challenging is the need to sort the wheat from the chaff. This is particularly the case when—as so often happens in relation to digital media—anecdotal, speculative and conjectural claims are presented in the same domain and often in the same form as more objective and empirical information. Especially in the hands of apologists and enthusiasts, there can be a great deal of 'hype' in relation to 'hypermedia,' and it can be particularly difficult to make an informed judgment, especially in a new and emergent field.

A third consideration is that of language. In the digital world (as well as outside it), many phenomena have several synonyms and it is therefore necessary to scan a number of different bodies of literature to keep up to date. Partly because the field is growing rapidly and, I suspect, partly because of 'terminological inexactitude,' it is difficult to determine what is actually going on and how it differs from familiar concepts. Terminological inexactitude—a tendency to use words imprecisely—means that terms such as technology-assisted learning, technology enhanced learning, computer-based learning, computer managed learning, web-based learning, digital learning, online learning, e-learning and recently 'networked learning' (Steeples & Jones 2002) are often muddled together and even used interchangeably. This is strongly reminiscent of the situation in relation to self-directed learning for which, as I demonstrated in earlier work (Candy, 1991), there were as many as thirty different terms in the literature.

One particularly egregious example of terminological inexactitude in the literature pertaining to ICT is the common tendency for authors to refer to 'learning,' when they actually mean 'teaching' or 'training.' The term 'learning' in the title of a book, article or report is no guarantee that the contents will be concerned, except tangentially, with the intellectual, emotional and social

processes undergone by those attempting to learn. Very often, the view of learning is implicit, taken for granted, submerged, even ignored, while the real focus of attention is on the technology, the contents, the pedagogy or the needs and interests of the teacher or trainer.

A fourth type of difficulty in discussing ICT in learning is the fact that it is not one phenomenon but many, with the current state of technologies being descended from several distinct fields of endeavour. At a broad level, technologically assisted learning builds on a long tradition of distance education, stretching from correspondence study in the 1840s to the use of educational television, the mailing out of video- and audio-cassettes, audio and video teleconferencing, and most recently the use of interactive multimedia including CD-ROMs. But it also draws on flexible classroom-based delivery, librarianship and information science, and the independent pursuit of knowledge through conventional research and various forms of self-directed inquiry. There is even a sense in which it has been influenced by concepts that owe their origins to knowledge work, and to electronic commerce. It is hardly surprising, therefore, that various authors draw more heavily on one tradition than another in explaining both the use and the impact of online tools in educational settings.

This leads to a fifth and final challenge in understanding and discussing ICT within learning; namely, the way in which new technologies are abolishing once sacred boundaries so that there is a convergence between formerly separate and separable practices, concepts and literatures. A useful way of thinking about this phenomenon is to borrow a concept from the world of business: 'blur' (Davis & Meyer, 1998), In the world of 'blur,' it seems as if everything is blending into everything else, formerly discrete activities, values, practices and ideas are mutually modifying one another, events are falling over each in their haste to happen all at once, and a new world view is rapidly supplanting the old. Some commentators revel in this novel situation, and advocate that others do too. Davis and Meyer, in their book *Blur: The Speed of Change in the Connected Economy*, unequivocally advise embracing it. The first item in their list of '10 Ways to Blur Yourself' is to 'Blur the Divide between Work Life and Life Life,' and they go on to tell readers not to object to the intrusion of work into family and community activities, but to 'go with the Blur' (Davis & Meyer, 1998, p. 237).

Others, however, are concerned that this blending of concepts and activities is not only perplexing, but that it threatens vital aspects of our humanity. They offer contrary advice to slow down, to get in touch with our 'inner selves,' and generally to avoid being caught up not only in conceptual and emotional confusion, but also in the intrusion of technologies that promoters portray as both necessary and inevitable. In his book *The Gutenberg Elegies: The Fate of Reading in an Electronic Age*, for instance, Birkerts writes:

> *In our technological obsession we may be forgetting that circuited interconnectedness and individualism are, at a primary level, inimical notions, warring terms. Being 'online' and having the subjective experience of depth, of existential coherence are fundamentally discordant.… My core fear is that we are, as a culture, as a species, becoming shallower; that we have turned from depth…and are adapting ourselves to the ersatz security of a vast lateral connectedness. That we are giving up on wisdom, the struggle for which has for millennia been central to the very idea of culture, and that we are pledging instead to a faith in the web* (Birkerts, 1994).

I will return later in this study to the concerns expressed by those who are cautious about uncritically embracing technology, but for now I want to consider those aspects of 'blur' that arise from the convergence between otherwise distinct entities. For many people, the digital revolution is exemplified by—perhaps even limited to—the concept of technological convergence, which refers to the confluence and interoperability of formerly discrete and free-standing technologies. Particular appliances and devices—computers, mobile phones, television receivers, digital cameras, photocopiers, printers, faxes, scanners and so on—are able to interchange information in digital form through being connected together and, in some cases, even being integrated into unitary 'multi function devices.' This phenomenon has led to convergence of technical specifications for such devices and the software that operates them, and this, in turn, has allowed for a convergence of activities and systems (including technical and social systems) on which they depend, that were formerly separate.

However, the phenomenon of convergence extends well beyond its technical meaning, to include convergence between and among various social systems and practices, including learning. There is a convergence between learning and other life activities; between self-directed and more formally structured learning such as courses and programs of study; and between and among the various aspects of online learning. My basic focus throughout this study is on self-directed learning, for reasons that are alluded to in the following section and explained in greater detail in Chapter Two. However, it is my fundamental argument throughout this study that such self-directed learning is inextricably intertwined with other activities—both intellectually and socially—and that in many respects this entanglement is facilitated by, even amplified by, digital technologies. Thus, providing assistance to self-directed learners is a distributed and shared responsibility. Overall, I have found the concept of convergence to be a useful way to frame and to understand many of the phenomena I have encountered throughout this inquiry, and accordingly I will recur to the theme of convergence from time to time throughout the following study.

Overview of the contents

As mentioned above, the basic purpose of this study has been to arrive at some understanding of the impact of Information and Communication Technologies on the world of learning, in particular through a study of the self-directed learning efforts of adults. The report is not intended as a practical guide for teachers, trainers, facilitators, instructional designers or policy makers. Nevertheless, it is to be hoped that it will prove useful to those seeking both to understand and to make use of these technologies, or to identify avenues for additional research and inquiry.

Essentially, the study is divided into four parts. Part I, which consists of two chapters, sets the stage by outlining two principal domains of interest. Chapter One provides an overview of the so-called digital revolution, reviewing the ways in which and extent to which technology, notably that associated with the Internet and more specifically the World Wide Web, has affected significant aspects of our lives. The chapter refers to its impact on business and commerce, on Government, on health and medicine, and on both the provision and consumption of information. This chapter demonstrates that there have been, and continue to be, widespread changes that are impacting on most aspects of our lives, including the opportunities to undertake all kinds of learning—formal, non-formal and informal or incidental. Indeed, some commentators have argued that that we have realised, or are approaching, the ideal of the 'Learning Society.'

In Chapter Two I turn my attention to the second major conceptual framework, which is the domain of self-directed learning. I have chosen this for several reasons; partly because in my view it is the prototypic form of learning which also provides valuable insights into the dynamics of learning in other contexts; partly because it is both a precursor to, and a common consequence of participation in formal education and training; and partly because I think it is highly relevant to an understanding of the general relationship between learning and digital technologies.

I also believe that at least some of the literature pertaining to self-directed learning is directly useful to undertaking other kinds of learning in the digital domain.

Each of these two major discourses—those pertaining to self-directed learning, and those relating to Information and Communication Technologies—has a good deal to offer in helping to understand the other. Given the size and complexity of these two domains, it would be impossible to integrate them in any comprehensive way; however, my aim in this Part of the project has been to identify points of inflection or convergence, and to point out areas in which each might productively illuminate the other. The chapter begins with

a brief historical overview before turning to a consideration of research that has been undertaken and theoretical models that have been advanced, especially since the 1960s. This then leads to an analysis of both practical and theoretical relationships between the two fields, including how learning has been reframed, and in some senses redefined, by the digital revolution.

Given the relative ubiquity and, I would argue, interdependence of these two phenomena—the digital revolution on the one hand and self-directed learning on the other—one could be forgiven for assuming that the vision of the Learning Society is already at hand, and that no particular steps need to be taken either to encourage self-directed learning or to ensure the availability of digital technologies. In fact, this is not the case, and in Part II, which comprises six chapters, I set out to examine a number of threshold issues which constitute the context within which it is possible to engage with digital technologies for any purpose.

Chapter Three deals with the most basic threshold issue, namely connectivity. Here it is argued that the availability of necessary bandwidth is a precondition for engagement in the new connected economy, as is access to technology capable of linking to the infrastructure. Indeed, it is further argued that it is not simply connection but robust and reliable connection that is required, and accordingly various kinds of backup and support are needed for individuals and groups, including community groups and enterprises, in order for them to be able to enjoy the benefits of access to the Internet.

While connectivity is clearly a necessary first step, it is not on its own sufficient to be able to engage in the digital world. Many people lack both the competence and confidence to use Information and Communication Technologies for a variety of everyday purposes, including supporting their learning needs. Chapter Four deals with the elements both of 'ICT literacy' and of 'Information literacy,' and discusses some strategies for the development of these competencies through partnerships between government, education and training providers, communities, professional associations and employers.

Chapter Five addresses another cluster of issues, namely the availability of affordable, high quality information in digital form. Despite the vast and growing amount of information in the digital world, it is evident that a great deal of valuable information is not yet in digital form, and that there is considerable variability in the quality of what is available. Moreover, not all available digital information is accessible to those who would like to be able to use it. This chapter considers issues to do with what is, or ought to be, digitised, how Governments and other information providers can ensure access by those needing certain classes of information, and alludes to some of the complex legal issues concerning intellectual property in the digital domain.

Chapter Six tackles the thorny issue of what it means to actually 'know' something in the electronic environment. In particular, it deals with the changing nature of information in Cyberspace, which is not only invisible, provisional and evanescent but which may be dynamically generated or even customised to the perceived needs and interests of particular users. Linking these two issues—invisibility and customisation—is the widespread concern about online security of personal information, including financial data, and the necessity for users to be confident that whatever they provide, including their own pattern of use, will not be inappropriately disclosed to those not authorised to receive it.

Chapter Seven deals with another fundamental issue; namely how information can be tracked down and located within the virtually limitless and constantly expanding universe of digital resources. The chapter offers an overview of the scale and scope of the invisible world, and provides some sense of how information resources are dealt with. From the point of view of those providing information, an attempt is made to consider both how resources may be made visible and how they can be drawn to the attention of potential users; conversely from the point of view of those seeking information, the chapter attempts to explain how various structures and strategies (including directories, gateways, portals and search engines) seek either to impose some structure on the chaotic universe of information or to strengthen and amplify the user's capacities and capabilities.

Of course, one of the defining characteristics of the online environment is its capacity, employing essentially the same technologies, not only to provide access to rich resources, but also, to allow learners and other users to communicate with each other, and indeed to co-create knowledge. Thus, Chapter Eight draws on the potential of digital technologies to support inquiry, collaboration and sharing—both one to one and in a group, and both real-time (synchronously) and in delayed time (asynchronously). The chapter examines the concept of distributed or virtual communities of practice, and emphasises the organic way in which such clusters have evolved.

It is in the context of and against the backdrop of such generic considerations that individual learners or cohorts of learners engage with digital resources and virtual communities in order to pursue particular learning opportunities. Part III, therefore, comprising seven chapters, focuses on the dynamics of self-directed online learning. Chapters Nine to Fourteen outline a six-part model of online learning, and Chapter Fifteen includes some explicit suggestions about steps that have been taken, or might be taken, by those wishing to support the efforts of self-directed learners.

The Part begins with an introductory section which explains my view of learning. Building on previous work (Candy, 1991) the paradigm chosen is

unambiguously constructivist; in other words, learning is taken to be a process whereby the learner builds up for him- or herself a model of the world, an explanatory system or scheme, which both conditions and is conditioned by the learning undertaken. Constructivism is essentially individualistic, a fact that resonates perfectly with the unique and highly idiosyncratic nature of the path taken by a user through any series of hypertext links. The basic building block of the learning effort is taken to be the 'learning project,' and the principal mode of learning is argued to be the 'learning conversation'; where the conversation may be literal or metaphorical.

Chapter Nine is concerned with the dynamics of the learner's engagement with any given learning task or endeavour. Against the broad backdrop to engagement outlined in Part Two, it focuses on the specifics of how and why a learner might undertake a particular learning task online, the considerations that can enhance or alternatively undermine his or her motivation and commitment to learning, and how groups or individuals may be able to assist learners, or would-be learners, to engage with the specific task at hand. For many learners this initial learning conversation determines the whole tenor of the learning effort, or even whether it progresses beyond a preliminary inquiry.

In Chapter Ten I turn my attention to the vital issue of locating resources—websites, people or groups—that bear on the content of a learning project. While there are some generic aspects to locating information in the digital environment, this chapter considers the specifics of locating material in particular domains and for specific purposes. It is recognised that the way in which a field is organised, the amount and kind of information and other resources available, the existence or otherwise of subject gateways, portals or dedicated search engines, and the nature and extent of available assistance all converge to define the context for the particular learning effort. It is also emphasised that a learning endeavour is not a static entity; it changes and evolves almost organically and, as a consequence, the location of sources and resources is itself an evolving and developing phenomenon.

This leads to a consideration in Chapter Eleven of the processes and criteria whereby a learner evaluates the relevance and quality of the information or other sources he or she encounters online. Given the elusive, transient and evanescent nature of information in Cyberspace, new rules and protocols are emerging about the quality of digital resources which distinguish learning in this context from its offline or pre-digital counterpart, and accordingly the chapter deals with the evaluation of websites and other resources. However, one feature that quite clearly carries over from one context to the other is the developing nature of the learner's expertise, and consequently this chapter also recognises that the ability to evaluate online resources is itself a

developmental phenomenon and that the learner will become more discerning as his or her project progresses.

Central to any learning project, whether online or not, is the requirement for the learner to assimilate new information and insights. This requirement has both a practical and a conceptual aspect to it. On the practical side, it means collating and drawing together resources—often quite diverse and sometimes even incommensurable with one another—in some kind of methodical and systematic way. The conceptual aspect of assimilation entails incorporating new information and insights into one's existing conceptual framework or schema. Both of these aspects may be facilitated by the use of digital technologies which can assist with the capture and management of relevant information in digital form, and by portraying it in novel and sometimes surprising ways. Chapter Twelve deals with the issue of assimilating information in the pursuit of an online learning project.

Of course assimilating information is not an end in itself but is a necessary aspect of learning which, in the context of this study, commonly entails reconceptualising or coming to see some aspect of the world in a new and qualitatively different way. In other words, learning is more than the accumulation of information, it involves transforming understandings based on new insights. In Chapter Thirteen, therefore, I explore the capacity of the digital environment to facilitate such reconceptualisation, largely through the learner's engagement with various kinds of 'learning conversations,' either with various kinds of resources, or with other people, or with his or her own existing understandings and world view.

Chapter Fourteen focuses on the potential offered by the digital environment to network with experts and with other learners. One of the most emancipatory potentials of this technology is its capacity to allow learners to share information as well as insights with others, and indeed to co-create knowledge with others. Since much learning does not involve merely the acquisition of existing knowledge but rather the creation of new knowledge, this chapter explores the unique facility offered by the online environment for learners—irrespective of their geographical location, their previous educational attainment, their physical characteristics, or even their confidence in face to face situations—to learn for themselves as well as to contribute to the learning of others. This chapter also examines the capacity afforded for learning through 'vicarious' or peripheral involvement by being in the virtual presence of others without necessarily feeling obliged to contribute in one's own right.

There is a widespread misconception that self-directed learners are necessarily solitary and isolated; yet, as demonstrated in Chapter Fourteen, a great deal of valued learning occurs in the context of being part of a group or a virtual

learning community. It is equally wrong to assume that self-directedness implies an unwillingness to obtain help from others. A large number of learning projects depend crucially on the learner obtaining assistance from an expert, a facilitator or from other learners. Indeed, not all assistance involves human agents; a distinctive feature of the digital environment is that some help may be programmed into software or available from websites. Clearly, the amount, kind and timing of help required depends on the nature of the learning project and on the learner's existing level of expertise. Accordingly Chapter Fifteen provides an overview of the kind of support (or scaffolding) that may be required and offered, under each of the six elements of the online learning model outlined in the previous six chapters. It also explores briefly the potential convergence between the online learning that is self-directed, and that which is mediated or supported in more formally structured educational settings and contexts.

The final section, Part IV, draws together the major strands and recurring themes or motifs of the study. It begins by examining some of the metaphors commonly evoked in attempting to understand, explain and use the online environment, and argues that no single analogy is sufficiently complex or robust to do justice to the profound transformative potential of the Internet. Finally, Chapter Sixteen revisits the relationship between self-direction and digital developments, and demonstrates how learning is inextricably interconnected with many other life activities. It examines the complex and multi faceted concept of the 'Learning Society' and explores the question of whether, and if so to what extent, the digital revolution might be said to be contributing to the vision of a society in which learning is ubiquitous, seamless and lifelong.

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In a way, it was reassuring to find that many of the resources I needed— books, reports, journal articles and other documents—were only available in old-fashioned hard copy, and I acknowledge the kindness, patience and professionalism of Beverley McCrae, Joanne Paine and Rebecca Phillips of the Department's library who obtained a large number of resources for me on Inter Library Loan. On the subject of libraries, I would also like to acknowledge the support and encouragement of Debbie Campbell, Director of the Coordination Support Branch of the National Library of Australia, who kindly pointed me towards some very relevant websites and other resources, and with whom I had several valuable discussions about online learning and information use outside formal educational structures.

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Despite these many and varied debts, intellectual, social and professional, however, the responsibility for this Report is entirely my own.

Philip C Candy

London

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Part I Setting the Scene

I care about what happens in Cyberspace, and to our freedoms in Cyberspace, because I dwell there part of the time. The author's voice as a citizen and veteran of virtual community-building is one of the points of view presented in this book: I'm part of the story I'm describing, speaking as both native informant and as uncredentialed social scientist. Because of the paucity of first-person source material describing the way it feels to live in Cyberspace, I believe it is valuable to include my perspective as participant as well as observer. In some places, like the WELL, I speak from extensive experience; in many of the places we need to examine in order to understand the Net, I am almost as new to the territory as those who never heard about Cyberspace before. Ultimately, if you want to form your own opinions, you need to pick up a good beginner's guidebook and plunge into the Net for yourself. It is possible, however, to paint a kind of word-picture, necessarily somewhat sketchy, of the varieties of life to be found on the Net (Rheingold, 1993).

Cyberspace as a frontier

In 1893, at the Great White Columbian Exhibition held in Chicago, a young Professor of History at the University of Wisconsin delivered a lecture that was to make his career, and to reverberate down through the years as perhaps the quintessential analysis of the forces that shaped America. Entitled 'The Significance of the Frontier in American History,' Frederick Jackson Turner's central thesis was that the constantly shifting westward frontier had been a crucial force in shaping the American psyche, in creating a spirit of individualism and self-reliance, and in providing boundless opportunities for freedom, growth and success.

Turner's paper appeared in the *Proceedings of the State Historical Society of Wisconsin* on December 14, 1893, and was subsequently reprinted in the 1893 *Annual Report of the American Historical Society*. It has since been reprinted countless times, including electronically on the Web, has been the subject of endless speculation and quotation, and has been debated and analysed from every conceivable perspective.

Although Turner's original idea pertained to the nineteenth century and the two hundred years of European settlement and expansion before that, not unexpectedly, many authors have seen the concept of the frontier as an important metaphor. The idea has been invoked to explain, amongst other

things, the American infatuation with exploration on land, underwater, and even in space. It is not surprising, therefore, that several writers have recruited Turner's thesis in their attempts to understand and explain the developments in Cyberspace, the latest frontier (see, for instance, Branscomb, 1996; Doheny-Farina, 1994; Ross, 1994; White, 1998). Indeed, some have extended the metaphor to include the concepts of lawlessness (Rowe, 1996), of confrontation between good and evil (Ludlow, 1996) and of virtual community building (Rheingold, 1993).

Not everyone is enthralled by the analogy. For instance, in 1994, Ross, in her paper called 'Civilizing Cyberspace: A Contemporary Reconsideration of the 'Turner Thesis',' began what Doheny-Farina (1994) called 'the important job of unpacking the electronic frontier metaphor.' She arrived at the view that 'the usefulness of the analogy is limited and, perhaps, limiting,' and that 'we may be better off if we develop alternative metaphors with which to interpret this phenomenon we call Cyberspace.' As it transpires, there are indeed many other such metaphors: I return to this theme in the Introduction to Part IV.

While acknowledging the need to exercise caution about the value of the parallels, I am still inclined to the view that the frontier metaphor has some merit. Among other things, Turner argued that a frontier attracts different kinds of people; notably pioneers, followed by settlers, and eventually by civilised society including the forces of law. At a superficial level at least, it is possible to see this typology in operation in Cyberspace and on the World Wide Web, where the early adopters have often displayed a somewhat cavalier attitude towards conventions, with more and more 'settlers' including government instrumentalities, educational institutions, and other established organisations subsequently developing a presence on the Web, and the law somewhat belatedly attempting to regulate what is already happening there.

In terms of learning in the digital environment, Turner's thesis offers, I think, some rich possibilities for speculation and research. For a start, he comments on what it is that makes the frontier attractive, at least in the first instance, to certain kinds of people:

> *Each frontier did indeed furnish a new field of opportunity, a gate of escape from the bondage of the past; and freshness, and confidence, and scorn of older society, impatience of its restraints and its ideas, and indifference to its lessons, have accompanied the frontier.*
> (Turner, 1893)

In terms of adult learning, it is interesting to speculate whether some of the early users of the Internet were not, as Turner implies, attracted precisely because it offered a new and different way of learning, a 'gate of escape from the bondage of the past.' If this is the case, then attempts to 'domesticate' the

Web, and to make it resemble other learning environments, while they might attract some people, may well drive others away.

The second interesting point concerning learning is the fact that the kind of learning possible on the Web might be more 'boisterous' than that which has been possible in other adult learning settings. Turner writes:

> From the conditions of frontier life came intellectual traits of profound importance... these traits have, while softening down, still persisted as survivals in the place of their origin, even when a higher social organization succeeded. The result is that to the frontier the American intellect owes its striking characteristics. That coarseness and strength combined with acuteness and inquisitiveness; that practical, inventive turn of mind, quick to find expedients; that masterful grasp of material things, lacking in the artistic but powerful to effect great ends; that restless, nervous energy; that dominant individualism, working for good and for evil, and withal that buoyancy and exuberance which comes with freedom...

It is hard to resist the observation that working with the Web often demands 'acuteness and inquisitiveness,' a 'practical, inventive turn of mind, quick to find expedients,' and of course a 'buoyancy and exuberance.' The point might be that the Web, like other frontiers, calls forth certain qualities and character traits, which recede, and maybe disappear entirely, once the frontier has been colonised by settlers and others.

Third and finally, those who arrive early on the frontier tend to give it its character, with those who come afterwards being obliged in some important respects to accommodate to the patterns laid down by their predecessors. Turner comments:

> Behind institutions, behind constitutional forms and modifications, lie the vital forces that call these organs into life and shape them to meet changing conditions. The peculiarity of American institutions is the fact that they have been compelled to adapt themselves to the changes of an expanding people—to the changes involved in crossing a continent, in winning a wilderness, and in developing at each area of this progress out of the primitive economic and political conditions of the frontier into the complexity of city life.

It is not too much of a stretch to see the same forces at work in Cyberspace; the mechanisms, structures and systems that are currently evolving or being put into place are in a real sense having to 'adapt themselves to the changes of an expanding people.'

Two framing perspectives

Although this present study began with an inquiry into the dynamics of online learning, especially self-directed online learning, it soon became apparent that a prior understanding of the digital revolution was commonly assumed by those writing on the topic of learning. The purpose of Chapter One, therefore, is to provide an overview of the ways in which digital technologies have invaded, and to a significant extent been seamlessly incorporated into, most aspects of every daily life—at work, at home, in the shopping mall, whilst travelling, in the community, and elsewhere. The progress of technologies has been inexorable, and their impact pervasive. As discussed elsewhere, they have provided both a constant stimulus to new learning, and an invaluable adjunct to people's attempts to cope with the need for continuing learning. As such, they are simultaneously part of the problem and part of the solution!

In a sense, the advances in technology have constituted a constantly moving frontier, with the attendant opportunities for early adopters—the pioneers on the electronic frontier—to create the context within which those coming afterwards—the settlers—are able to operate. In fact, it might be argued that the way in which people have chosen to use the Web is indicative of their 'natural' tendency. They have adopted it and made it their own. The way in which adult self-directed learners have used the digital environments to support and facilitate learning basically reflects the way they see it as being most comfortable, convenient and appropriate. There is therefore a logic in coming to understand and to 'map' that usage as a basis for subsequent policy and pedagogic decisions, in preference to outlining a normative vision for how things should be from the perspective of a planner, teacher or information provider.

At one level, the frontier analogy implies that there is a single wave of pioneers, followed by a single wave of settlers; however, it is manifestly clear that those moving to the West in the United States comprised more than just two clusters. In fact there were very early adventurous souls who were commonly at home in the wilderness—prospectors, fortune seekers, ranchers and cattle rustlers, surveyors, explorers, traders and the like—followed by groups increasingly reliant on the existence of the trappings of civilisation— general stores, schools, saloons, hotels, railroads, military posts and so on, right through to those who would only undertake the journey if the basic necessities of safety, security and comfort had already been established by others.

This image of successive waves, from the earliest pioneers through to the latest settlers calls to mind Rogers' classic work on the diffusion of innovation. His framework, first published in 1962, identifies five categories of people in relation to any given innovation. First there are the innovators,

commonly operating at or beyond the limits of current practice. They are followed by the early adopters, then the early majority, then the late majority and, finally, the laggards, who, for a variety of reasons, resist the uptake of new ideas and practices. It has even been claimed that it is possible to specify the average proportion of the population that will fall into each of these five categories:

• the first 2.5% of the adopters are the 'innovators'

• the next 13.5% of the adopters are the 'early adopters'

• the next 34% of the adopters are the 'early majority'

• the next 34% of the adopters are the 'late majority'

• the last 16% of the adopters are the 'laggards' (Green, 1996)

Whether in public policy terms or in developing educational interventions, it is important to recognise that the attitudes and learning approaches of each of these five groups will differ sharply from one another. In the case of technologies for learning, for instance, it should come as no surprise that innovators require little if any direct support; indeed as innovators they would neither expect nor welcome external intervention. However, the late majority and the laggards may require a good deal of encouragement in order to take up the opportunities presented by new technologies. It is also salutary to recognise that those advocating the exploitation of new technologies themselves tend to be the innovators, or at least early adopters, and that their enthusiasm needs to be tempered with the knowledge that not everyone will share their optimism about the potential of something new.

In addition, it is probable that the overall market for technologies will be segmented into a number of smaller entities, so that people may, on average, be more comfortable with their use for communications or for banking than they are for shopping, or that they will accept technologies for recreational purposes more readily or more completely than they will for learning purposes.

In Chapter Two, I switch my attention from the broad impact of the digital revolution to consider self-directed learning, another phenomenon in which people differ from one another both in their general orientation and in relation to particular topics or subject areas. I begin from the position that learning in formal courses of education and training is a special and somewhat artificial case of learning in general, and that there is merit in understanding both what and how people learn without the constraints (or for that matter without the support) of institutional affiliation.

In many respects, there seems to be a natural symbiosis between self-direction and digital technologies. For a start, such technologies offer an unprecedented opportunity for the independent and private pursuit of areas

of interest, including those that are awakened through participation in formal courses and programs of study. Moreover, the skills of problem identification and information retrieval and use that are commonly acquired and developed in formal education and training are put to use in such learning.

A further reason for focusing on self-directed learning is that, despite the increasing availability of courses in educational institutions, workplaces and community settings, the majority of people are largely self-taught in relation to the technologies themselves. Thus, an understanding of self-directed learning can provide an insight into how and what people learn about digital technologies.

There is a fourth and final reason why I chose to consider self-directed online learning in preference to its more domesticated counterpart; in some respects at least, it conjures up an image of self-sufficiency and independence in learning. However, I am chastened by the cautionary comment made by Doheny-Farina:

> *What the hypemeisters don't say or don't realise is that this frontier metaphor deceives us. It conjures up Americana images of the individual lighting out for the territories, independent and hopeful, to make a life. But what is hidden by the metaphor is the cybernaut immersed in virtual worlds, neither self-reliant nor liberated, but utterly dependent for existence on technology created, provided, and sustained by others, living the isolated life of the placeless domesticate* (Doheny-Farina, 1994).

While such an image might conceivably have been true of the innovators and early adopters, it is probably less true of the rest of the population who constitute the vast majority of those now choosing to use the technologies to pursue their learning interests. These cautionary comments should be borne in mind as I turn, in Chapter Two, to a consideration of the relationships between self-direction and the online world.

Taken together, then, these two chapters frame the study: Chapter One providing the backdrop to the contextual issues dealt with in Part II, and Chapter Two setting the scene for the model of self-directed online learning advanced in Part III.

1 The Digital Revolution: Are We There Yet?

Far away in the heavenly abode of the great god Indra, there is a wonderful net which has been hung by some cunning artificer in such a manner that it stretches out indefinitely in all directions. In accordance with the extravagant tastes of deities, the artificer has hung a single glittering jewel at the net's every node, and since the net itself is infinite in dimension, the jewels are infinite in number. There hang the jewels, glittering like stars of the first magnitude, a wonderful sight to behold. If we now arbitrarily select one of these jewels for inspection and look closely at it, we will discover that in its polished surface there are reflected all the other jewels in the net, infinite in number. Not only that, but each of the jewels reflected in this one jewel is also reflecting all the other jewels, so that the process of reflection is infinite (Cook, 1997).

1.1 Introduction

In the past decade or so, the world has witnessed an unprecedented level of globalisation. One of the key driving forces behind this movement has been the rapid and pervasive spread of Information and Communication Technologies, which has allowed governments, businesses and individuals to deal with one another across vast distances, often across the entire planet, with extraordinary speed. It has led to, or at least accompanied, a shift towards the development of a weightless economy, where a significant amount of economic activity is attributable to intangible, information-based activity. An increasing proportion of the workforce, especially in advanced industrialised countries, now works largely or exclusively with developing, transforming, storing, manipulating, combining, extracting, selling or otherwise dealing with information and, since an increasing share of that information now exists in digital form, it follows that a large proportion of world economic activity necessarily involves the use of digital technologies.

In this chapter, it is my intention to examine these trends in greater depth, to consider what this means for many everyday activities, and in particular to tease out what it portends for various kinds and levels of learning.

1.2 The information explosion and the knowledge economy

Although history is an unbroken continuum from the distant past to the unknowable future, it is customary to divide it up into manageable and memorable chunks. Thus historians are inclined to speak and write of recognisable periods such as the ice age, the stone age, the bronze age, the iron age and so on, even though these periods in fact blend imperceptibly into one another and even overlap.

Another useful way of classifying history is to consider how people have occupied themselves at various times, and this yields the familiar categories of the hunter gatherer age, the agricultural age, the industrial age and most recently the information age. Whilst there is some dispute about what is likely to come next after the information age, almost all commentators agree that each of these periods is shorter than the one before it. Thus, in terms of human history, the hunter gatherer era lasted for perhaps one hundred thousand years, the agricultural age for several thousand years, the industrial age for perhaps 200 years and, depending on how it is defined, the information age began sometime between the 1970s and the 1990s, and there is already talk about a post-information era (the knowledge age and the holographic age have both been suggested).

Irrespective of precisely when the information age began, or whether as some claim it is already coming to a close, it has been marked by a number of characteristics including greater globalisation, larger amounts of complex information, increased reliance on technologies to handle these expanding amounts of information, and a larger proportion of the workforce engaged in dealing with information or, in Leadbeater's (2000) evocative phrase, 'Living on Thin Air.'

As Spender puts it in her essay 'E-learning and its future':

> *This revolution in the information medium isn't just impacting on educational institutions. The new technologies have produced unprecedented quantities of 'information' and it is this which is changing the nature of work, and wealth.*
>
> *Where communities once farmed the land or toiled in factories, they now handle, process, make information. And not only does this mean that they are trading in intellectual property, in knowledge products (goods and services), it means that work itself takes a different form...*
>
> *For the first time in history, the greatest source of wealth is not in farms or factories—but in ideas, intellectual property—information:*

People with ideas—people who own ideas—have become more powerful than people who work machines and in many cases, more powerful than the people who own machines.

So many jobs which once demanded human labour are now automated. So many work activities which once demanded an assembly line, an office, a warehouse—can now be undertaken anywhere—online. By any one at any time. (Spender, 2002, p. 24, emphasis in original)

The present age is distinguished not only by this elevation of information and knowledge work, but by the growing dependence on digital technologies which are themselves increasingly ubiquitous. In fact, it is not only their ubiquity but their interconnectedness or 'interoperability' which is the key to understanding just how transformative these new applications are. There is a growing interdependence, almost an organic symbiosis (Cox, 1997; Dron, J., Mitchell, R., & Siviter, P. (1998)), between many aspects of society including the conduct of government, business, information provision and learning, and at the heart of this evolutionary phenomenon is the Internet. It is increasingly vital for groups and individuals to have access to the Internet in order to be able to participate fully and actively in a range of activities at work, at home and in the community. Accordingly, it is to this quintessential feature of the so-called 'knowledge economy' that I will turn my attention in the next section.

1.3 The short and eventful history of the Internet

Considering the dramatic impact of the Internet, notably email and the World Wide Web, it is hard to believe how relatively recent these innovations actually are. According to Berners-Lee, the 'father' of the World Wide Web:

the Internet was up and running by the 1970s but transferring information was too much of a hassle for a non computer-expert. One would run one program to connect to another computer and then in conversation (in a different language) with the other computer, run a different program to access the information. Even when data had been transferred back to one's own computer, decoding it might be impossible. (Berners-Lee, 1999, pp. 20–21)

In those early days, the Internet was restricted primarily to universities and the research community, and it was there that the World Wide Web also began life, being traced more or less directly to a paper written in November 1990 by Berners-Lee and Cailliau entitled 'World Wide Web: Proposal for a

Hyper Text Project.' What they envisaged was a simple navigational tool linking computer data, text or graphics together into a web of pages. A prototype was demonstrated in December 1990 and in May 1991 the concept was tested on computers at CERN in Switzerland. From then, the growth of the Web has been exponential; by 1993 the number of separate hosts was 1.3 million, and six years later, by January 1999, it was 43.2 million. Similar dramatic increases apply to the number of webpages hosted, the amount of traffic over the Internet, the number of emails, the number of 'hits' and indeed any other measure imaginable.

While academics and researchers might have conceived and introduced the Internet and the Web, the explosive growth has in fact been fuelled largely by private industry. 'Businesses started to link satellite offices… Corporations set up email accounts for employees to communicate with clients, vendors and others. Web pages were created to become "online storefronts." Important business documents were transferred, edited and returned with rapid speed.' (Websense, 1999, p. 3).

Today, the Internet has extended its reach well beyond the universities that spawned it, and beyond the corporations that nurtured it, to become an indispensable adjunct of modern life for more and more of its users. Email, for instance, is commonplace and 'surfing the Web' is a concept that is understood, even if it is not practiced, by a very large proportion of the population in western countries. In fact, there are few sectors which have escaped its impact. Virtually all aspects of government are now digitally enabled (including defence, parliamentary practice and health), and an increasing proportion of commerce—both business to business (B2B) and business to customer (B2C)—is conducted online.

One of the major users has been the education and training industry, which has seen considerable potential both for supporting conventional face to face instruction, as well as extending the reach and enhancing the quality of distance learning. Clearly the rapid development and uptake of the technologies has benefited many, although not without confronting others, including Governments and legal practitioners with a host of daunting problems, some of which are dealt with in this chapter and elsewhere throughout this study.

1.4 Sorting the hype from the reality

In the Prologue, I referred to some of the difficulties in evaluating and predicting the impact of Information and Communication Technologies. One such feature is the abundance of dramatic and frequently excessive claims

made about new technologies, which are expected to revolutionise some aspect of life—knowledge management, communications, entertainment, commerce, learning and so on. In a keynote address to the Educause Conference in Queensland in 2001, Hayward identified what he termed a 'Hype Cycle'; a five stage process between the invention or announcement of some innovation, which he terms a 'technology trigger', through to its incorporation into productive practice. In essence, at any given time there will be a number of new ideas and applications which have been developed or, in some cases, are simply envisaged. They are plotted along a line whose shape is invariant, but along which different ideas will travel at varying speeds.

Timing—The Hype Cycle
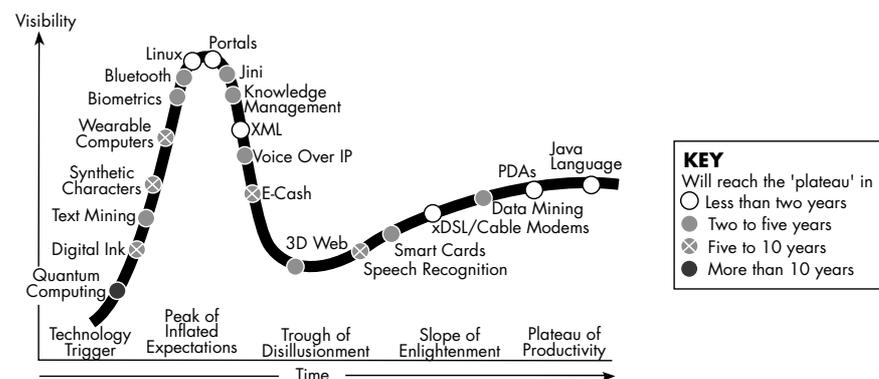
(Hayward, 2001)

The speed at which they are likely to advance, and indeed their ultimate impact, will vary according to a number of considerations, including whether or not they solve 'real' problems, to what extent they capture the public imagination, which individuals or groups pick them up and develop them, their affordability, and so on. Certainly, in the case of those technologies that are used to support learning, although they might have been hatched in universities and research institutes and nurtured in corporations, it seems likely that history will one day reveal that they were made or broken—at least with regard to their use in self-directed learning—in homes, clubrooms, community centres and libraries. In other words, as discussed in the Introduction to this Part, users are the principal arbiters of whether or not some technology—an application, a website, a piece of software—will become widespread. Thus, quite apart from its technical attributes, the likelihood of any given innovation succeeding can be explained in part using the following criteria:

- *Relative advantage* over what it replaces
- *Compatibility* with existing values and practices
- *Complexity*—how difficult it is to learn and use

- *Trialability*—how easy it is to try out
- *Observability* of results (Geohegan 1994, cited in Alexander & McKenzie, 1998, p. 11)

Since it is difficult for experts (and virtually impossible for non-experts) to agree on what is happening, on where various ideas are located along the hype cycle, and on the likely fate of any given technology, it is tempting to rely on the predictions of particular prognosticators. For the whole of recorded human history, and plausibly for a long time before that, every society and every major societal shift brought forth those who claim, and whose adherents believe, that they have a unique understanding of the forces at work and the likely impact of those forces. It is therefore no surprise to find that there has been a continuing proliferation of pundits, each claiming to have an infallible understanding of the current and future impacts of the various technologies. Since there is no completely authoritative source, in attempting to sort the hype from the reality one is forced to rely either on intuition, or on indicators such as the track record of the individual or group concerned, the plausibility of the predicted scenarios, whether or not they have any particular bias to promote, and whether the necessary conditions for the fulfilment of their vision are in place. Even with all this, the decision to believe one view over an another is essentially an act of faith, and yet many otherwise hard-nosed individuals—leaders and decision makers in Government, business and the community—commit themselves to courses of action, often entailing the expenditure of millions of dollars and/or the changing of many people's lives, based on their private convictions about the potential, for good or for ill, of the so-called 'new technologies.' This is a good example of the problem already alluded to, of 'sorting the wheat from the chaff.'

While all else may be contested, there are two propositions about which there is near-universal agreement: first, that digital technologies are basically here to stay; and second, that their influence to date, massive as it has been, is but of a pale shadow of what is yet to come.

1.5 The impact of technologies on learning

Although digital technologies might have been developed for, or adapted to the needs of researchers or commercial interests, few sectors in society have been as enthusiastic or as innovative in their use as the education and training providers including schools, colleges and universities. At all levels from preschool to postgraduate, in all subjects from arithmetic to astrophysics, and in all settings from remote rural areas to metropolitan heartlands, educators

have seized enthusiastically on digital technologies to enhance the experiences and augment the learning outcomes of their students.

Yet, while there is a burgeoning literature about the use of digital technologies in education—what has been done and why; how it has worked; its impact on students and its challenges for faculty—much of this turns out to be fundamentally about enduring educational problems and issues, rather than about anything dramatically new and transformational. With some notable exceptions, many of those experimenting with ICT in classrooms are doing precisely that—simply experimenting with ICT—and leaving fundamentally unchanged important aspects such as the structure of the curriculum, the dominant modes and purposes of assessment, and most importantly the powerful role of the teacher, trainer or facilitator and the relatively powerless and dependent role of the student, trainee or learner.

Three major orientations can be discerned in the literature, basically the same three strands that may be found in all educational literature. First, there are those whose primary emphasis is on the transmission of information— whether face-to-face or at a distance—who have seized on and exploited the capacity of technologies for transmission. Second, there are those whose concern has been with the creation of learning communities and the co-creation of knowledge who have emphasised the capability of technologies to communicate with others, both synchronously and asynchronously. Third and finally, there are those who particularly value the independence of learners, and their capacity to find things for themselves, who for their part have exploited the capability of technologies to support independent inquiry.

Thus, when one reviews the uses to which technologies are put in education and training settings, there is often a dispiriting sense that powerful and potentially emancipatory technologies are all too often being used in relatively unimaginative ways. Despite the fact, as Scardamalia and Bereiter write, that 'nobody wants to use technology to recreate education as it is'.

> *There is not much to distinguish what goes on in most computer-supported classrooms versus traditional classrooms. Kay (1991) has suggested that the phenomenon of reframing innovations to recreate the familiar is itself commonplace. Thus one sees all manner of powerful technology (Hypercard, CD-ROM, Lego-Logo and so forth) used to conduct shopworn school activities: copying material from one resource to another … and following step-by-step procedures… With new technologies, student-generated collages and reproductions appear more inventive and sophisticated—with impressive displays of sound, video and typography—but from a cognitive perspective it is not clear what, if any, knowledge content has been processed by the students* (Scardamalia & Bereiter, 1996, p. 249).

Why is it that teachers might fail to capitalise on the great potential of technologies to allow students to do so much more for themselves? One answer is that they themselves may not have been exposed to such progressive applications and accordingly may not realise the capacity of the technologies for innovative teaching approaches. A second answer might be that they genuinely believe that technology is no more than an adjunct to normal face-to-face instruction, and that 'online learning is simply another, albeit sophisticated, medium for doing what we have always done' (Stephenson, 2001, p.219).

A third possibility is that they may recognise only too clearly the truly subversive potential of such powerful media, and fear that they will become marginalised and even irrelevant should students gain too much access to these technologies. A fourth potential reason could be that it is too difficult to make the necessary pedagogic changes which, far from being superficial and easy, can go to the very core of their philosophy and approach;

> *Relying on yesterday's methods can be effective in a climate of incremental change, where adaptation can also be incremental and feedback is usually rich and easy to recognise. But the online world constitutes a qualitative change in the way we manage our interactions. The education system is struggling to optimise its limited resources and inherited skill sets to respond to technological change. Barker (1993) perceptively offers the 'back to zero rule' arguing that in any paradigm shift, if people continue with traditional working methods, they find themselves less effective than they were prior to the arrival of the technology* (Dickinson & Stewart, 2001, p.196).

In many ways, digital technologies have thrown into sharp relief differences of opinion—whether about the purposes of education or about the best ways to achieve those purposes—that have existed for decades, perhaps even longer. In 1970, a Commission on Instructional Technology in the United States released a two volume report, much of which still sounds surprisingly relevant and contemporary today:

> *Since the heart of education is the student learning, the value of any technology must be measured by its ability to facilitate learning. Learning therefore has been the Commission's touchstone throughout. All our studies, inquiries, research and deliberations have begun and ended here: with the student as learner—whether he [or she] learns by him [or her] self, with fellow students, through a teacher, or through some other agent. This emphasis is consonant with the most promising advances in education. 'Less teaching and more learning' has been a goal of enlightened educators since Comenius pleaded for it in the 17th Century* (Tickton, 1970, vol. 1, p. 16).

Three decades later again, a very similar point was being made:

> *Rather than look for something new, it is argued, we should first concentrate on using the right methodology for the educational purposes we have in mind, and then look at ways in which online learning can be structured to ensure effective learning takes place* (Stephenson, 2001, p.219).

So if the plea for 'less teaching and more learning' is more than three centuries old, it is hardly surprising that, when one examines the literature about technologies in relation to education, it turns out to be symmetrical with the existing literature about education generally; indeed one can detect exactly the same established paradigms and alternative views of the purposes of teaching or the processes of learning. One useful typology of alternative conceptions of teaching is provided by Prosser and Trigwell (Prosser & Trigwell 1999; Trigwell & Prosser 1996) who argue that teachers (in this case, university teachers) tend to hold one of several mutually exclusive conceptions about their purposes, as follows:

- transmitting concepts of the syllabus
- transmitting the teachers' knowledge
- helping students acquire concepts of the syllabus
- helping students acquire teachers' knowledge
- helping students develop conceptions
- helping students to change conceptions

Each of these conceptions of teaching implies and carries with it a corresponding view of learning and of the role of the learner. Thus, when reviewing literature about online teaching and learning, it is instructive to ask whether the author is implicitly endorsing one or other of the above conceptions, or perhaps combining two or more of them. In this study, my focus is very largely on the latter two visions of learning; by adopting the self-directed learner's perspective I am explicitly playing down both the notion of a syllabus and the notion of the 'teacher' and his or her knowledge.

1.6 The need for continuing and lifelong learning

This leads to one last consideration, which is the relationship between technologies, especially rapidly changing technologies, and the field of lifelong learning. One of the recurring motifs in writing about digital and other technologies is that their ubiquity, combined with the speed of change,

creates a need for continuing learning. Whether in relation to the specific economic, social and cultural domains in which people live and work, or to the technologies themselves, virtually no one can be thought to be always on top of the technologies that are invading their lives, and there is a need for constant learning.

This imperative is, if anything, even more pronounced for those who are in, or are planning to join, the workforce. If they wish to maintain or enhance their employability, they are confronted with the need to maintain currency in their chosen field as well as familiarity with the technologies commonly encountered within that field. To some extent, this is good news for those whose job it is to provide continuing education and training, but there is an underside to this; it means that a great deal of people's intellectual and emotional energy, not to mention their discretionary time, is taken up in work-related learning. An inevitable corollary, however, is that there may be less discretionary time for people to pursue their own individual learning interests.

Some commentators, such as Birkerts, resent this imperative and in various ways—some more overt than others—encourage us to resist it. Others adopt a more conciliatory approach and encourage people to welcome and embrace the changes. There is hardly anyone, however, who denies the need for continuing learning across the lifespan. While this might always have been true, the impacts of the digital era make it even more irresistible. This new pragmatism is a concern for many, who see it as a capitulation to the dynamics of global capitalism, and who question the rhetoric of the community, government and business leaders and of the media, who urge attention to learning of all types across the lifespan. The triumph of learning might well turn out to be at the expense of its integrity as a truly valuable and emancipatory human activity. I will return to this theme in Chapter Sixteen, in considering whether the Learning Society is turning out to be a vision or a hallucination; a dream or a nightmare.

2 Self-directed Learning: Online and Offline

… let us put together the storage and retrieving capabilities, the management capabilities, and the instructional capabilities of computers. It is now possible to conceive of a computer programmed to provide instantly, at a home terminal, continuously updated information about the total educational resources of a community… A member of a family might very well secure a printout of what is coming up in the way of arts shows, museum displays, athletic events, plays, lectures, and so on, and where and how these educational and cultural resources might be reached. Clearly some of them would come directly into the home via computer terminal. Included in this repertoire of cultural resources would be a library of educational programs spanning the whole gamut of human interest. Envision a cultural community generating centre in which the totality of learning resources available is 'programmed.' Envision also, an individual record-keeping system by means of which the segments of this, uniquely assembled for any given individual, are managed.

The above is not 'education 1980.' But it very well could be 'education 2020' (Goodlad, 1970, pp. 95–96).

2.1 Introduction

In Chapter One I indicated that formal education and training are two of the principal fields to have been affected by the digital revolution, and to have exploited its potential. The result is that throughout the world, a great deal of learning at all levels from preschool to postgraduate study, in many subject areas and in a variety of contexts, is now technologically mediated. And because education and training systems worldwide represent such a large investment and such a significant part of each country's social, cultural and economic infrastructure, it is hardly surprising that the efforts of teachers and the experiences of learners have become major objects of study by researchers. As a consequence, there is a huge and expanding body of literature about online learning within educational settings.

However, vital as it is, the learning that occurs in schools, colleges, universities and training centres constitutes only a minute fraction of all the

learning that occurs throughout a lifetime. Moreover, it is a specific sub-category of learning endeavours generally, since the strictures and structures of the formal education system inevitably constrain and inhibit such learning and distinguish it from the more fluid, and in many ways more adaptive, kind of learning that occurs in everyday settings. In fact, in its truest form, self-directed learning is a wellspring of individual expression; it is the unfettered pursuit of interests dictated by one's personal values and aspirations.

The relationship between technologies and at least some forms of learning is held to be reciprocal. On the one hand, new technologies have created a potent incentive for a great deal of learning, since they are so ubiquitous and versatile. Moreover, there can be little doubt that, properly used, they can expand the individual's universe and provide a powerful adjunct to the self-directed inquiries of men and women of all ages and all stations in life. On the other hand, the growing demand for learning, and the increasing sophistication of learners, has stimulated the development, expansion and refinement of technologies to satisfy the hunger for information and knowledge. It is because of this reciprocity between learning activity and technological development, and because of the central importance of self-directed learning as both a precursor to and frequently as a consequence of formal education and training, that this study has been undertaken.

2.2 The historical importance of self-directed learning

Those who work in formal education and training settings have a tendency to equate learning with being taught, and to overlook the fact that such learning represents a relatively small proportion of all the learning undertaken by a person throughout his or her lifetime. Even those who experience lengthy periods of formal education, for instance through to postgraduate level, nevertheless learn a great deal more, and arguably a great deal more relevant, information and insights through various life experiences. Much of this other learning is unanticipated and unplanned; it occurs unbidden and continuously. It is generally referred to as informal or incidental.

Learning is as old as humankind; it is an inescapable part of life. Since time immemorial, humans have had to learn and adapt in order to optimise their chances of survival and to cope with changes in their environments. Indeed, in many senses, it is this propensity to learn which gives us our human qualities. Against the backdrop of what might be called inescapable or unavoidable learning, much of it incidental and unplanned, there is a dramatic and complex tapestry of intentional learning. Some of it is planned,

managed and facilitated by others and occurs in recognisable dedicated domains such as schools, colleges, universities and training centres. However, a great deal of it—some curiosity driven, and some in response to external imperatives—is largely self-planned and self-managed. In these latter cases, whatever the stimulus to learning, the locus of initiative and control lies with the individual learner.

For a long time, despite being so widespread, such self-directed learning was largely ignored by educational researchers and theorists. It was regarded as beyond the reach of educational interventions, and of little interest to researchers. However, it has become increasingly apparent that such learning can be studied in a systematic and methodical way, and furthermore that such studies can yield information that is both interesting and useful to practising educators. If we understand both what and how people learn when they are pursuing their own interests, it may provide valuable insights into how formal education may be more responsive and relevant to learners.

Of course, the growing interest in self-directed learning is being driven not only by its potential value to educators, but by a surge of interest in learning more generally. Learning and social change have always been intertwined. In relatively stable periods and in traditional cultures with limited change, learning has been more measured; conversely in times of great political, technological or social turbulence, the need for learning is more pronounced. Today, as the rate of change in virtually every aspect of our lives has accelerated, and almost every certainty has been brought into question and thrown into doubt, the amount and speed of learning have both increased to keep pace. Throughout the world there is renewed attention to the importance of learning throughout life. Not only educational providers, but governments, companies, professional associations, and even community groups have become involved in providing support for learners and for learning. Never before has there been such widespread attention not only to individual learners, but to concepts such as the learning organisation, the learning community and even the Learning Society. There is little doubt that the subject is in vogue at all levels from the individual to the societal and for all ages from the very young to the elderly. We are living, as Jarvis points out, in 'the age of learning' (Jarvis, 2001).

A significant corollary of this newfound enchantment with learning on the part of powerful social entities such as business, Government and the media has been the proliferation of education and training consultancies, the development of educational software programs, and the more extensive provision of resources to a mosaic of cultural agencies and research institutes, training providers, libraries, museums and art galleries. For those who have spent a lifetime as professional educators, advocating the central importance

of learning to our wellbeing both individually and collectively, this might seem like good news. However, while there is little doubt that governments, multinational enterprises and large sectors of the media are supportive of learning, much of their support is precarious and conditional and, in any case, has to do with global capitalism, 'rather than being treated as a natural human process that results in the development of people as human beings' (Jarvis, 2001, p vii). Many people have grave misgivings about what this has done and is doing to the quality of our learning. I will return to this issue in Chapter Sixteen in my consideration of whether or not we are realising the vision of a Learning Society.

2.3 A brief review of research into self-directed learning

As suggested above, formal research into self-directed learning is relatively recent, although the phenomenon itself is very ancient. Prior to the 1960s, the bulk of the literature pertaining to self-directed learning was precisely that, literature—mainly biographies and autobiographies—since many eminent people were largely if not entirely self-taught. Indeed, prior to the emergence of formal systems of schooling a couple of centuries ago, this was the main way in which most people learned what they wanted or needed to know. In his book, *The Pursuit of Knowledge under Difficulties*, first published in 1830, Craik writes:

> *Originally, all human knowledge was nothing more than the knowledge of a comparatively small number of such simple facts as those from which Galileo deduced the use of the pendulum for the measurement of time, and Newton the explanation of the system of the heavens. All the rest of our knowledge, and these first rudiments of it also, a succession of individuals have gradually discovered, each his own portion, by their own efforts, and without having any teacher to instruct them. In other words, everything that is actually known has been found out and learned by some person or other, without the aid of an instructor. There is no species of learning, therefore, which self-education may not overtake; for there is none which it has not already overtaken. All the discoverers (and the whole of human knowledge that has not been divinely revealed is the creation of discovery) have been self-taught, at least in regard to that which they have discovered...* (Craik, 1866, p. 31).

Craik's book was published by the quaintly titled 'Society for the Diffusion of Useful Knowledge,' and if there was ever a high water mark for self-direction

in an earlier age, it was probably the nineteenth century. That era saw the establishment of both religious and secular societies to promote and support learning, the creation of mechanics', scientific and literary institutes and mutual improvement societies, the spread of lyceums and athenaeums, of libraries and reading rooms. It also witnessed an upsurge in the publication of improving books and manuals, literary and philosophical journals, encyclopaedias and do-it-yourself guides, which often appeared in weekly installments. Books such as Craik's *The Pursuit of Knowledge*, Smiles's *Self-Help* and Kemp's *Enquire Within Upon Everything*, each of which was reprinted many times and went into multiple editions, attempted to keep up with a seemingly insatiable demand for information about every imaginable topic and subject.

While this veritable torrent of publications and organisations stands as testimony to the intellectual curiosity and thirst for learning on the part of our ancestors, formal research into the phenomenon is remarkably recent. Arguably the first treatise on the subject from a scholarly point of view was in the early 1960s when Houle, then a professor of Adult Education at the University of Chicago, gave a series of lectures while he was Knapp Visiting Professor at the University of Wisconsin-Milwaukee. For his topic, he chose an interdisciplinary approach to the deceptively simple question 'What kinds of men and women retain alert and inquiring minds throughout the years of their maturity?' Houle's lectures were subsequently converted into a slim but influential book entitled *The Inquiring Mind: A Study of the Adult who Continues to Learn* (Houle, 1961). This minor classic legitimised the study of self-directed learning and, since he himself was a leading professor of Adult Education, eventually prompted an entire research tradition that continues to this day.

In his lectures, and the book generated from them, Houle ventured a three-part typology of what he called 'whys,' the principal explanations advanced by continuing learners for their interest. He identified the following three classes of learning motivations:

Goal-oriented learners tend to have very specific questions or intentions for participating in any learning activity. Their participation tends to be non-continuous and episodic because they withdraw or focus on some other activity just as soon as their particular need or interest has been satisfied. Their motivation tends to be pragmatic and short-term and, interestingly, they commonly attribute the same sort of instrumentalism to others.

Activity-oriented learners, on the other hand, commonly involve themselves in learning experiences for reasons that may be relatively unrelated to the ostensible purpose of the activity. An obvious example would be those who join a learning experience out of loneliness and the need for social

interaction; others may be motivated by the recognition of their achievement especially in the form of certificates or diplomas. Others again might engage in learning because it is expected of them; for instance, it could be a way of carrying on a family tradition.

Finally, there are the **learning-oriented** learners for whom learning is a continuous, almost a habitual activity. Such people tend to see learning as good in and of itself. They view it as something enjoyable and stimulating; indeed for many, it is a kind of entertainment, which they find it difficult to separate from other aspects of their lives.

Houle's original book was born into an era pregnant with possibilities for research, especially as a number of graduate students were searching for fertile areas of inquiry in the emerging scholarly field of adult education, which at that time had been less extensively studied than its school-based counterpart. One such student was Tough, himself later a distinguished Professor of Adult Education at the University of Toronto, who in the early 1960s decided that it would be interesting to explore in greater depth and detail what people do when they learn for themselves without institutional affiliation or support. In 1965, Tough completed his doctoral dissertation at the University of Chicago into what he termed 'adult self-teaching.' The following year he published a journal article on 'The assistance obtained by adult self-teachers'; in 1967, he produced a report entitled *Learning Without a Teacher: A Study of Tasks and Assistance During Adult Self-teaching Projects*, and in 1971, the first edition of the book for which he is arguably best known, *The Adult's Learning Projects*.

Whereas Houle had simply undertaken a very small-scale qualitative study of 22 continuing learners to develop his typology, Tough managed to operationalise what had hitherto been a vague and undefined form of activity in such a way that allowed for the systematic study of such learning. Central to Tough's work was the concept of the 'learning project,' which he described as a deliberate and sustained attempt to learn something, extending over more than seven hours (the equivalent of a full day), and directed by the learner him or herself. Using Tough's definition, many researchers have been able to inquire into the learning efforts of various cohorts of independent adult learners, so that today there are few identifiable groups whose learning has not to some extent been documented and studied.

Despite the elegance of his formulation, and the significant contribution that his research has made to our understanding of this vital aspect of adult learning, Tough's work highlighted several problems that have bedevilled researchers ever since. The first is the somewhat arbitrary nature of what constitutes a learning project. At what point does a casual inquiry become a more intentional and significant event, and is seven hours the right length of

time to define such an effort? Indeed, should a learning project be defined quantitatively at all? Second, Tough identified the fragmented and episodic nature of many adult learning activities, a fact that may simultaneously be a strength and a weakness: a strength because it implies a cumulative and recurrent engagement with the ideas, but a weakness in the sense that its disjointedness may lack disciplined coherence. Third, it was apparent in Tough's work, and has continued to be the case, that many people do not in the normal course of events distinguish between teaching and learning, with the result that, if asked whether they have learnt anything recently, their answer tends to be framed in terms of whether or not they have participated in some formally taught course or program. To put it another way, it is difficult to investigate a phenomenon when many of the respondents do not share with the investigator a common understanding of what is meant by the core term 'learning.'

While each of these issues poses a conceptual and methodological challenge to anyone wishing to study the phenomenon of self-direction, it is arguably yet another issue that makes it almost impossible. Since self-directed learning, by its very nature, tends to occur in the privacy of people's homes, workplaces or communities, it is difficult to investigate it fully and accurately. Such investigations depend significantly on self-report data which may either understate or overstate the actual amount of time and effort involved. In researching learning that occurs in the online environment, although the technology itself can help to track and monitor the amount of time that a user is logged on, and even the pattern of sites he or she visits and the navigational pathways followed within and between sites, it is still notoriously difficult to reconstruct accurately the learner's intentions and thought processes whilst learning. I will return to these issues later in this study in addressing the challenges of researching self-directed learning online.

2.4 Distinguishing self-direction from learner-control

At the beginning of this chapter I alluded to the fact that there is a large body of literature pertaining to the phenomenon of online learning. Of that literature, the greater proportion focuses on learning in the context of being taught, although there are many references to concepts such as independent, self-paced, self-directed, autonomous or otherwise learner-managed learning. On closer examination, however, the majority of this literature actually turns out to refer to a severely circumscribed kind of independence, in which the learner is 'permitted' to take control over a relatively narrow range of choices.

It is certainly a far cry from the kind of entirely self-directed learning with which I have been dealing, and is instead more akin to the concept of 'learner-control.'

In earlier work (Candy, 1991) I distinguished between true self-direction, or autodidaxy, on the one hand, and what I labelled learner-control of instruction on the other. In conventional offline education, there is a long tradition of teachers, lecturers, instructors or others giving learners some control over certain instructional functions (such as the pacing or sequencing of various topics within a course), often on the dual bases that this increases the sense of ownership and hence motivation to learn, and that it may lead to an enhanced capacity for undertaking the other sort of self-directed learning. While there is considerable support for the claim that increased learner control can increase ownership and hence motivation, the link between learner control of instruction and self-directed learning in other contexts is more tenuous. In fact, it can prove to be little more than an article of faith, especially if there is no explicit attempt made to develop learners' capacity to manage their own learning beyond the institutional setting.

From the point of view of an outside observer, it can be difficult to detect whether a given learning project is more properly defined and viewed as an example of learner-control or of self-direction, since the external manifestations may be the same in both cases. However, the distinction is an important one, because it goes to the heart of where true control of a learning event actually lies. In the case of learning online, the same distinction can usefully be made, and throughout this study I have tried to maintain a focus on self-directed learning which is entirely the prerogative and responsibility of the individual learner. This means that I have not, for the most part, dealt with the literature that is primarily concerned with learner-control.

There is an important caveat to be noted here, particularly with respect to learning online. In the pre-digital world, there was obviously potential for confusion between these two phenomena. A purely self-directed project could conceivably make use of some materials developed for formal courses; perhaps even more likely, participation in a formal program of study could give rise to the independent pursuit of learning when the student found him- or herself sufficiently engaged by the subject-matter. However, the learner would be reasonably sure when that invisible line had been crossed, and he or she had moved from one context to another. In the online environment, however, the possibility of such connections is dramatically enhanced. Because there is a unified platform for the storage and delivery of materials, learning projects that start out as independent and self-directed can subtly merge across into courses and programs offered online—with or without the

formality of enrolment. Conversely, participation in an online course can give rise to the pursuit of more self-directed activities and interests. Indeed, the hypertext environment is such that a learner can seamlessly and sometimes even unintentionally move backwards and forwards between different learning resources and environments in a way that was not possible in the pre-digital era. Thus, there is a greater transparency in the online environment, a fluidity between formal education and training and the independent pursuit of learning which needs to be recognised by information and education providers alike. In short, there is perhaps more of a continuum than a dichotomy; this is an issue to which I will return later in the study.

2.5 The relationship between self-direction and digital technologies

Earlier in this chapter I alluded to the significant increase in attention to learning in recent years, not only by formal education and training providers, but more impressively by groups which, by and large, have in the past been less interested in promoting and supporting learning. These include Government, business and industry, professional alliances and community groups of various kinds.

> *Intriguingly, this increased attention to learning has tended to follow a similar trajectory to the progress of Information and Communication Technologies. At the heart of many people's conception of the renaissance of learning is the other great triumph of recent decades, the progress of technology. Indeed, for most people—educators, business leaders, policy makers, technologists and members of the community at large—it is almost impossible to divorce the upsurge of interest in learning from the rapid advances in technologies to support it.*

If this is true of learning in general, there is an even more compelling symbiosis between some forms of self-directed learning on the one hand and digital technologies on the other. From the point of view of learners, the capacity to access a virtually unlimited range of information pertaining to their learning needs and interests; to capture, store, manipulate and display such information; and to make contact with fellow learners and experts around the globe without formality and at the press of a button all represent an invaluable adjunct to their self-directed inquiries. Likewise, from the point of view of those designing, manufacturing or distributing hardware and software, providing information resources, or facilitating connections between likeminded individuals (whether free or on a fee-for-service basis), the

existence of a widespread, technologically skilled and learning-oriented constituency seems to provide a significant impetus to the further elaboration and development of their offerings.

Given, then, this strong and compelling reciprocity between self-directed Learning and Information and Communication Technologies, what evidence is there of the impact that each domain has had on the other?

Impacts of ICT on self-directed learning

With respect to the impact that ICT has had on learning, there are four fundamental approaches to the issue: one might look for evidence that the amount of self-directed learning has changed; that a wider or different cohort of learners is now engaged; that there has been some non-trivial change in the actual dynamics of the learning process; or finally that the quality, or the ability to evaluate the quality, of information now available is different from before.

In relation to the first of these elements, an obvious although somewhat crude measure would be whether or not the absolute amount of self-directed learning has increased with the advent and spread of digital technologies. In effect, this is impossible to gauge, since there are no reliable baseline data about the existing extent of self-directed learning. Nevertheless, it is feasible to assume that the extraordinary uptake of ICT—in the home, in the workplace and in the community—has been accompanied by a commensurate increase in its use for learning-related purposes. A small but persuasive piece of evidence is the extent to which people who are otherwise uninterested in the use of computers, notably those older than 55, have participated in classes conducted by community and other groups so that they can use the technology to pursue hobbies, of which genealogy is the most common. This sort of curiosity-driven inquiry is only one kind of learning, however, and it is to be expected that a good deal would also occur at work for work-related purposes. The more widespread availability of technologies in the workplace has almost certainly led to their increased use for professional as well as personal activities including learning:

> as the Internet has streamlined work processes, it has also given workers access to new and more interesting avenues at their desktops. In fact, with entertainment, gaming, sports, shopping and other activities [including learning] available at the touch of a button, the Internet is a temptation many workers have a hard time resisting. Couple this with the limitations of Internet access at home—slow, 56k dialups or expensive cable-modem services—and it becomes obvious why workers use their company's connections for the majority of their Web leisure (Websense, 1999, p. 3).

Again, there is no direct information, but inferential evidence suggests that many workers, now that they have access to such technology at their workplace (and commonly on their desktops), are prepared to use it to locate and retrieve information, to send and receive emails, and to engage in various discussion groups and forums including those that pertain to their work life. Whether one focuses on the career-oriented person 'who wants to … keep up with expanding knowledge in his or her own and related fields …' and who 'knows how to learn by keeping abreast of developments in modern information technology,' or 'the liberal notion of the autonomous individual working within a learning framework' (Griffin & Brownhill, 2001, p.64), there seem to be at least two distinct motivations for ongoing learning in the workplace.

This leads to the second issue, which is whether digital technologies are likely to have changed the composition of those engaging in self-directed learning. Clearly the ability to learn at home, in the community or in the workplace is dependent on having ready access to technology, and those who lack convenient access to ICT, or who lack the confidence to use it, are unable to take advantage of the services and activities that it offers, including learning. Thus, the technologies might have reached and empowered some people who before were unable or unwilling to learn, but at the same time have disadvantaged and disenfranchised others. This phenomenon, which comes under the general rubric of the 'digital divide,' is dealt with in greater depth in Chapter Three.

As to the third question—is self-directed learning different online?—the evidence is mixed. Quite clearly, for anyone to pursue a learning effort in Cyberspace, he or she needs a minimum level of technological literacy, as well as specific expertise in the area of interest. Whether pursuing a learning project to do with ecclesiastical architecture, growing roses, breeding and showing pedigree dogs, dealing with a Down's Syndrome child, or restoring a vintage motorcar, the learner will need some basic skills along with a more detailed knowledge of terms, sources and experts in the chosen field of learning.

In relation to observations about how online differs from offline learning, two completely different views have been advanced: on the one hand, online learning is claimed to be an inherently anti-social and individualistic activity, that decontextualises knowledge and uncouples people from the social processes of knowledge creation. Linked with this is the common criticism that it is addictive and absorbing in a way that other kinds of learning are not. It has been suggested that once online, people can lose themselves in an artificial environment and thus run the risk of fracturing their relationships in the real world. As discussed elsewhere in the study, there are undoubtedly

some obsessive personalities and some antisocial individuals for whom this is true, but in fact it is hardly different from any deeply committed person who is devoted passionately and single-mindedly to the pursuit of a hobby, crusade or other learning endeavour offline.

On the other hand, however, it has been argued to the contrary that modern technologies when networked together have the capacity to provide greater social contact than the former stand-alone machines and electronic devices that preceded them. Accordingly, online learning allows learners to network with each other in hitherto unimagined ways and with great ease. Whereas a self-directed learner in the past might have been forced to pursue his or her learning endeavour in relative isolation, working in a library, listening to radio and television broadcasts, sending for and receiving information by post, or inserting floppy disks or CD-ROMs into his or her machine: today the same person can be in rapid, frequent and intimate contact with other learners by fax or telephone, or via the Internet using email, discussion groups or even 'live' through a chat room. Ironically, some critics have even objected to the excessively connected nature of modern technologies. Birkerts, for instance, lamenting the demise of deep reading, writes that 'we sacrifice the potential life of the solitary self by enlisting ourselves in the collective…this is finally, even more than the saving of labor, what these systems are all about. They are not only extensions of the senses; they are extensions of the senses that put us in touch with the extended senses of others. The ultimate point of the ever-expanding electronic web is to bridge once and for all the individual solitude that has hitherto always set the terms of existence.'

Of course personal interconnectedness is only one aspect of the learning equation. What of the quality of the learning experience itself? Commentators have pointed to three related issues. The first is the paradoxical observation that the very same users who may expect their search to turn up precisely the right information within a short period, say less than 30 seconds, and who exhibit symptoms of 'Internet Rage' when it does not, will spend countless hours online and can become absorbed into a virtual world.

The second observation, usually presented as a criticism, is that online users may develop a less discerning attitude towards what they encounter in Cyberspace, so that they limit themselves to, and (at worst) accept uncritically what is located by their search engines. There certainly is anecdotal evidence to support the view that some users might exhibit a degree of 'historical amnesia,' believing that the only worthwhile information is to be found on the Web, and that there is no value in conventional authorities and sources such as books, journals and published conference proceedings. Linked to this is the third claim, namely that technology has a tendency to present inquirers with decontextualised knowledge claims, commonly lifting information out of

its narrative and conceptual framework. To the extent that this critique is justified, it potentially represents a serious drawback of self-directed online learning, because it could lead to shallow reproductive learning.

What exactly is 'reproductive learning'? Over a period of several decades, there has been considerable research into the concept of Approaches to Learning of which, at least in formal education settings, there are considered to be three: Deep Approaches (a serious interest in the topic associated with an attempt to understand the meaning structures and principles underlying the topic); Surface or Reproductive Approaches (where the learner is memorising lists or identifying isolated and unconnected atoms of information) and Achieving Approaches (most often associated with formal education settings, in which the learner makes a deliberate and strategic decision to do the minimum necessary to fulfil some external requirement and no more). Research has emphatically demonstrated that there is a clear relationship between approach and outcome; in other words, if a learner adopts a surface approach to a learning effort he or she will inevitably reap surface learning outcomes.

It is logical to assume that a motivated and interested adult learner, engaging in a learning project on his or her own behalf and based on an intrinsic desire to solve a problem or to learn a particular topic, would adopt a Deep Approach. This is not to say that he or she would necessarily be good at the inquiry, but at least that would be the intention. As McDowell and Pickard put it:

> *The key factor here is the approach to learning adopted by [learners]. Deep approaches and interest in learning tasks afford more active engagement with information and the construction of knowledge, whereas surface approaches lead toward more straightforward reproduction of information to fulfil task requirements. Some contexts fail to encourage students [and other learners?] to see themselves as active constructors of knowledge or 'apprentice knowledge workers'* (McDowell & Pickard, 2000, p. 6).

Do digital technologies have a greater propensity to emphasise quick, shallow reproductive learning or do they, because of their capacity to engage learners at a deep level, to model alternative constructions and to place learners in contact with one another, support complex and transformative level learning? On the whole, there is some justification for the belief that new technologies have changed self-directed learning and self-directed learners. On the one hand, they have greatly facilitated access both to rich information resources and to online expertise, and have made it easier for the dedicated, knowledgeable and inquisitive learner to find an extraordinary richness of learning resources. On the other hand, they may lead those who are so inclined to accept partial, biased or incompletely understood information, to

engage either too deeply or too shallowly with their inquiry, and to rely too heavily on the technology to assist them in knowing what to think and what to believe. I will return to this issue in greater depth in Chapter Thirteen on 'Reconceptualising.'

In this regard, it is important to recall Sir Winston Churchill's famous observation about the relationships between people and the contexts they create. In a wartime speech to the House of Commons, in fact delivered in the House of Lords, Churchill said, 'We shape our buildings, and afterwards our buildings shape us' (Churchill, 1943/1960). Technologies reflect our purposes, but they also influence what we want, and are able, to do with them. It seems probable that learners and other users have adapted in significant ways to the technology, and that Churchill's dictum could be reframed as 'We shape our technologies, and afterwards our technologies shape us.'

Impact of self-directed learning on ICT

Turning to the other side of the coin, what is the evidence that self-directed learning has had an impact on the digital domain? There are several approaches to this, each at a different level of abstraction. One could search for evidence that software or other **applications** have been developed specifically for self-directed learners; one could look for examples either of new sites, or of additional **information** being placed on existing sites for self-directed learners; and finally, one could try to adduce evidence that the **digital environment overall** has been affected by self-directed learning.

In terms of the point just made concerning the reciprocal relationship between users and technologies, there is no doubt that self-directed learners, enterprising and adaptable as they are, have pressed into service a number of programs and applications in support of their learning efforts. Many of the most common and widely available software packages and applications—word processing and spreadsheets, emails, discussion boards and chatrooms and scanned images—are all increasingly standard and are used routinely by self directed learners. Likewise, familiar search engines are also commonly used by those pursuing their learning independently. In other cases, specific devices and software have been developed for particular cohorts of learners. Dedicated search engines and databases, tools for harvesting and filing websites, and software for handling subject-specific resources have been prepared and offered either free of charge or for purchase. Many of these have been developed by fellow-enthusiasts, with the specific needs of learners in mind. There is also a wide range of software that has been developed to support learners in formal courses and programs. As discussed earlier in this chapter, because of the relative fluidity

of the Web environment, many self-directed learners use such resources, having either discovered them for themselves, used them while enrolled as students, or been introduced to them by others. Self-directed learners represent a significant and in many domains large constituency whose needs and demands feed both directly and indirectly into the creation of domain-specific software and applications.

Turning to the issue of websites and databases, it is evident that a large number have been developed, or their contents enhanced, specifically to serve the needs of self-directed learners. These have been prepared by a variety of individuals, agencies (including both public and specialist libraries, government departments and professional associations), companies and cooperatives as well as by community-based interest groups. While some of these sites also fulfil statutory obligations or act as marketing devices for the organisations concerned, many explicitly set out to provide information, databases, advice, online courses and other links for those wishing to undertake learning.

Some of the best and most accessible sites have been developed by libraries, museums, art galleries, archives, public broadcasters and other cultural institutions keen to reach a wider audience. Publishers have also been quick to realise the increased potential afforded their products—whether books, journals or newspapers—by offering companion websites. Yet another category of such sites is that of the corporate universities set up by many large corporations or professional associations to support the self-directed learning efforts of their employees, members, distributors or clients; a good example of this latter is the Learning Space, a not-for-profit site maintained to assist schoolteachers to optimise the use of technology in their classrooms (http://www.learningspace.org/teach_learn.html [accessed 14 January 2003]). In short, there is considerable evidence that at least some of the growth online has been in direct response to the demands of self-directed learners, who often have quite specialised areas of interest and expertise, but who do not wish to participate in formal courses and programs of study.

Finally, there is the broadest level of abstraction; the impact that self-directed learners have had on the digital environment at large. Since digital technologies have become so seamlessly and comprehensively woven into the fabric of people's lives, it is difficult to state precisely how much and what kinds of independent learning are occurring in the digital environment. Nevertheless, as discussed in the introduction to this Part in discussing the electronic frontier, it is likely that learners—both the pioneers and the more recently arrived settlers—have exerted a profound but unquantifiable effect on the invisible world of information and communication.

A simple example of this imperceptible but influential phenomenon might help to clarify the point. Some cities have been planned from first principles by urban planners. With an overall vision of what the city might be like, the values that it should embody, and the topography of the land with its disposition of natural resources, the planner is able to map the basic area, then to superimpose major items of infrastructure—roads, railways, airports, canals and so on. Plans are made for providing needed utilities—electricity, gas, water, sewerage and telecommunications. Space is set aside for various functions such as retail precincts, heavy industrial areas, residential locations, green corridors and recreational zones. Care is taken to ensure that contradictory uses are not co-located, that roads are wide enough and that important amenities such as sports grounds, car parks, meeting halls, shopping centres, railway stations and airports are provided in convenient and accessible locations.

In reality, however, most established urban areas are not planned like this at all. More often they have grown up willy-nilly, around old and cramped ports, or ancient villages with tiny narrow streets and constricted access. Businesses jostle with residential and retail areas, and factories are located close to the city centre rather than in spacious areas at the margins with good transport routes and room to expand. The appearance of the town or city is commonly a compromise, hammered out in practice and over time, and no one group of users could be said to have created the final shape on its own; it is an amalgam of history and geography, local council interventions, government regulations, the free market, lobby groups and so on all interacting with one another.

In many senses, the online world is like the traditional township. It is made up of a series of overlapping uses, just as a city is made up of recreational, industrial, administrative, domestic, commercial and other purposes. It has evolved more or less unplanned, in fits and starts, with a thousand different stakeholders pulling in various directions. Businesses have made one set of impacts, government another. Telecommunication providers have helped to shape the ways things are, as have software writers and hardware manufacturers. Libraries and museums, churches, schools and clubs have all taken their place in creating clusters of information and practice. And on top of all this, learners have found ways of locating needed information, pursuing their interests, networking with others with whom and from whom they are able to learn. It is therefore difficult to say with any precision to what extent self-directed learners and learning have affected the nature and extent of the digital world, but the impact is likely to have been both widespread and subtle.

Overall, while there is little doubt that digital technologies have been beneficial to learners and vice versa, it is difficult if not impossible to gauge

precisely the effects that each side has had on the other. In other words, there is no robust data concerning how ICT has impacted on self-directed learning, and equally (with the exception of software written exclusively for educational and training applications) no measure of how self-directed learners have affected the design, rollout or uptake of ICT. Moreover, there is surprisingly little crossover in the literatures of the two domains.

When I embarked on this inquiry, I was struck by the relative absence of references in the extensive literature about online teaching and learning to the equally extensive, although somewhat older literature on self-directed learning. I was even more surprised to find that discourses about self-directed learning included relatively few references to the massive and growing body of information about ICT. On the whole, this seems to echo the wider neglect so forcefully and elegantly expressed by Thorpe; 'There are two broad literatures that currently connect hardly at all; the literature of Information and Communications Technology, and that of adult education … proponents have shown little inclination to integrate the theoretical perspectives of Duguid, Jonassen, Vygotsy and Pask with those of Freire, Knowles, Brookfield et al.' (Thorpe, 2000, p. 1).

On the surface at least, this state of affairs seems counter-intuitive, and it is intriguing to speculate as to why this might be. The field of ICT is notoriously fast-moving and, as a result, somewhat ahistorical in its focus. This might mean that authors working in this field simply have not had time to connect their concerns and preoccupations with those about which literature has been developing for at least forty years, since the appearance of Houle's classic monograph, *The Inquiring Mind*. It is, however, somewhat less easy to explain why theorists and writers who have been active in the field of self-directed learning have been slow to contribute to the burgeoning literature on online learning. One plausible, but untested assumption is that many of them feel that the ICT literature is overly concerned with technologies and techniques and has, perhaps, been under-theorised from a learning point of view. While this may be understandable, it is in fact a mistaken view; there is strong evidence that at least some of the literature about online learning or E-learning has the potential to illuminate traditional thinking about learning in general and self-directed learning in particular. Indeed, in the field of pedagogy, there is compelling evidence that experienced teachers and trainers have been driven to a more carefully considered view of the true nature and purpose of learning through their attempts to use technology in a thoughtful and theoretically rigorous way.

2.6 Towards a model of self-directed learning online

Within the pantheon of learning, few activities have the nobility or moral integrity of self-directed learning. This is the process whereby, as Craik pointed out more than a century and a half ago, all knowledge was originally attained; it is also, along with reflection and introspection, arguably one of the most fundamental of human activities and impulses. Yet, despite the self-evident extent and importance of self-directed learning in the digital environment, it has been less well documented, at least so far, than its offline predecessor. This is not to say, however, that there is any less learning occurring online than previously. As will become apparent from the chapters in this Report, the learning that is undertaken in the online environment is certainly not less and indeed may be more than that which obtains in the offline context. It is impossible to quantify, partly because it is difficult to research and partly because of how rapidly the domain is developing; nevertheless some indication of the extent of self-directed online learning may be gained from indicators such as the number and range of available websites; the availability and use of certain software packages; the number of 'hits' reported by various information sources such as libraries, museums, art galleries and archives, and the number and range of courses—both online and offline—that exist to help people to be more self-reliant as learners.

Since the principal purpose of this research project is to explore the range of online self-directed learning, to examine and report on some of the impediments to its more comprehensive uptake and use, and to articulate a model of online learning which might be of interest and use to all those organisations and individuals committed to enhancing the experience for online learners, in the next Part, I will explore a range of issues that have been reported to be essential prerequisites to any engagement in online activities. In Part III, I will outline the major elements of a model of online learning.

Part II The Context
for Digital Engagement

*But we cannot envision or bring about very much of this if we fail to
realise that the changes potentially inherent in modern technology
will change systems as we know them. Change is not just a matter of
tacking on something new. If a change is significant—and computers
hold the potentiality for significant change—then it will affect the
entire organism. The system will enter into disequilibrium and all of
its parts become subject to change. Consequently, all of its parts can
be redesigned...* (Goodlad, 1970, pp. 95–96).

Up to the Starting Line

Throughout the world, there is a growing recognition that the future is likely
to be increasingly digital. As a consequence, at regional, national, provincial
and even local levels there have been innumerable conferences, reports,
projects and initiatives designed to overcome the looming 'digital divide'
between those with and those without access to, and the ability to use,
emerging digital technologies. These efforts seek to ensure that, whether for
business, health, citizenship, learning or any other purpose, there is adequate
connectivity and infrastructure to allow the people of that area to be full and
active participants in the emerging 'information economy.'

For example, at the July 2000 Summit of the G8 Heads of State in Kyushu
Okinawa, a Working Party was formed called the Digital Opportunities Task
Force. Its Final Report, tabled a year later in Genoa, opens with these words;

*In recent years, major advances in information and communications
technologies (ICT) combined with the rapid growth of global networks
such as the Internet, have transformed businesses and markets,
revolutionised learning and knowledge-sharing, generated global
information flows, empowered citizens and communities in new ways
that redefine governance, and created significant wealth and
economic growth in many countries. This 'digital revolution' has been
made possible by the potent combination of dramatic increases in the
power and versatility of technologies, at significantly lower costs with
enormous creativity in the applications of these tools and networks in
all aspects of the economy and society* (DOTForce, 2001, p. 6,
emphasis in original).

The Report then goes on to detail a Global Action Plan, a comprehensive set of decisions and actions that its authors believe need to be taken in all parts of the world, 'by nations and communities themselves, to create the environment, mobilise the consensus, and set the priorities that will shape each nation's path to global opportunity' (DOTForce, 2001, p. 12).

While similar pronouncements can be found in many supranational organisations and forums, many individual Governments worldwide have also been working tirelessly to get their citizens online. A range of justifications is offered for this enthusiastic rollout of communications infrastructure. Some Governments and their respective agencies stress its centrality to economic development and growth in job opportunities; others highlight its potential for enhanced social interaction and participation in government and civic affairs; and others again stress the crucial importance of connectivity to better information and access to learning opportunities for all. Of course, all these points of view are simultaneously valid, for it is arguably the convergence of intellectual, social and economic objectives that is facilitated by the digital revolution.

The potential offered by the digital revolution is enormous and undoubtedly includes dramatically enhanced opportunities for learning. However, many enthusiasts and advocates commonly play down or ignore the limitations of the technology and in particular fail to acknowledge the impact of the so-called 'digital divide.' The predominant concern with the 'digital divide,' is the recognition that there is a growing disparity between people in terms of their access to, and ability to use, relevant technologies to perform an expanding variety of everyday tasks, including participating in the workforce, managing personal finances, communicating with others, retrieving information and taking part in various civic activities.

Whilst it is manifestly not mandatory for everyone to engage with the digital world—including learning—as more and more everyday tasks require some level of connectivity and technological fluency, it is becoming increasingly likely that those without such attributes will be marginalised and left behind. This concept of marginalisation is hardly new; one need only look at what happens to many of those who lack conventional literacy in a literate society. Thus, in some ways the 'digital divide' is merely a recent, information-based incarnation of an age-old problem of the 'haves' and the 'have-nots.' However, given both the speed and the extent of the information explosion, issues of electronic access are arguably more urgent and more significant today than in the past.

For many, the divide is defined exclusively in terms of connectivity and, as such, its resolution is seen to be the responsibility of telecommunications companies, Governments and regulatory agencies. However, there is much

more to the divide than just electronic connectivity; it turns out to have technological, educational, political, financial and social aspects, with each dimension in turn having a number of layers. There are a number of complexities in measuring the existence of a 'digital divide' and, in the words of a discussion paper prepared and circulated by BECTA in the UK:

> *Its extent will vary depending on the technologies included and the measurement employed. The speed with which new technologies develop, coupled with wider social differences, mean that it remains highly unlikely that complete parity will be attained. A clear and agreed indication of the levels and types of access sought and why these would be effective in reducing the divide(s) would be beneficial.*

> *'Digital divides' involve a complex web of interconnected social, economic and cultural factors that cannot be fully captured by a definition that focuses solely on access or ownership. Whilst access is a key factor to be addressed in bridging the 'digital divide,' it is merely one aspect* (BECTA, 2001, p. 4).

If there are problems in defining and measuring the divide(s), there are even more problems in deciding what to do about the problem. Governments and international organisations, along with telecommunications agencies and Internet Service Providers have been active in attempting to ensure more widespread access. However, there are many other players and stakeholders, including the education sector, software manufacturers, cultural institutions and other content providers both public and private, and the corporate sector in general, that have been and are engaged in ensuring not only that a variety of content and applications is available, but that people are enabled to use them. For all of them, the digital divide can be transformed into what Brotman (2002) terms a 'digital dividend.'

The primary focus of this study has been on self-directed online learning. However, as the study progressed it became increasingly apparent that there is a range of overarching issues that impact on the ability to participate in a growing range of social, economic and intellectual activities including learning. It is recognised that these considerations are much broader than their application in self-directed learning situations, nevertheless, they are also a necessary precondition to extensive participation in online learning:

Connectivity
- Telecommunications infrastructure and affordable charges
- Access to hardware and software
- Access to technical support

Competence

- Adequate ICT literacy

- Appropriate 'information literacy'

- A blended concept of 'digital literacy'

Content

- Sufficient high quality digital resources in the learner's area of interest

- Affordable access to relevant digital resources

- Preservation and continuity of digital documents and resources

Credibility and confidentiality

- Confidence in the consistency of the technology

- Confidence in the credibility of the information

- Trust in the confidentiality of sites and transactions

Capturing information

- Agreed protocols for storing, tagging and retrieval of digital materials

- Search engines and other resource discovery mechanisms

Collaboration

- Existing or emergent networked communities

- Co-creation of knowledge

In the following Part, I will use these six headings to review an array of issues pertaining to engagement with and use of digital technologies for a diverse range of activities, before considering the steps required to meet the needs and interests of particular learners engaging with particular learning efforts.

3 Connectivity: An Essential Precondition for Online Engagement

3.1 Introduction

In an earlier era, when the only wires leading from the back of a computer were those connected to the electricity supply and the printer, each piece of technology was free-standing, and whatever was generated on one machine had to be downloaded onto an external device—either in hard copy or in some other form such as punched cards, magnetic tape or floppy disk—before it could be 'read' and utilised by someone else.

In recent years, there have been massive advances in the power, affordability, and ease of use of most digital technologies, but arguably the most significant breakthrough has been the deceptively simple ability of machines to link together and thus to transfer information directly from one to another. With this connectivity has come the concept of the networked global economy with its emphasis on the value of that weightless commodity—information. At first, machines were simply connected to each other within a single office, or at most within a single precinct; what today we would call a Local Area Network or LAN. Later, organisations and communities started to link machines over greater geographical distances, or Wide Area Networks. Both conceptually and technologically it was a relatively short step from this to the linking together of such networks to create a network of networks, or an Internet.

Nowadays, of all the issues raised and discussed in the context of the knowledge economy, the most important threshold consideration concerns the ability of individuals, organisations and communities to connect to the Internet. A Discussion Paper prepared by the New Zealand Department of Labour describes the issue of connectivity—specifically the concept of bandwidth—as potentially a 'showstopper,' by which it means that until there is widespread, preferably universal, access then there will be groups of people who are effectively 'locked out' of participating in, and hence reaping the benefits of, the global knowledge economy. In the present context, connectivity is not understood as a unitary issue, but as a multi-layered phenomenon comprising at least three elements: telecommunications

(essentially bandwidth); the availability of adequate compatible hardware and software; and finally, access to needed technical support. Each of these three issues is discussed below.

3.2 Telecommunications infrastructure and affordable charges

It lies outside the scope of this study, and well beyond my competence, to survey the extensive technical literature concerning the desired and current levels of connectivity in different jurisdictions for different purposes. Nevertheless, a number of general principles may be identified and conclusions legitimately drawn in this area.

First and foremost, the requirement for bandwidth or carrying capacity is a function of the uses to which digital technologies are being put. For instance, the transmission of text-based data over telephone lines uses relatively narrow bandwidth compared with the transmission of voice or other sounds, and that in turn is less profligate than the transmission of graphics, animations and video signals. One-way transmissions are less demanding than two-way or interactive applications, and not unexpectedly those that involve multiple media are the most extravagant of all.

Bandwidth demand is made up of various overlapping usages. As more people within any given organisation or community come to use networked digital technologies, there is a corresponding increase in the overall demand for bandwidth. Likewise, as the number of corporations or other large-scale users increases, there is a growth in the aggregate demand. To some extent this can be obviated by, for instance, compressing data electronically, caching frequently-used information locally or downloading large amounts of data at off peak times. Nevertheless, as there is more traffic, so there is a requirement for greater carrying capacity. In the same way that building extra lanes on a highway simply seems to create more traffic, providing greater bandwidth seems to encourage ever more demand for bandwidth.

Demands for digital connectivity are being met in two principal ways. The first is through an expansion and upgrading of existing telephone systems, about which Rheingold says this:

> *Computers and the switched telecommunication networks that also carry our telephone calls constitute the technical foundation of computer-mediated communications (CMC). The technicalities of CMC, how bits of computer data move over wires and are reassembled as computer files at their destinations, are invisible and irrelevant to*

> *most people who use it, except when the technicalities restrict their access to CMC services. The important thing to keep in mind is that the worldwide, interconnected telecommunication network that we use to make telephone calls in Manhattan and Madagascar can also be used to connect computers together at a distance, and you don't have to be an engineer to do it* (Rheingold, 1993, Introduction).

The second major approach to meeting the requirement for connectivity is through the roll-out of broadband cabling, which was originally intended to carry Cable Television, but is increasingly being used to carry Internet traffic and even telephone services as well. Thus, there is a convergence across various uses, but even so the cost of providing adequate bandwidth is likely to represent a heavy burden, particularly for those countries that currently lack high quality telecommunications infrastructure. Given the exponential increase in demand for bandwidth, opinions are divided as to whether this demand will ever be met, or whether increased supply will simply lead to more and more 'bandwidth hungry' applications and hence to an ongoing cycle of increased capacity and increased usage.

There are currently significant deficiencies in the level of connectivity provided in most countries to less densely populated regions. Remote areas, and those with less well developed infrastructure for commercial, military or government use, are likely to have 'thinner' telecommunications networks, with the result that users in such areas may be disadvantaged compared to those in metropolitan or other more favoured locations.

Furthermore, the speed and reliability with which information may be accessed electronically is a function not only of the public networks, but also of the carrying capacity at the user's end: in fact it is finally determined by the slowest part of the entire network between the source of the information and the user's computer. Even if very high quality and high capacity technology carries information to a particular building, organisation or community, this might be of little consequence for the end user if the infrastructure within that building, organisation or community is antiquated or otherwise constricted. Thus the costs of providing online access are a matter not only for public infrastructure but must also be borne by individuals, families, workplaces and communities, some of which may well be financially disadvantaged.

One possible approach to overcoming the problems both of public and private infrastructure is the use of microwave, satellite and other 'wireless' technologies, whereby information is downloaded directly from a provider to the user's receiver. A simple analogy would be radio or television signals; indeed, the advent of digital television, incorporating teletext and various interactive capabilities, represents a potentially significant step towards converged 'multi-function devices' that act as entertainment and information

hubs simultaneously. Thus, in the fullness of time, it might be expected that much if not all Internet traffic will bypass terrestrial cables. When that happens, a new term might have to be found to replace the word 'online' to describe technologically mediated interaction and data transmission!

Finally, in addition to the technical specifications concerning carrying capacity and data transmission speeds, there are significant issues regarding the affordability of Internet connectivity itself. Those in larger urban centres are likely to have cheaper connection costs than those in rural and remote areas, whether using the phone system, broadband cables or wireless technologies, principally because of competition between providers and because accessing an Internet Service Provider is either continuous ('always on'), or involves only a local phone call. Those in more remote areas, on the other hand, may have less choice of carriers, poorer quality connections, and greater expense if accessing their Internet Service Provider entails long-distance charges.

It is clear, therefore, that equitable access to online information for each family, organisation, region or nation is likely to remain an elusive goal for the time being. Moreover, experience suggests not only that this is a moving target, because bandwidth requirements are constantly growing to meet demand, but that it will necessarily entail some unprecedented partnerships between government, industry, and large scale information providers and users including the media. I will return to the issue of partnerships later in this chapter.

3.3 Access to required hardware and software

As vital as it is to have robust, affordable high capacity networks, these are of no value unless users have access to computers capable of connecting to the Internet. These basically subdivide into three categories: corporate or work-related; public or community-based; and private or domestic computers. For all three, there is also the issue of technical support.

The availability of equipment that is or may be readily connected to the Internet is unevenly spread even within those countries and regions that have advanced economies and technological infrastructure. Not unexpectedly, major corporations, government departments, hospitals and health centres, and large educational providers such as schools, colleges and universities tend to have more extensive internal networks, more up-to-date and better-maintained equipment, and greater technical support than their smaller counterparts. Thus, those who work or study in such environments tend to have greater access to, experience with, and support for a range of applications including online learning. As a general rule, such organisational

settings are more common in larger urban agglomerations, with the result that those who live and work in rural, regional and remote settings are relatively disadvantaged. As a result, there are numerous projects in many non-metropolitan settings to ensure the provision of appropriate hardware to government agencies and public educational institutions at all levels.

The second major avenue of technology access, therefore, is the public machine. Many libraries, local councils, clubs and societies, and community education providers such as neighbourhood houses have one or more machines whereby patrons, users or members can gain inexpensive (or even free) access to the Internet and other electronic resources. Such facilities tend to be more prevalent in metropolitan settings, partly because of the urban lifestyle and partly because of the connectivity issues alluded to above.

Even when the technology is available, not everyone will be able or willing to use it. Research in Canada for instance has shown that inexperienced users, in particular older people and women, are often apprehensive about the public use of such technologies. Fearing that they will look stupid, or that they will use up their time in simply logging on, they tend to be wary or reluctant about approaching these unfamiliar technologies. In any case, there are commonly restrictions both on the hours during which such facilities are available and how long any particular user can be logged on. As a result, it is less than satisfactory as a mechanism for undertaking Internet-based work including usage (such as learning) that involves regular or extended access.

An alternative to such publicly provided resources is the Internet café or the pay-per-use public terminal such as those provided in airport lounges, bus stations and shopping malls. Clearly the highly public nature of these terminals and the charges for their use, which in any case is timed, militates against clients doing much more than sending and receiving emails or checking specific websites. They cannot be seriously regarded as permitting more protracted or frequent use.

Third and finally there is the category of private machines. As Information and Communication Technologies have become more commonplace, the uptake of home computers has increased dramatically. However, there are many categories of people who do not have access at home to computer technology—these include the unemployed and lower socio-economic groups, the elderly, and those for whom English is not the dominant language. Moreover, simply because there is a computer in the home does not mean that it is capable of linking to the Internet; many machines are used for playing games, word processing or domestic chores such as storing recipes or managing the household finances, but are not powerful enough or lack the necessary software to connect to the Internet.

Even when a household does have the necessary technology, there is evidence to show that not all members of the family unit have equal access to it. In particular, young people tend to be the dominant users in terms both of the amount of time and complexity of applications, and many women defer to their children and to their male partners. Finally, irrespective of whether the technology is available domestically or publicly, many disabled people, including those with mobility problems, limited manual dexterity or visual impairments, are less likely to be able to use it than are the able-bodied, despite the availability of 'assistive' technologies.

In addition to these issues to do with hardware, the ability to access and use sites of interest is significantly influenced by the actual software that is running on any given set of equipment, as well as its compatibility with the technology employed by a range of information providers. The situation is succinctly explained on a website entitled 'Universal Accessibility,' published by the Government of Canada:

> *Computers and electronic networks, like the Internet, have been wonderfully enabling technologies for many people, and especially for persons with sensory, physical and intellectual disabilities. Computers and the Internet have provided many with a sense of intellectual and economic freedom unparalleled in the past. It has been remarked that 'there is no disability on the Internet.' This is generally taken to mean that stereotypes vanish inside an e-mail message, or in a chat-room, or in an electronic business transaction.*

> *Some people may require assistive technology—such as screen-readers for persons with blindness or voice-input systems for persons with mobility impairments—to overcome the barriers raised by standard computer interfaces. Since disability affects everyone differently, there are many different types of assistive technology—far too many to assume that all people with a particular disability will use the same assistive technology. Systems and tools that help persons with disabilities overcome the barriers to accessibility are constantly being refined and enhanced. Unfortunately, development and widespread acceptance of these aids often lags far behind the introduction of new and inaccessible features of the World Wide Web.*

> *In a wider sense, the same is true for users of 'standard' technology. Statistics may show that a certain percentage of visitors to a site are using any one browser, but it may not be clear what percentage of those are particular versions of the browser. This is important because a Web site will look and behave differently depending on which browser and which version is being used. That reasoning is generally true for variations between computer systems: a site will look different*

> *when viewed with a high-resolution/high-colour display than with a*
> *less sophisticated system* (Government of Canada, 1998, p. 2).

The Canadian website goes on to outline a number of principles that should
govern the design of websites 'to ensure access to information on the Web …
in a way that allows everyone to benefit.' While accessibility may be
celebrated in best practice examples, and even enshrined in legislation, the
fact is that many websites are designed to maximise visual appeal or to satisfy
the aesthetic sensibility of the designer, rather than with a view to its
widespread usability. In combination with the issues already discussed
concerning access to the Internet more generally, it is evident that we are still
a long way short of universal access to or interoperability of digital
technologies, and moreover, that certain categories of people are less likely
than others to be able to 'go digital.' These include people in non-
metropolitan settings, the elderly, women, the socio-economically
disadvantaged and some disabled people.

3.4 Access to required technical support

In addition to the availability or otherwise of appropriate hardware and
software, one of the most significant impediments to the more widespread
uptake of technologies within the community is the experience of technical
difficulties. Problems with dated or overloaded computers, narrow bandwidth,
slow and unreliable connections, incompatible software and even fluctuating
power supply, can cause computers to crash and users to become
disillusioned with the technologies—whether they are being used to access
entertainment, work, government, learning or other sites and services.

With the rise of telecommuting and other flexible work patterns, some
employers now provide their employees with computers and dial-in access to
work and, as mentioned elsewhere, larger or better-resourced organisations
and communities commonly have local technical expertise so that when the
inevitable crash does occur, help is at hand. A similar situation applies in the
case of students undertaking formal programs of study online; most schools,
colleges and universities which offer online education also provide a
helpdesk, and most common problems can usually be dealt with through a
telephone call. Even those who use equipment provided through libraries,
Internet cafés and community centres often have someone to call on for help
and advice.

However, particular problems and frustrations arise for people seeking to
utilise technologies for their own purposes without any formal institutional

support, and who lack diagnostic and problem-solving expertise, or readily available spare parts and peripherals. Admittedly, in some community settings, there may be individuals who are able to trouble-shoot common problems (see, for instance, 'Mentoring and Technical Support,' in New Zealand Labour Market Policy Group, 2001), but despite the round-the-clock nature of Internet access, it is unrealistic to expect such services to be available at all times, free of charge. It has been suggested in some jurisdictions, for example in New Zealand, that the Government may be willing to train and to pay local consultants to provide technological triage; however, this is unlikely to be a viable solution for many settings. Until the technologies themselves can be relied on to provide robust and consistent service, users (especially those operating on their own account and particularly in isolated areas) will be unable to enjoy the full benefits of connectivity so enthusiastically touted by advocates and apologists for the digital revolution.

3.5 Connectivity for what?

While to a significant extent many of the efforts to harness and capitalise on the digital revolution have been driven by economic imperatives, as the technologies have become cheaper, more ubiquitous and more flexible, almost all sectors of society have benefited. One beneficiary has been the formal education and training sector which, as it has become more closely aligned with national prosperity and global competitiveness, has increasingly become a central part of many governments' policy objectives.

However, it is not only formal education and training that have attracted increased attention and support. Indeed, in a rapidly changing, information based society, it is widely recognised that no system of education, however extensive and responsive, could ever hope to fulfil the learning needs of every member of the community. Accordingly, there has been much more recognition, support and, in some cases, assessment of non-formal learning that occurs outside education and training. The European Centre for the Development of Vocational Training (Cedefop), for instance, in a Summary of its project *Making Learning Visible* states:

> *Learning that takes place away from the classroom, during leisure time, in the family or at work, is increasingly seen as a resource that needs to be more systematically used. Non-formal learning is an indispensable but very often invisible part of modern societies, currently operating in the shadows of formal education and training but with the capacity to play a more active role in matters such as labour relations…*

Making Learning Visible reflects a change in attitude towards the competences acquired outside the formal education and training institutions that currently define our perception of what is good and valuable learning.... From this, the issue of identification, assessment and recognition of non-formal learning might prove explosive for labour relations, with demands for remuneration based on what has been learned and not simply on where someone has been for the purpose of learning (European Training Village, 2002).

While the tone of this report is unmistakably pragmatic and economically minded, the issue of recognising and supporting non-formal learning—including that which occurs online—has also received attention for other reasons, such as the fact that it leads to a richer and more vibrant society and to higher levels of citizenship and informed democratic participation. Taken together, these considerations noted in favour of self-directed learning comprise the classic trilogy of economic competitiveness, personal fulfilment and social inclusivity; exactly the same set of justifications commonly cited, especially by Governments, for increasing electronic connectivity for individuals, workplaces and communities. This symmetry reflects, as discussed in Chapter Two, the natural affinity and growing alignment between learning and digital technologies.

Thus, for various reasons, non-formal learning is being promoted from its former status as a marginal activity to being viewed as a fundamental building block for an equitable, progressive and prosperous nation. And since self-directed learning forms a significant and growing part of that activity, it has become vital, especially in terms of government economic and social policy, to support those wishing to learn for themselves. Accordingly, opportunities for self-directed learning—including opportunities for online and other kinds of technologically assisted learning—are becoming more prominent than in the past. However, it is equally evident that, in the online world, there is a growing convergence and crossover in the needs, interests, modes of operation and ambitions of many parts of society, and that for the realisation of new learning opportunities, it is important to encourage partnerships between all the various stakeholder groups on both sides of the equation—information providers and users alike.

3.6 Forming partnerships to support connectivity

Clearly, the push towards connectivity has multiple impulses, being supported by governments and telecommunications companies, by educational providers and professional associations, by publishers and a loose coalition of cultural

institutions, to say nothing of the increasing demand from the community at large. But arguably the greatest single impetus has been contributed by the business community, with the rapid and dramatic shift towards the conduct of business online. Yet, although much of the development of digital technologies and applications has been driven by business, it is debatable whether that sector has done as much to ameliorate the digital divide. Most commonly, this is because the business community, despite assertions about community service obligations, is predominantly concerned with financial results, and its brand of conventional wisdom would dictate that those on the wrong side of the digital divide are unlikely to contribute significantly to increased sales or other financial benefits. However, according to Brotman, bridging the digital divide could actually contribute to profits:

> *The digital divide is not only about offering Internet access to every citizen, nor is it only about social policy or computer penetration. The stakes are in fact much greater. Creating what I call a 'digital dividend' will enable business to thrive at a new level of post-industrial innovation…*

> *Government has taken the first steps in identifying and addressing aspects of the digital divide. Yet government cannot and should not be expected to lead on this issue. Instead the business community must take on that role. Government initiatives are insufficient for several reasons. First, many innovations are fundamentally driven by the marketplace and government can't dictate the market. Second, with budget surpluses turning into deficits, policymakers today have fewer resources with which to close the fissures.*

> *Given these factors, and more importantly because of the tremendous stakes for the private sector, business leaders must engage with the policy community to develop strategies for spreading digital technologies…*

> *For example, within corporations, managers must make sure lower skilled workers get the training they need to participate in new forms of work. The digital-proficiency gap between high- and low-skilled employees must be closed. Mobile and work-at-home personnel also need an adequate technological infrastructure to link them to company systems, customers and co-workers. Beyond the office walls, the private sector must also help to prepare tomorrow's workforce. US workers will slip further behind their competitors abroad unless the educational system gets corporate help to prepare students to work in the digital economy. The emergence of the electronic marketplace as the hub of domestic and global commerce creates another compelling argument for business to help close the digital divide…*

> *In order to realise the digital dividend, the business community must form a new compact with the policy world. Policymakers have long promoted the concept of 'universal service' to ensure that income and geography are not insurmountable barriers to telecommunications access. The business community recognises the economic efficiency of having as many people connected as possible, but it looks to the bottom line rather than social policy as the rationale for supporting network expansion. Joining these two principles can generate exponential growth in digital-technology penetration by virtue of both government support and private investment* (Brotman, 2002).

Thus, potentially at least, we stand on the brink of a new dispensation which may realise partnerships in which Governments, technology and communications companies, and the business sector generally unite with cultural institutions and communities to create unprecedented levels of connectivity and heightened awareness of its potential. The issue of partnerships is addressed again in Chapter Sixteen.

3.7 Conclusion

Clearly there are many elements involved in people's engagement with the global knowledge economy; however, the most fundamental must surely be their ability to connect and to stay connected. As I will explore in subsequent chapters, there are other matters that must likewise be taken care of, some of which require policy support or other governmental intervention, and some of which depend crucially on the users themselves. However, 'connectivity' broadly defined remains a significant challenge for all nations, regions, organisations and communities, and a vital issue if equitable access and use is to obviate the invidious distinction between the information 'haves' and the 'have nots.'

4 Competence: Developing a Range of Vital Skills

4.1 Introduction

While connectivity is manifestly a vital precondition for taking part in this new digital dispensation, it is increasingly recognised that it is not sufficient on its own. Another basic consideration is whether or not people feel confident in their ability to use the technologies in the first place. It is possible to envisage a continuum of confidence ranging from those who are quite innovative and adventurous in their approaches at one end, to those who suffer from a serious and debilitating fear called 'computerphobia' at the other. Improbable as it may seem, this is actually an established and documented medical syndrome (Fisher, 1991), in which the sufferer is averse to using computer technologies, either because he or she finds them dehumanising, or because of fear of breaking something, or because of a concern of looking foolish in front of others, even if they are both unknown and unseen.

Perhaps unsurprisingly, computerphobia is more common amongst older users who have not grown up with these technologies, and who may not find the applications intuitive or as easy to learn as their younger counterparts. Even so, once older people in this position overcome their antipathy, evidence shows that with their additional resources of time, money and perseverance, they may be amongst the most avid technophiles.

A milder version of the same condition is simply called 'computer anxiety.' In the late 1980s, a test was devised to assess the level of computer anxiety experienced by users and potential users (Simonson et al., 1987), and some researchers claim that as many as 30% to 40% of the population suffers from some kind of aversion to computers (Tseng et al., 1998). There is something of a reciprocal relationship between computer anxiety and computer use. Those who suffer from anxiety tend to use the technologies less, and those who use the technologies less tend to suffer from computer anxiety. However, many applications and everyday tasks at work, in the home and in the community now require a minimal level of understanding of and familiarity with basic terminology and with how computers and computer networks function. Consequently, in parallel with the roll-out of broadband networks and availability of required technology, governments, education and training

institutions and, to some extent, employers have also been working to ensure that all members of the community—from the youngest to the oldest—have the necessary competence and confidence to use both existing and developing digital technologies, and to make sense of the information to which they provide access.

There are many different terms used to refer to this, including computer skills, computer literacy, technological literacy, technology fluency and more. As so often happens, the use of alternative terms has given rise to a spirited, if at times casuistic, debate about subtle shades of meaning and whether or not one particular term is preferable to the others (see, for example, Mackay, 1992). In this study I have chosen to use the term 'literacy,' but it, too, is a complex notion, and I will therefore provide an overview of the concept before turning my attention to literacy in the digital domain.

4.2 The literature on literacy

Literacy is an extensively documented and contested topic, about which there is a large and complex body of writing. Originally 'literacy' was a relatively non-controversial term; however, successive generations of researchers and theorists have invested the term with additional layers of meaning. At first it simply denoted the ability to make sense of the written form of a language, a skill widely assumed to be acquired through instruction or, in some rare instances, through independent inquiry and research, such as the efforts of archaeologists or historians in deciphering the literature of an ancient civilization. However, a moment's thought reveals that this basic interpretation is clearly inadequate. There may be many different levels of literacy within any given language group; for instance, a second language learner might be literate at a particular level, but not have the same degree of fluency as a native speaker. Surely, it came to be argued, literacy implies more than merely the ability to decode symbols on a carving, page or screen, and indeed even more than knowing what those symbols mean in some absolute or objective way. Literacy in higher forms also entails knowing what those symbols imply, what they connote, what they mean in a particular context or to a particular readership.

But even this is inadequate, because it turns out that there are different kinds of literacy. A shop assistant might have a different kind of literacy from a journalist, and a nurse a different kind from a lawyer. This is more than snobbery; it reflects the fact that people in any given society can operate perfectly well in their chosen occupation and social milieu if they are functionally literate for that role. To say that a doctor is not as 'literate'

as a poet, for instance, is no criticism, because equally the poet would be unable to read, write and speak the technical language of medicine.

Theorists also argue that it is possible to have, or to develop, different levels of literacy, from basic through to advanced. A primary aged schoolchild might be literate for his or her age level, but this would be a different level of literacy from an adult language user such as a university student. A cadet journalist might have a different level of literacy from a Pulitzer prize-winner. This is not only a matter of the size of his or her vocabulary, or even virtuosity with the pen—or the keyboard—but the subtle and often tacit understandings that an experienced practitioner might command more readily than a tyro in the same field. Literacy, then, is not a simple phenomenon that one either has or does not, but a nuanced gradation, a continuum or even a hierarchy.

On top of all this, others began to argue that literacy is not a unitary idea, but rather a multi-dimensional construct, perhaps analogous to 'intelligence' which, as Gardner has suggested, may take many forms. In a series of publications, culminating in his 1993 book *Multiple Intelligences: The Theory in Practice*, Gardner argues that there is not just a single unitary concept of intelligence but rather eight different manifestations or expressions of what it means to be intelligent:

- Linguistic intelligence
- Logical-mathematical intelligence
- Visual-spatial intelligence
- Musical intelligence
- Bodily-kinesthetic intelligence
- Interpersonal (social) intelligence
- Intra-personal intelligence
- Naturalist intelligence (Gardner, 1993)

In the same way it has been suggested that that there are multiple literacies, including visual literacy, media literacy, critical literacy, numerical or statistical literacy, musical literacy, film literacy, cultural literacy and so on. Whereas some have pointed out that such usages are placing too much weight on a single word, in the process weakening it through over-use, others have argued to the contrary that literacy is a robust and versatile idea, a powerful metaphor with a cluster of valuable connotations and implications.

Into this fraught and indeterminate field has come a new conception of literacy, in which the capacity to use technologies, at least at some basic level is increasingly considered to be an essential survival skill. Not unexpectedly therefore, since literacy is a contextual concept, authors and commentators

have begun to dub these skills 'technological literacy' or computer literacy, with all the attendant connotations of those terms, both positive and negative. In this study, I use the term 'ICT literacy' to refer to that cluster of skills and insights that allow people to engage with computers and other devices in the digital domain.

4.3 Adequate levels of 'ICT literacy' to engage with the digital domain

As long ago as 1984, Scher stated that it was important for people to have 'appropriate familiarity with technology' to allow them 'to live and cope in the modern world' (Scher, 1984, p. 25), and in the same year, Hunter advocated the acquisition of 'the skills and knowledge needed by a citizen to survive and thrive in a society that is dependent on technology for handling information and solving complex problems' (Hunter, 1984, p. 45). In the years since then, there has been considerable debate both about which skills and knowledge are required in order to be considered to be ICT literate, about what level of competence is needed to operate at different levels of functioning, and, finally, about who is or should be responsible for ensuring that all citizens develop these attributes. Not unexpectedly, views about exactly which skills and knowledge are required have evolved over the intervening years in step with the evolution of the technologies themselves. In this chapter I will concentrate on the skills required in everyday settings and in the workplace, rather than considering the extensive literature about the skills required to function in formal educational settings.

In the early days of computing, and in particular when the Internet was embryonic, there were essentially two divergent schools of thought. On the one hand were those who felt that people needed only a general 'sense' of the technologies because it was a technical field that would not directly affect them. On the other hand were those who argued that everyone ought to know how computers work and how to write and run programs. Perhaps unexpectedly, with the rapid advances in networks, hardware, software and operating systems, there has been a rapprochement between the two opposing views about ICT literacy. Although it is now almost universally recognised that there is requirement for some level of understanding and competence, most systems now are so relatively straightforward and 'user friendly' that the majority of people do not require the high level of technical skill and understanding that had earlier been advocated.

A number of alternative formulations of ICT literacy for the general populace have been proposed. One of the most widely cited is the International Computer Driving Licence, which comprises seven Modules as follows:

Module 1: Basic Concepts of IT

The physical make-up of a personal computer and concepts such as data storage and memory.

Module 2: Using the Computer and Managing Files

The fundamental functions of a personal computer and its operation system.

Module 3: Word Processing

Creating, formatting and finishing a word-processing document, and using more advanced word-processing features.

Module 4: Spreadsheets

Developing, formatting and using a spreadsheet; using basic formulas and functions to perform standard mathematical and logical functions.

Module 5: Databases

Designing and planning a simple database using a standard database package; retrieving information from an existing database.

Module 6: Presentations

Creating, formatting and preparing presentations, using graphics and charts and various slide show effects.

Module 7: Information and Communication (Internet and email)

Using a Web browser application and available search engine tools to accomplish Web search tasks; using email software to send, receive and organise messages.
(http://www.acs.org.au/icdl/pdf/ECDL_Syllabus.pdf.
[accessed 4 July 2002])

The International Computer Driving Licence and its counterpart, the European Computer Driving Licence, have become something of a standard, with many organisations including businesses, governments and educational institutions providing instruction and endorsing testing for their employees, members or students. Nevertheless, a large segment of the population, especially those who are not in the workforce or not studying, have never heard of this standard and in practice would have little opportunity to attain such a qualification.

Because of growing international interest in the subject, in January 2001 the Educational Testing Service in the United States convened an International ICT Literacy Panel, with the intention of developing a robust definition of the concept, along with an associated array of tests to measure competence. The Report of that Panel provides the following definition; 'ICT literacy is using digital technology, communications tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society' (ICT literacy Panel, 2002, p.2). This definition embodies five distinct elements, which are defined as follows:

Access—knowing about and knowing how to collect and/or retrieve information;

Manage—applying an existing organisational or classification scheme;

Integrate—interpreting and representing information. It involves summarising, comparing and contrasting;

Evaluate—making judgments about the quality, relevance, usefulness or efficiency of information; and

Create—generating information by adapting, applying, designing, inventing, or authoring information (ICT Information Literacy Panel, 2002, p. 3).

Three points about this definition stand out. The first is that it recognises both the developmental nature of the concept, and the fact that the various aspects of ICT literacy are cumulative, being presented 'in a sequence that suggests increasing cognitive complexity' (ICT Information Literacy Panel, 2002, p. 3). Second, the skills are germane to a number of activities required for functioning effectively in the 21st century—at work, in the community and as a citizen—and are not restricted to one's role as a learner. Third, they bear a close resemblance to many of the tasks and activities that are entailed in being an effective self-directed learner (see Chapters Nine to Fourteen) and, as a consequence, the self-directed online learner has to develop a reasonably high level of ICT literacy if he or she is to function effectively, and independently, in a chosen area of interest.

This last point raises the issue of the extent to which ICT literacy, like any literacy, might exist at varying levels of attainment. A study undertaken for the West Australian Department of Training and Employment (Market Equity, 2001), identified four different levels of what was described as 'computer literacy,' as opposed to the concept that someone is either computer literate or not. The four components were;

• awareness of day-to-day computer applications;
• functional ability to use a computer to carry out basic tasks;

- ability to use online computer applications to good effect without supervision; and

- awareness and understanding of the broader social and ethical issues surrounding computer and Internet usage

These form a cumulative hierarchy, which is shown in the following diagram, where each of the four elements 'represents increased familiarity with using a computer and a higher degree of computer literacy.'
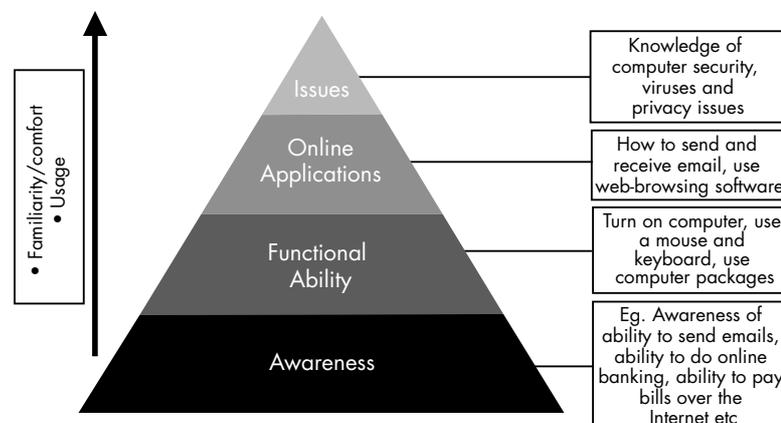
(Market Equity, 2001, p. 19)

It is increasingly acknowledged that some level of generic digital literacy is now fundamental to the performance of many everyday tasks, and that those who lack this minimal level risk being disenfranchised from the mainstream of society. However, as noted above, ICT literacy is not a single unitary concept, but a number of separable skills. For instance, a person making frequent and advanced use of ICT to perform specialised tasks will require different literacies from someone simply wishing to send and receive emails. A person with a particular interest in using the Internet for online banking or investing in the stockmarket, for instance, will probably know more about the relevant software and Internet sites than will someone using it to check the weather at various holiday destinations; and someone wanting to download or to participate in online discussions about popular music, will develop different literacies from those using it to perform statistical analyses as part of his or her job. When the concept of different levels of ICT literacy is combined with the notion of different aspects it is clear that a complex matrix is possible and that any educational intervention designed to enhance people's ICT literacy needs to be multidimensional as well as cumulative and developmental.

In discussing the issue of ICT literacy, it is worth commenting briefly on the widely held view about intergenerational differences between younger and older people with respect to their general levels of comfort and competence. Authors such as Tapscott (1998) and Rushkoff (1997) have stressed, albeit sometimes in an exaggerated manner, the current differences between young people who have grown up 'bathed in bits' (in Tapscott's evocative phrase), in a world dominated by digital technology, and their elders—commonly including their parents and teachers—who have not. Clearly, the impact of this phenomenon will diminish over time, as those with an almost-intuitive feeling for digital technologies (which have only been introduced in the past generation) become the majority. However, at this particular instant, many young people, including those enrolling in further and higher education and those entering the workforce, are more adept with digital technologies than those in positions of authority. Accordingly, while young people have probably since time immemorial had their own argot and their own youth culture, there is an unusual, perhaps unprecedented, overall lack of symmetry between age and expertise which is changing the power relationships in the classroom, the workplace and the community. As Brodsky observes:

> *Colleges and universities are about to admit to their halls a new generation of learners. They have grown up in a period of collapse for societal structures and of recombinant, interlacing growth in electronic diversion. Theirs is a world of videogames; multitasking and attention spans geared to what speaks to them effectively. Many of our most inquisitive learners have been at least supplementing their pre-college studies, utilising Internet communications technology. Their 'learning diet' has included—in addition to content forays—a hefty dose of 'Internet community-based interaction.' Some of this has been recreational in nature (eg 'chat rooms' and MUDS). But programs such as the ThinkQuest contest have been demonstrating a methodology that integrates academic subject matter in areas ranging from liberal arts to science and mathematics with a collaborative quest to teach and learn via the Internet* (Brodky, 1998).

This discussion raises an important question about where and by whom such attributes are to be developed. For many people, both young and old, ICT literacy has been acquired piecemeal, through trial and error. However, in the same way that it would be untenable to expect members of our society to acquire conventional literacy in the form of reading and writing skills entirely through their own self-directed efforts, it is becoming increasingly inappropriate to expect people to develop ICT literacy in this adventitious way. If we are to advance collectively and to realise people's capacity for online learning, some sort of deliberate program of instruction and development is evidently called for, and an obvious starting point for any

such interventions is the formal education system, partly because most countries are striving for near-universal penetration of compulsory schooling and partly because it is particularly vital for young people to develop technological 'fluency' early in life. As a result, most jurisdictions have developed and are implementing policies on ICT literacy in the school curriculum; a corollary of which is the need for professional development for their teachers.

However, young people are not the only targets of Government policies; it is equally important—perhaps even more so in the current circumstances—for those of mature years to have the chance to become ICT literate. Since such people occupy the entire range of positions in society, live in every conceivable geographic location, and have available to them widely divergent means for accessing technologies, some sort of partnership is required between Government, business and industry, professional associations, library and information specialists, education and training providers and community groups to ensure that the development of ICT literacy is enacted as a national priority. This is a major challenge for all countries, but fortunately, rapid advances in technologies, especially in software and other applications, are making at least some of these ICT literacies easier to acquire.

4.4 Appropriate levels of information literacy to evaluate sources

In addition to the technical competencies required to participate fully in the digital environment, there is a separate set of attributes that pertain to the ability to solve information and learning problems, more or less independent of the form in which that information is provided. This is commonly referred to as 'information literacy,' a concept which, like ICT literacy, has generated a large and growing body of literature.

Regrettably, these two concepts are commonly confused, so that some authors assume that Information literacy automatically implies ICT literacy, and others make the reverse assumption, namely that if one is ICT literate this must inevitably entail the ability to be discerning with respect to information as well. The indiscriminate use of these two terms more or less interchangeably is regrettable, since it blurs some important distinctions between the attitudes and skills involved in each. In this context, I will discuss the two separately, but at the same time it must be acknowledged that the distinction is, in some senses becoming blurred because of the provisional and volatile nature of knowledge in Cyberspace. There are in

fact some significant senses in which the information literate person of today is ICT Literate and vice versa; I will return to this later in this chapter.

Turning to the concept of Information literacy, in the late 1980s, recognising the increasing impact of information on people's lives, the American Library Association established a Presidential Commission on Information Literacy. According to the *Final Report* of that Commission, 'To be information literate, a person must be able to recognise when information is needed and have the ability to locate, evaluate and use effectively the needed information … whether the information they select comes from a computer, a book, a government agency, a film, or any number of other possible resources' (1989, p. 1).

Starting basically with this 1989 report, the concept of information literacy has spawned a huge literature with many slightly different definitions. However, as Webber and Johnson state in their review of developments in the field, most such definitions have the following elements:

- effective information seeking;
- informed choice of information sources;
- information evaluation and selection;
- comfort in using a range of media to best advantage;
- awareness of issues to do with bias and reliability of information; and
- effectiveness in transmitting information to others (Webber & Johnson, 2000).

Many of these definitions, and this composite list of elements is no exception, tend to portray information literacy largely as a generic accomplishment, a matter of applying certain skills such as information retrieval or critical thinking, irrespective of the subject matter or of the medium in which it is contained or conveyed. Put simply, the implication is that there is a generic aspect to Information literacy; a capability of distinguishing useful from useless resources, reliable from unreliable sources, and sensible from silly knowledge claims. A further implication, rarely made explicit, is that this generic kind of information literacy can be taught and learned in a context-free way. At one level this is probably true; however, there is a strongly context-dependent element as well, and Information literacy is influenced both by the domain or subject area, and by the form of the information, notably whether it is digital or hard copy. I will deal with the domain-specific aspect in Chapter Eleven; at this point I wish to consider how the actual form of the information can affect the judgments that are made about it.

In the offline world, although beginners may be unable to make a fully informed appraisal of the contents of what they read, there are nevertheless some well-established indicators that might be used to assess the trustworthiness of sources. Even in an unfamiliar field, an information-literate

person is likely to be able to make an informed guess about the likely dependability of a resource. Particularly in the case of documents—books, journal articles, research reports and the like—there are well accepted and time-honoured techniques for distinguishing the quality of the material with which readers, learners and scholars have to deal. These include indicators such as the reputation of the author, the extent to which he or she seems to be cited or quoted by other authorities in the field, the calibre of the publishers, the 'look' and 'feel' of the book, journal or report, and whether it appears to have been through some robust process of peer review. In the online world, however, many of these techniques are not applicable, and the familiar tell-tales are absent or less evident.

The issue of evaluating information encountered in the web environment is not simple. Certainly the quality of writing itself, including the presence or absence of spelling or typographical errors, and the range and currency of references, are indicators of the likely authority of an article that appears on the screen, as is the reputation of the author (although not all online sources are attributed and even when they are, the problems of anonymity and forgery in the digital world are legion). The currency, truthfulness or trustworthiness of various knowledge claims can be tested by triangulation against other sources, providing such other sources are to be found. In their chapter entitled 'Teaching advanced literacy skills for the World Wide Web,' Britt and Gabrys (2001) use the term 'Corroboration,' which comprises looking for supporting information, or triangulation, in other sources. They write:

> *Corroboration is an important skill for [learners] to have for several reasons. First, corroboration enables students to verify the accuracy of information before relying on it too heavily. [Learners] can check new information against other independent documents or find the most direct source. Second, corroboration enables [learners] to identify agreed upon facts, events and interpretations and to weigh them appropriately. Third, because no single document can offer a complete picture of the situation or argument supplied, the act of corroboration enables students to locate unique information not mentioned in the original source. Finally, through corroboration, [learners] can identify information sources that omit important generally agreed upon facts, interpretations or alternatives and this may serve as a red flag to identify whether an author may be intentionally deceptive or misleading* (Britt & Gabrys, 2001, pp. 80–81).

Even more challenging is assessing the utility of the information for a particular purpose, a complex process of judgment that entails an evolving understanding of the field of inquiry. In most cases, the more experienced learner will be in a better position than the neophyte to make such an evaluation.

Anyone accessing and utilising resources in the online world must be aware of the possible threats to validity and reliability of the sources they encounter. Since not all information users will be experts in the field, at least not at the outset, there is a wide range of web evaluation guides in existence, most of which provide some sort of checklist. For instance, on a website entitled 'Caveat Lector', Auburn University in Alabama has an evaluation checklist with the following sections:

Accuracy:
- Does the author cite reliable sources for his or her facts?
- How does the information compare with that in other works written about this topic?

Audience:
- Who do you think the author(s) of the website are trying to reach?
- Is there a particular group or segment of society that the author/s are targeting?

Authority:
- What are the author's qualifications for writing on this subject?
- Is he or she connected with an organisation that has an established reputation?

Currency:
- Does the website include a publication date or 'last updated' date?

Objectivity:
- Is the author affiliated with a particular organisation that might have a bias?

Purpose:
- Is the author's purpose to inform, e.g. provide new information, current events, etc?
- Is the author's purpose to explain, e.g. describe a process, teach, etc?
- Is the author's purpose to persuade, e.g. change your mind, convince you to buy, etc? (Auburn University Library, 2003).

As useful as such checklists are, they do not deal with the specifics of particular fields of study or practice. Therefore, as with ICT literacy, there is a need for some domain specific guides to quality. These must also be contextualised through direct interventions in the form of information literacy education.

Research and writing about the need for information literacy has, at the conceptual level at least, united diverse players; governments, educational providers, business and industry, librarians and information specialists among them. However, each group has tended to adopt a relatively narrow, and frequently quite instrumental perspective on the topic. Thus, educational providers commonly concern themselves with the skills and attributes that are required of students in the formal education system, employers and industry groups embrace information literacy but only to the extent that it contributes to their 'bottom line,' governments release general statements about international competitiveness or active citizenship but rarely back this up with any concrete policy objectives, and librarians and information specialists advocate information literacy so that people can independently meet their individual information needs.

One exception to this generalisation is the Australian Library and Information Association's 'Statement on Information Literacy for all Australians,' which is as follows:

Principle

A thriving national and global culture, economy and democracy will be best advanced by people able to recognise their need for information, and identify, locate, access, evaluate and apply the needed information.

Statement

Information literacy is a prerequisite for:

a. participative citizenship;

b. social inclusion;

c. the creation of new knowledge;

d. personal, vocational, corporate and organisational empowerment; and,

e. learning for life.

Library and information services professionals therefore embrace a responsibility to develop the information literacy of their clients.

They will support governments at all levels, and the corporate, community, professional, educational and trade union sectors, in promoting and facilitating the development of information literacy for all Australians as a high priority during the 21st century (ALIA, 2001).

It is, of course, notoriously difficult to unite such a diverse range of different stakeholders, even in support of an evidently beneficial idea, especially when it entails, as this one would, the considerable expenditure of resources to see it realised for all Australians. It is therefore vital to have explicit leadership and endorsement of the concept from the highest levels of Government. In his paper prepared for the US National Commission on Libraries and Information Science, UNESCO and the US National Forum on Information Literacy, Horton argues that the provision of information literacy must be a national priority and, moreover that it must be construed as a basic human right. He writes:

- *Educating and training its citizens, even in a limited way, with the basic knowledge and skills needed to find, retrieve, organise, evaluate and use information … is not seen around the world as a public policy obligation of government, with the possible exception of a very few … countries; the special public information needs of disadvantaged and disabled citizens are even more rarely addressed;*

- *[however], information literacy must be singled out and elevated to the status of a major national policy and programmatic goal; adequate funds must be appropriated to support public sector information literacy initiatives at the federal, state and local levels; schools and libraries must play a key role in these initiatives; public and private sector information literacy initiatives must be complementary* (Horton, 2002).

Clearly such a vision goes well beyond the present patchwork of provision in most jurisdictions. It rests on the recognition not only that 'public information is a strategic resource needed at all levels of society, by all people in all walks of life,' but that 'information literacy skills are necessary to exploit that strategic resource, and … the acquisition of those skills by all citizens should be treated as a basic human right' (Horton 2002).

4.5 A blended concept: Digital literacy

As mentioned earlier in this chapter, the literature about literacy in general is complex and confusing; especially given the propensity of various authors to argue (or simply to assume) that one concept is sovereign and accordingly subsumes others. In this domain, there are those who argue either that ICT literacy necessarily encompasses Information literacy, or the reverse. In this chapter, I have taken care to separate and distinguish the two constructs; however, the networked environment has thrown up a level of complexity not envisaged or encountered in the previous worlds either of static resources (notably ink and paper or microforms) or of stand-alone machines. As a

result, there is some evidence to support the view that in the digital world these two ideas are in fact converging and mutually modifying one another. In other words, the ICT literate person must also be information literate, and *vice versa*, since digital technologies are in a way changing what counts as knowledge. The fact that knowledge is as provisional and evanescent as it is, that much valued information is developed and held in dynamically generated form, and that there is a growing convergence between different kinds of digital material means that a new hybrid form of literacy is evolving. To describe this composite construct, I have chosen the term 'Digital literacy.' As Lanham puts it, 'to be deeply literate in the digital world means being skilled at deciphering complex images and sounds as well as syntactical subtleties of words. Above all, it means being at home in a shifting mixture of words, images and sounds' (Lanham, 1995, p. 161).

4.6 Conclusion

As digital technologies become more widespread, it seems that people will increasingly be confronted with the need to deal with this 'shifting mixture of words, images and sounds,' and that the facility to do so will be a vital attribute not only for learning, but for all other forms of online engagement. Accordingly, in terms of research, public policy and educational interventions, we need to develop information literate and ICT literate workers, students and citizens who are at home in the complex topography of information, that is both abundant and contestable. A New Zealand Government report puts it in these terms;

> *Much has been written around the idea of the information superhighway, but from the learner's point of view, the metaphor of a landscape better describes the complex, ever-changing, diverse information environment. People's experience of the information landscape depends on where they are standing, where they want to go, the tools they are equipped with, and the degree of guidance available to them. While the information landscape is huge and diverse, within this landscape there is increasing convergence and integration of once-distinct areas and disciplines.*

> *The current information landscape contains more information than ever before in an increasing range of formats and from a wider variety of sources. However access to more information does not guarantee that the learner will be better informed. In fact, the opposite may be true unless learners can gain the knowledge skills, attitudes and values that they need to function effectively in this landscape* (New Zealand Ministry of Education and National Library of New Zealand, 2002, p. 9).

Although the foundations of such 'knowledge, skills, attitudes and values' are laid during the school years, it is apparent that they are not once-and-for-all accomplishments, and moreover, that account must be taken of the needs of those who are beyond the age of schooling. Accordingly, the development of competence—ICT literacy, Information literacy and Digital literacy—must be a shared responsibility involving, as I have argued in this chapter, a partnership between 'Government, business and industry, professional associations, library and information specialists, education and training providers and community groups.' This is a theme to which I will return throughout this study, although principally in Chapter Sixteen in discussing the concept of the Learning Society. In the next chapter, however, I turn to a consideration of the content of information that can be encountered online.

5 Content: Ensuring Affordable Access to Quality Digital Resources

5.1 Introduction

Judging by the extensive and animated discussions that have taken place about the interrelated issues of how to locate needed information, and how to judge or evaluate its quality once located, one could be forgiven for assuming that much, if not all of the world's valued information is already 'on the Web,' and that it is freely available to users. In fact, however, as librarians, archivists and other information specialists are quick to point out, a large proportion of the world's historical, artistic and cultural heritage, not to mention its economic, scientific and other databases is not yet available in digital form. Even where it is, there is no guarantee as to its continuing availability or its ready accessibility by learners and other searchers who limit their inquiries to the online domain or to standard search engines. Moreover, there are recognisable cohorts of people for whom little if anything of interest or use is currently available in digital form[1]. Consequently, the focus of this chapter is on the triple challenge of availability, affordability and continuity of digital information.

5.2 Sufficient high quality digital resources in the learner's areas of interest

In discussing digital resources, a useful distinction is made between those that are 'born digital,' and those that are 'digitised.' Given the pervasiveness of electronic technologies, particularly in government, business, education, publishing and research organisations, a very large proportion of recently

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1 In this section, and indeed throughout this chapter, I will confine my discussion principally to materials that are available in English. This is a major limitation, not only of this study but of digital technologies—including the Internet, Videos and CD-ROMs—more generally. Large numbers of people are denied effective access to online learning because of the limited range of materials available in languages other than English and in alphabets other than the Roman.

created information has been 'born digital.' However, much of this is restricted to individual machines or intranets, or even to stand-alone devices such as CD-ROMs and their archival equivalents. Thus, even information that started life in digital form may not readily be available to self-directed learners unless they have access to those repositories and devices.

Even more significantly, only a minute fraction of the world's records and archives—its scientific, literary, artistic, historical, cultural, archaeological and other heritage—is currently available in digital form. One consequence of this is that information users will, for the foreseeable future at least, require the skills to access information in various forms including not only digital but also either paper and ink or microform. A second consequence is that those responsible both for maintaining information repositories and for extending their accessibility and use need to decide what to digitise and in what format. Basically there are three approaches to the digitisation of existing resources: retyping or keying-in to databases, spreadsheets and word processing documents, information that already exists in non-electronic forms; scanning documents and then using Optical Character Recognition (or OCR) software to render it into searchable digital form; and scanning it so that it appears on the screen as a facsimile of the original.

Throughout the world, there are major projects of digitisation underway and, in the fullness of time, these are likely to be of immense benefit to learners and researchers. However, when one thinks of all the libraries, the collections of newspapers journals and other publications, the archives and record offices, the business, military, scientific and other data sets around the world—both public and private—it is apparent that the task ahead is a massive one. Indeed, as one South African archivist has pointed out, it is a task that, in terms of time money and expertise, may protect some artifacts while, at the same time, detracting from the primary role of cataloguing and conservation of collections:

> *In South Africa we have also just commenced a pilot document digitisation project funded by the Andrew Mellon Foundation, based at the University of Natal, in Durban. It will digitally scan 'liberation struggle' literature of the movements which opposed Apartheid in the period between 1960 and 1990—which is a scattered resource currently much studied by historians... It will be necessary to find funding for the enormous investments which will be involved if widespread digitisation of documents is to go ahead. Equipment and expertise comes mainly from abroad. The investment required is daunting in local terms, and technical obsolescence is so rapid that the financial input is never-ending.*

> *[Moreover], the diversion of scarce funding into IT is starving heritage institutions of the money to undertake their* primary *acquisition and curatorial functions. The obsession with virtuality masks a growing disaster as professionals are increasingly unable to preserve reality* (Allardice, 1998).

The question of whether to digitise, and if so what and in what form, is therefore a matter of grave concern for those whose role is the preservation and conservation of our collective knowledge base. Many archives offices and libraries are digitising those images that are most in demand, or those that are fragile and most at risk, to protect the originals while making the information more widely available. Others are digitising only on demand, so that instead of photographing or photocopying documents, they are professionally scanned, with one copy being sent electronically to the user and a master copy being retained by the agency involved.

Different archives authorities, both public and private, have adopted different approaches to the digitisation of images. The National Archives of Canada, for instance, has set up an online division called ArchiviaNet. This provides access to many electronic databases which, in turn, allow the user to click through to digitised copies of certain documents held by the agency. For instance, the Attestation Forms of hundreds of thousands of Canadians who served in the First World War have been scanned, back and front, and mounted on ArchiviaNet.

The Australian Archives, on the other hand, has made a blanket decision that certain classes of records may be made available without restriction, but they are copied only on demand. When a user has located in an index a document of interest, two buttons are provided on the website, one marked 'Purchase a photocopy' and the other 'Request a digital copy (no charge).' If perchance the relevant document has already been scanned for another customer, an icon is shown which, if clicked, brings up the images on the screen; these can then be printed out by the user.

The National Library of Australia hosts an award-winning website entitled 'Picture Australia,' on behalf of some eighteen organisations in Australia and New Zealand. Picture Australia provides access to thousands of images that 'cover all aspects of Australiana:

- Artworks include paintings, drawings, prints and posters of abstract art, fine art and portraits
- Photographs [that] capture people, places and events
- Objects [that] include sculpture, scrimshaw, bark, costume, weapons
- Images may be in black and white or full colour' (Picture Australia, 2002).

It links to other collections and gateways that also carry images of interest and relevance to Australia and, as the website itself explains, is similar to a number of initiatives in other parts of the world. Users can search for images by subject, theme, medium, collection, geographic location, author or creator, and so on. Clearly such information has to be embedded into the files for each image to be accessible, and since there are a number of participating agencies, they had to agree on a common format for these descriptive tags.

The Public Record Office of England and Wales, with tens of millions of documents in its care, has undertaken a targeted program of digitisation and indexing of various classes of documents including Wills, Cabinet Documents, Prison Records and various documents of great historical importance. Using a search engine and various keywords, the user can identify whether a digital image has been made yet; if so, he or she can click an icon that simply adds the document to a notional shopping basket. There is no opportunity to view the actual contents of the document until chosen. At the end of the session, a charge is levied on the user's credit card based on the number of items selected and an email is sent advising how the documents can be downloaded onto the user's own computer. Some of the public documents (such as Shakespeare's Will and the Magna Carta) may be selected and downloaded without charge.

In the United States, the massive Immigration Museum on Ellis Island has scanned the passenger lists for more than 24 million people who arrived in New York in the years between 1892 and 1924. These have all been indexed, and the user, having performed an online search and located the name of interest, can view a transcript of the passenger list of interest. If required, he or she can also click a button and view an actual image of the original handwritten passenger list, which may be downloaded if desired. Although there is no charge for this service, there are various other paid services, including the opportunity to order elaborate framed photographic quality prints both of the Passenger Lists and of the ships to which they pertain.

The massive private database Ancestry.com, which claims to give access to more than a billion genealogical records, has thousands of separate databases, some of which (notably US Census Records and images from the Civil War Pension Records held in the US National Archives) may be searched and viewed, but only by members who have paid an annual subscription. Users without a subscription can use the search facility but in most cases they are greeted with a screen that tantalisingly tells them how many records have been found that meet their search criteria, and then invites them to subscribe to the service in order to view them.

There are countless other initiatives to provide access to various public and private collections, of a variety of media including printed materials (books,

journals and newspapers), manuscript documents (letters, forms, lists, diaries, journals, accounts, personnel files), images (photographs, paintings, drawings, maps, plans, charts, blueprints, technical diagrams, postcards, posters, video clips) and sounds (public announcements and speeches, radio broadcasts, interviews and conversations, musical rehearsals and performances). In many cases, the owners of the originals have inserted some kind of digital 'watermark' into the image or file to prevent its unauthorised use, broadcast or publication. Clearly all those services that offer digitised copies depend on the quality of the indexes, which vary depending on the skill of the indexers, including (in the case of manuscript originals) their ability to decipher old-fashioned handwriting, unconventional spellings, or unfamiliar terminology. Without an adequate index, scanned images and sound archives remain frustratingly unusable.

The foregoing discussion has concentrated on the creation or digitisation of resources for which there is already, or is likely to be, a significant level of demand. After all, when resources are limited, in the first instance they are likely to be focused on meeting the needs of the largest number of users or potential users. However, it must be recognised that not all groups within society will readily find digital resources that meet their needs and interests. I am not referring here to minority groups with very specialised or highly esoteric interests (although paradoxically to some extent the advent of the Internet has benefited such groups by allowing them to form virtual communities and to exchange information and insights with others who may be scattered around the globe). Instead, I have in mind identifiable groups who may feel that their interests are not adequately met or represented in the online world and, in particular, that they are ignored or overlooked by the 'mainstream' interests that control the technology behind the Internet. A discussion paper prepared by the New Zealand Labour Market Policy Group makes the point in the following terms:

> *The content issue seems to be particularly relevant for Mäori and Pacific people, women and people with disabilities, with some of these groups having a perception that the Internet is largely for (young) white males. It was suggested that greater assistance could be provided to groups to generate their own content … through [for instance] community grants. There was also a suggestion that Te Puni Kokiri [Ministry of Mäori Development] and the Ministry of Pacific Island affairs should administer special grants to Mäori and pacific content creators. It was also noted in this context that content needs to be updated to remain relevant, and that the cost of ongoing site management should be built into any such grants* (New Zealand Labour Market Policy Group, 2001, pp. 24–25).

It is of course difficult to know what kind of assistance to offer and to whom; partly because many groups may claim that they are systematically disadvantaged in a free market economy and need special help to develop their own materials, and partly because the digital world has provided unprecedented opportunities for specialist groups to network with each other and to share their information with the wider world. However, the 'digital divide' can clearly extend beyond the technologies to the materials available to specific users and potential users, and Governments, communities and other groups may need to form partnerships with such parties in order to help them establish and maintain a viable presence in Cyberspace.

5.3 Affordable access to relevant digital resources, including government and private sources

At a philosophical level, the adage that 'knowledge is power' ('Scientia Potestas Est') has a long heritage, having been applied for millennia to situations as diverse as warfare, diplomacy, business negotiations, education and interpersonal relations. A particular case in point is the exercise of one's democratic rights and responsibilities as a citizen. Many years before the advent of the Internet, Major Owens a former librarian turned Congressman wrote:

> *All men [sic] are created equal, but voters with information resources are in a position to make more intelligent decisions than citizens who are information illiterates. The application of information resources to the process of decision-making to fulfil civic responsibilities is a vital necessity* (Owens, 1976).

Although government resources are not the only ones that are relevant to such participation—either as citizens or as learners—the sheer volume and diversity of digital material that is accumulated, generated and managed by Governments for the benefit of their citizens makes it particularly vital to have in place robust information policies. According to Horton, 'diffusing government's knowledge resources efficiently and effectively to all of a country's citizens is essential...' He goes on to identify at least five domains to which the diffusion of government information is vital:

- *sustaining the competitive competency of the country's businesses and industries, in both domestic and global marketplaces, not only for large multi-national global enterprises, but especially for small and medium-size enterprises;*

- *attaining the highest levels of educational excellence for all the nation's children and adults in a lifelong learning context;*

- *enabling citizens to participate more effectively in all facets of a democratic society, especially in the governance activities of their government, such as voting and elections;*

- *informing public officials at all levels of government so that they can enact better laws, formulate and enact enlightened public policies, monitor the programs they authorise effectively, and govern fairly, equitably and wisely; and*

- *enhancing the quality of life of all a country's citizens, including responding to the special government information needs of disadvantaged and disabled individuals* (Horton, 2002).

In the past, a great deal of government information was available in hard copy—print or manuscript form—or in microfilm through a diverse range of public sources such as libraries, archives, record offices and other information repositories. Today, very large amounts of government information are being generated, stored and disseminated digitally. On the surface, this should lead to greater transparency and accountability and to easier information access for the population at large. However, in practice, the sheer volume of information in the digital domain can sometimes overwhelm even the most dedicated inquirer.

Indeed, the advent of the digital era has raised or thrown into sharp relief a range of intriguing questions. These include: who 'owns' government information; who is responsible for maintaining its continuing availability or persistence in digital form; are Governments within their rights to charge individuals and organisations for access to the information so maintained; at what point can Governments claim to have 'added-value' to the information collected from citizens, communities and organisations; can Governments be construed as having discharged their obligation to 'disseminate' information simply by placing it into the digital domain, and, finally, does the creation and maintenance of digital repositories entail any concomitant responsibility on the part of Governments to ensure that all citizens have access to and can understand the information? In relation to this last issue in particular, Shenk in his book *Data Smog: Surviving the Information Glut* is quite clear:

> *All government documents should not only be accessible, but approachable. In our glutted society, government has a special responsibility to communicate with its citizens concisely and articulately. Tax forms are not the only documents that should be able to fit on a postcard. The essence of legislation, regulations, and court rulings should be something that any literate person can understand. A new Government Information Act should ensure that*

citizens have not just online access, but actual understanding of the workings of government (Shenk, 1997, p. 210).

Clearly the desirability of having comprehensible Government documents is not new; however, the digital era has made the need more obvious and, because of the sheer volume of information, more pressing.

While equitable access to government resources is an important consideration for citizens, information users and learners, another set of issues relates to privately generated information and, in particular, that held in proprietary databases. This raises two related sets of issues, one to do with affordable access to information, and the other touching on copyright, or digital rights management. With respect to the first of these issues, as discussed in the Introduction to Part One, the Internet is a largely unregulated environment akin to the frontier during the decades of the Wild West. In part, this is because of its novelty and the speed with which it has developed; and in part because its evolution has largely been driven by raw capitalism and market forces. For all these and other reasons, many operators have seen it as an opportunity to create an income stream by charging for access to information and related services. This is understandable and, to an extent, acceptable especially since it allows for the extension of services and provision of information that would otherwise be unavailable.

There are, however, issues of equity at stake here, since the charges levied by providers can place the information beyond the reach of some cohorts of users. More alarmingly, some information providers, including online publishers, have taken information that is already freely available in the public domain and charged for access to it. Clearly the morality of this is questionable. Another example of dubious behaviour concerns those publishers who charge handsomely for subscriptions to online journals, where the bulk of the findings reported are the result of publicly funded research. Whereas some advocates argue that such information ought to be made freely available to the research community and other learners, the publishers argue that they add considerable value both through their peer reviewing mechanisms and through the quality of the publications themselves (Correy, 2001).

One attempt to bridge this gulf between publishers and the research community was PubSCIENCE, a database produced by the US Department of Energy's (DOE) Office of Scientific and Technical Information (OSTI), in partnership with the US Government Printing Office and several scholarly publishers. Between its foundation in October 1999 and October 2002, PubSCIENCE provided a database of abstracts for over 1200 separate scientific journals produced by some 35 publishers including both professional associations and private publishers, although links to the journals themselves were generally paid. In August 2002, the Office of Scientific and Technical

Information announced its intention to discontinue the service, on the grounds that similar services were available through private publishers. Whereas some have seen this as an appropriate recognition that government agencies should not duplicate services already available commercially, others have claimed that this represents a capitulation to large multinational interests and something of an abdication of the legitimate information-providing role of Government. In an article entitled 'PubSCIENCE Joins the Endangered Species List,' Ojala asks 'Did the private sector win its battle against competition from the public sector? Neither Warnick [from PubSCIENCE] nor LeDuc [representing the Software & Information Industry Association] is willing to put it in those terms' (Ojala, 2002).

A similar battle between publishers and those wishing to use the Internet to make information more freely available is represented by the Swedish based 'Campaign for the Freedom of Distribution of Scientific Work,' which argues that:

> *Since nowadays most scientists and researchers type their manuscripts directly on a computer, it is possible to share the manuscript with other scientists immediately through computer networks. Many copyright-transfer agreements are currently an obstacle to this possibility [however]. Scientists are not free to put their manuscripts on their web pages, so that everyone can easily access them* (Free Science Campaign, 1998–99).

This touches on a related matter, namely the whole vexed question of who owns information in Cyberspace. The digital world has thrown up complex and hitherto unprecedented issues of intellectual property. These include whether or not something as transient or ephemeral as a computer program or webpage attracts the same rights as a manuscript, a document or work of art; how the authorship of materials can be definitively established especially when it is so easy to 'cut and paste' materials from various sources; which jurisdiction is to prevail when material is generated in multiple locations and used or consumed in others; how to prevent a legitimate user or subscriber from making unauthorised use of proprietary content; whether or not information can be said to have been 'used' when it simply appears on a screen, or when it is downloaded or printed out; and how to monitor the actual usage of digital resources when particular devices may be used by multiple individuals. Indeed, the digital environment has thrown up a multitude of interrelated conceptual, technological and legal entanglements and, in the process, spawned a large and growing specialist literature. As a result, education and training providers, librarians and information specialists, as well as legal systems throughout the world, have been scrambling to adapt conceptual and legislative frameworks that were developed for a past era.

For learners, including those engaged in self-directed learning outside formal education and training, there is a host of complex and unresolved matters to do with the information sources to which they may wish to have access. These range from online newspapers and journals, sound recordings and digitised images, to data sets and archival holdings that may be relevant to their needs and interests. For learners and other information users, despite the explosion of information in the digital era, access to needed sources may ironically turn out to be more difficult and even more costly than offline.

5.4 Ensuring the preservation of digital documents and resources

While the availability and affordability of digital resources are vital considerations, another major issue concerns which technologies should be used both to digitise and to archive the digitised images? The history of technology is replete with examples of devices that were at one time 'state of the art,' but which are now historical curiosities. One needs only to think of Glass Lantern Slides (or indeed 35 mm slides); Box Brownie cameras, reel to reel tape recorders, Nitrate and Acetate-based films; Super8 Home Movies, Betamax and U-Matic Video formats and so on. In the world of computing, there are many studies of the rapid development of the technology which has meant that, in the comparatively short span of fifty years, computers have moved from the ENIAC and UNIVAC machines that took up entire rooms, to the extremely powerful, miniaturised handheld devices of today.

If modern day systems are dependent on devices and technologies that are no longer supported, the results can be challenging, to say the least. In May 2002, news services carried reports that NASA was scouring the Internet for stockpiles of aging parts in order to keep its Space Shuttle fleet flying. One such report in the *New York Times* stated:

> *NASA needs parts no one makes anymore. So to keep the shuttles flying, the space agency has begun trolling the Internet … to find replacement parts for electronic gear that would strike a home computer user as primitive. Officials say the agency recently bought a load of outdated medical equipment so it could scavenge Intel 8086 chips—a variant of which powered IBM's first personal computer, in 1981.*

> *When the first shuttle roared into space that year, the 8086 played a critical role, at the heart of diagnostic equipment that made sure the shuttle's twin booster rockets were safe for blastoff. Today, more than two decades later, booster testing still uses 8086 chips, which are increasingly scarce* (Broad, 2002),

If such obsolescence can affect vital hardware, what happens to those records, images and databases that were originally committed to a technology that no longer exists or for which parts are not obtainable? The obsolescence of many digital technologies has become a major concern for those entrusted with preserving fragile information. Around the world, librarians, archivists, technologists, information specialists, educators and others have been concerned with how to maintain 'digital continuity' or, as one author puts it, how to 'keep digital documents alive' (Clay, 2002). She writes:

> *Digital continuity refers to the ongoing existence of digital documents and objects in various formats. Print documents can last for centuries, provided they are printed on a durable medium, stored under the right conditions and if necessary, have restricted handling. But not all digital items enjoy that same longevity—some have a useful life of little more than a decade. This is because hardware and software formats become obsolete, the responsibility for preservation is unclear and version control can be problematic, to name a few factors.*

> *In Australia, the National Library and the National Archives of Australia lead preservation practices, policies and advocacy. Universities have long been major stakeholders in digital preservation, and with scholarly publishing and educational delivery increasingly moving online they must consider ways to future-proof their information* (Clay, 2002).

In the United States, there has been a major debate concerning the vulnerability of the world's digital records. One of the key opinion pieces in this debate was a letter from Deanna Marcum, President of the Council on Library and Information Resources, to the Editor of the *Washington Post* on 21 January 1998, in which she summed up the looming problem in these apocalyptic terms:

> *We run the risk that digital information will disappear. Indeed, portions of it already have become inaccessible. Either the media on which the information is stored are disintegrating, or the computer hardware and software needed to retrieve it from obsolete digital formats no longer exist. The extent of the problem will emerge as more and more records are requested for retrieval and cannot be read. There are already documented examples of this, and government and industry representatives are concerned about the potential large-scale consequences…*

> *Military files, including POW and MIA data from the Vietnam War, were nearly lost forever because of errors and omissions contained in the original digital records. Ten to twenty percent of vital data tapes from*

the Viking Mars mission have significant errors because magnetic tape is too susceptible to degradation to serve as an archival storage medium.

Research conducted by the National Media Lab, part of the National Technology Alliance—a consortium of government, industry and educational institutions that seeks to leverage commercial information technology for government users—has shown that magnetic tapes, disks, and optical CD-ROMs have relatively short lives and, therefore, questionable value as preservation media. The findings reveal that, at room temperature, top-quality data VHS tape becomes unreliable after 10 years, and average-quality CD-ROMs are unreliable after only five years. Compare those figures with a life of more than 100 years for archival-quality microfilm and paper. Current digital media are plainly unacceptable for long-term preservation.

Finding a late-model computer to read a 5.25-inch floppy disk—a format common only a few years ago—or the software to translate WordPerfect 4.0 is practically impossible. On government and industry levels, the problem is magnified: old Dectape and UNIVAC drives, which recorded vast amounts of government data, are long retired, and programs like FORTRAN II are historical curiosities.

The data stored by these machines in now-obsolete formats are virtually inaccessible. The year-2000 problem concerns only obsolete formats for storing dates. It is merely a snapshot of the greater digital crisis that puts future access to important government, business, and cultural data in such jeopardy (Marcum, 1998).

This letter gave rise to a heated exchange involving various representatives of the information industry (chronicled, in part, under the title *Chronology of a Scandal: A CD-Info Special Report*, available online at http://www.cd-info.com/CDIC/Industry/news/media-chronology.html [accessed 23 July 2002]) in which the sensational and allegedly misleading nature of such claims was hotly disputed by, among others, the National Media Laboratory whose media life expectancy work was cited.

Whatever the rights and wrongs of the specific claims, there can be little doubt that the rapidly increasing volume of digital information, combined with the growing obsolescence of certain forms of technology does pose major challenges to those concerned with the preservation of information. In 1998, the Getty Conservation Institute hosted a symposium as part of its 'Time and Bits: Managing Digital Continuity' Project. Reporting on the meeting, Davis and MacLean write:

Around the world, decisions are being made to commit cultural memory to digital technology—and marking time with bits—under

*the assumption that someone, somewhere, is taking care of the details.
What we are discovering is that 'someone, somewhere' is not there.
Not yet….*

*The mission of the Getty Conservation Institute is to further the
appreciation and preservation of the world's cultural heritage.
As part of its commitment to enhance the philosophy and practice of
conservation, the Institute undertakes research and applied projects,
shares its knowledge base worldwide, and collaborates with partners
to promote an informed awareness of and involvement in
safeguarding the world's cultural heritage. Within this context, we
recognise the importance of providing sound guidance—when
asked—about the means by which governments, organisations, and
other authorities might best protect their own heritage.*

*We also recognised that ensuring the survival of digitally recorded
information—especially cultural information—would require the
involvement of many groups, professions, businesses, and non-profit
organisations. Indeed, it will take real cooperation and
collaboration among these communities, a first for some of them*
(MacLean & Davis, 1999).

The problem of what to preserve has a long history. As Kessler points out
in his annotated bibliography; 'Preservation is an old problem. The choices
being faced with so many fears today have been faced before. What to save
from floods and fires and revolution … to whom to entrust the task of
selection, what to preserve, and how to preserve it' (Kessler, 1995, p. 1).

Clearly it lies beyond the scope of this study to consider the many complex
considerations that are exercising librarians, archivist and other information
specialists in ensuring the continuing availability of information into the
future. However, it is my contention that maintaining a focus on the likely
needs of future generations of learners, including researchers and other
information users, should provide a stable point of reference in their efforts
to do so.

5.5 Conclusion

In the context of the so-called information explosion, it is often overlooked
that the sheer volume of digital resources is not so much a solution to
people's information needs as it is an additional burden. For many, locating
what they need among the overwhelming abundance of material—what
Shenk (1997) has dubbed 'data smog' and others call 'info glut'—can be

problematic. Moreover, it is not as if everything that people want or need is yet available in digital form. Despite the significant, in some cases Herculean, efforts that have been made to provide access, there are many fields where needed information is not yet in digital form, or if it is, there are financial, technological or legal impediments to those wishing to access it.

As we create more and more digital information, librarians, information specialists and technologists are confronted with the problem of how best to preserve it and to make it available. While the problem itself may not be unprecedented, its scale most assuredly is. A newspaper article published in October 2002 claimed that 'Digital information growth continues to accelerate, and will grow at a 61 percent compound annual rate (CAGR) between 2001 and 2005' (Dearne, 2002). Much of this growth is in so-called reference information, including emails, medical images, videos, photos and presentations. It is hard to capture and convey the scale of the challenge, but if it is recognised that all the words people have even spoken take up 5 exabytes,[2] that the world produced approximately 3 exabytes of entirely new information in the year 2000 alone, and that 93 per cent of all information now produced is stored in digital format, it becomes apparent that simply storing (much less searching) the exponentially increasing amount of information is a major challenge.

It is a strange irony that the digital revolution may, in a perverse way, be moving us further from the ideal of a Learning Society, simply because of the combination of too much of some kinds of information and too little of other kinds. This is an issue to which I will return in Chapter Sixteen.

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2 In the arcane world of digital information, new terms are constantly being developed to describe incomprehensibly huge amounts of information. A terabyte is 2 to the 40th power or approximately a thousand billion bytes, that is, a thousand gigabytes. A petabyte is the next step up as a measure of memory or storage capacity and is 2 to the 50th power bytes or, in decimal, approximately a thousand terabytes. A petabyte would be roughly equivalent in storage capacity to 20 million 4 drawer filing cabinets. An exabyte (EB) is two to the 60th power bytes. The prefix exa means one billion billion, or one quintillion. In decimal terms, an exabyte is a billion gigabytes.

6 Credibility and Confidentiality: The Basis of Trust in the Unseen

6.1 Introduction

As discussed in Chapter One, the extensive uptake of personal computing is relatively recent and, despite the many advances that have been made in hardware, software and connectivity, many users are still somewhat apprehensive about engaging with the technology.

Part of their apprehension may revolve around the perceived impermanence of the technology, and a concern that in such a volatile domain, both hardware and software standards could become rapidly outdated so that money time and effort invested in acquiring and mastering various applications may prove to be wasted. Moreover, even if the software itself is reasonably likely to continue to be available, potential users must be confident that it will be robust and reliable, and that it will not distort, transform or corrupt the information entrusted to it.

In this chapter, I will explore some of the issues that may prevent potential users from engaging with the digital domain for a variety of purposes, although as always my primary concern is with online learning and related applications. At their base, most of these issues revolve around the concept of trust, and as a result I will classify the issues under the following headings: trust in the information, trust in the confidentiality of usage, and trust in the security of transactions.

6.2 Trust in the information

While people's willingness to use digital technologies might depend partly on their technical proficiency (or ICT literacy) and partly on their confidence in the technology, there is another even more subtle set of concerns about the consistency of the information encountered in the digital environment. One of the vaunted advantages of the electronic world is that it allows access to the most current version of any particular source. Offline, the relative permanence of paper and ink or of microform documents means that each time a user

accesses the same source, he or she can generally be sure that the information will be the same from one event to the next. However, in the digital world, particularly in the case of material that is dynamically generated in response to a request, information will vary from occasion to occasion—although an informed and experienced user can perhaps make allowances for such changeability. Perhaps even more challenging is the potential for variation between users. In the familiar offline world, if various users access the same physical source, the information to which they are exposed will be the same. In the digital world, however, the volatility of Cyberspace means that there is no guarantee that information will remain fixed from one user to another.

The capacity of information technologies to tailor both retrieval strategies and information presentation 'intelligently' to the needs, interests and preferences of individual users is held out as a distinctive advantage of the digital revolution. This facility for 'mass customisation,' where each reader, user or learner is able to access a different, personalised 'package' of information, is commonly trumpeted as a strength for many applications, including E-learning. However, there may be a negative aspect to this, which is the possibility that different users or even different cohorts of users, mistakenly believing that they are accessing identical information, might in fact be presented with information that varies from that available to others. If, for instance, websites were programmed to recognise each time a user logged on, and to subtly alter not just the appearance but the content of the information provided, then it is possible that various groups would be operating on a systematically different set of data from one another.[1]

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1 A somewhat quaint example is provided by the Treaty of Waitangi, which was entered into in 1840 between representatives of the British Crown and the Maori people of New Zealand. The purpose of the treaty was to create the basis for some sort of accord between the Indigenous people and the European authorities. According to a website devoted to the subject, the Treaty:

> recognised the prior occupation by Maori people of New Zealand. It enabled the peaceful acquisition of land for settlement purposes and ensured that immigrants could come and live here in peace. It allowed the Crown to set up a government to establish laws. In return the Crown were to guarantee and actively protect Maori tribal authority over their lands, fisheries, forests, villages, treasures and culture and extend to them the status and rights of British citizens (Treaty of Waitangi, n.d.).

Two versions of the Treaty were prepared, one in English and one in Maori. The problem is that it now transpires there were subtle differences between the two texts. Scholars, including anthropologists, lawyers and linguists, have argued about whether these differences were material or not; from a layperson's point of view it certainly looks as if the English wanted the Maori to cede full 'sovereignty' to them, whereas the Maori version of the Treaty conveys a much narrower and less extensive concept of 'governorship.' Of course this particular example is made more complex by the norms of Imperialism that prevailed in the mid-nineteenth Century, and by the different cultural and linguistic conventions underlying each side's perspective, but nevertheless the broad principle is established.

There are no doubt innumerable examples throughout history that illustrate the invidious consequences of providing different information to different groups. However, the principle is clear, people need to have access to the same information, or at least to be aware of how their information bases differ, if they are to make informed choices or to negotiate as equals.

In terms of 'trust,' a small but influential aspect is the commonly-experienced intrusion of unwanted or 'inappropriate' sites in the middle of some unrelated online activity. Some of these involve 'pop up' screens about advertising, gambling or pornography, and others again take the form of a request for some response or input before proceeding. Sometimes these unwelcome sites appear because of a mistyping, at other times they simply obtrude unbidden and unwelcome onto the learner's screen. In either case, they are commonly off-putting and even unpleasant and, even when the content is not directly offensive or confronting, as Felix (2001) points out in her study of online language learning, the most overwhelming feeling is of annoyance and hostility on the part of the user. Certainly they do little to enhance the user's trust in the appropriateness or 'controllability' of the medium.

In the context of digital information, therefore, it is vital for people to have confidence in the consistency of the technology and in the reliability of the information encountered or generated if they are going to be willing to utilise the technology for a variety of purposes including learning.

6.3 Trust in the confidentiality of usage

Linked to this issue of confidence in the consistency of information is another issue of trust; namely whether one's engagement—with websites or with other people—is subject to some sort of surveillance. This issue has two separate facets; the unintentional and often covert provision of information about the user's interests and patterns of web use, and the direct and explicit provision of information that might nevertheless be potentially embarrassing or damaging should it fall into unauthorised or otherwise inappropriate hands.

With respect to the first of these issues, there is certainly evidence to suggest that some users are emboldened by the apparent anonymity of the digital domain, a feature which has both negative and positive consequences. One of the negative or undesirable consequences of this so-called dis-inhibition is the phenomenon of 'flaming' or otherwise attacking other online users—either collectively or individually. When one's interactions are mediated by technology, it is relatively easy to lose sight of the fact that real people with real emotions lie on the other side of the screen, although this may be nothing more than a temporary aberration until people become more familiar

with this novel domain of social interaction. On the positive side, however, there is evidence that some users at least are less inhibited in seeking information about important matters that are beneficial to them, their families, workplaces or communities, such as finance, health or relationships. If, for example, someone seeks information about giving up smoking, or drug or alcohol abuse, or weight loss, or if they are open to learning about the causes and consequences of domestic violence—whether from a website or from an anonymous advisory service—the Internet may be viewed as a very beneficial aid to self-directed inquiry.

If users or potential users develop a concern that their Internet traffic or Web logons are being monitored by their employers, their family or some external 'authority' such as the police or an Internet Service Provider, this is likely to curtail or even completely stop their use of technologies for what might otherwise be innocuous and even desirable purposes. While some people might manifest an irrational and excessive concern that they are the subject of undue and inappropriate surveillance—a form of paranoia—in other cases, their concerns might be both legitimate and well founded (Spears & Lea, 1994).

The whole issue of Internet security is both complex and controversial, but there is little doubt that the sites with which most users interact generally maintain a record of the transactions between users' machines and their own. Most commonly this is in the form of a 'cookie,' a small text file that is placed on the user's machine by the web server to which it connects. Any subsequent contact between the two machines can likewise be logged, with additional information being added to or linked to the original cookie. The positive aspect of this technology is that it allows for the ready identification of repeat visitors and, if they have provided information, engaged in transactions or indicated preferences on previous occasions, this can be used to customise both the appearance and content of the information provided to the user. The downside of such technology is that it can be used to build up a detailed, if at times intrusive and even erroneous, profile of the user. If such information is handed on to others, for instance to marketing companies, or is combined with information derived from other sources, there is a clear potential for serious breaches of privacy.

It must first be pointed out that this technology does not identify individual users, but rather individual computers, and so multiple user machines— whether in the home, the community or the workplace—may have a multiple or composite set of cookies. For instance if a family has a single computer that is used to connect to the Internet, it will reflect the combined interests of everyone who uses the machine: maybe father is interested in Thai cooking and has downloaded a number of recipes as well as buying some exotic ingredients on the Web; mother might be an avid football fan and often

access information about her favourite team and its players; one of the children could be interested in classical music and spend countless hours surfing sites related to his favourite composer, and his sister could be an expert at target shooting, being in touch with rifle clubs, mail order gun stores and ammunition manufacturers around the world. The cookies loaded onto that machine's hard drive would be an amalgam of all the sites and all the interests of people in the household and could not therefore be taken to be an accurate profile of any one of them.

Second, it is possible for users to turn off, or opt out of cookies, although this disables one of the Internet's strongest features; its ability to engage proactively rather than just passively with users.

Third, even when cookies have been disabled on a particular machine, there are still features of the resident software that may allow for a user's activities to be reconstructed using commonly available data recovery software. Preying largely on fear, a number of software products have been developed to tidy up and eliminate these deep traces of sites visited, programs loaded and activities performed on any given machine. There are plenty of legitimate reasons for wanting to cover one's tracks in this way. A student using an institutional machine may not want others to know which sources he or she used to complete an assignment; a business person may wish to protect commercial-in-confidence information; and an investigative journalist may wish to preserve the anonymity of his or her sources.

However, for every appropriate and defensible such application, it is not hard to envisage less benign scenarios such as the use of computers to support terrorism, paedophilia or other criminal activities, where the eradication of an electronic trail is not in the public interest. Clearly there are issues of civil liberties at stake here, since society may well seek to monitor and curtail certain threatening or criminal online activities, while preserving the democratic and commercial freedoms of users at large. Thus it can be seen that the issue of how to monitor Internet traffic in selective ways is technically, legally and morally complex: the point remains that people's ability and willingness to engage in online activities will depend to a significant extent on their trust in the transparency and relative anonymity of the technology.

A second aspect of trust in the confidentiality of such technologies concerns the information that users may be asked to provide deliberately as part of their participation in a discussion, a survey or even an online learning activity. Much learning necessarily entails a degree of self-disclosure, and in that case, social risk-taking. This may be in the form of completing and returning a questionnaire, participating in an online discussion group or forum, or even providing feedback and evaluation about an idea, experience or product.

Such feedback may range from the completion and return of a questionnaire to the more discursive comments that take the form of a dialogue.

No doubt this is an issue that has been confronted by market research companies and by those providing online advisory and discussion groups. More recently, there has been an animated online discussion and debate concerning the practical and ethical dilemmas involved in soliciting student feedback online about their learning experiences (see McCormack, Applebee & Donnan, 2002). In all these cases, a degree of personal risk-taking is entailed through telling others—always unseen and commonly unknown—something about oneself and one's interests or opinions. Even the simple act of providing feedback can be fraught if one believes that there is a potential for reprisals or other adverse consequences for oneself or one's family should the comments be intercepted by or sent to someone not authorised to receive them. Participants are more likely to offer frank, candid and forthright insights and feedback when they are confident that their input will be treated respectfully; clearly it is vital for those eliciting feedback or providing an opportunity for discussion and dialogue to establish clear guidelines about the treatment of participants' contributions, and to model such respect in their own dealings with users. Privacy legislation has been drafted or enacted in some jurisdictions to provide protection against misuses of personal information, a sensitive and valuable commodity in the current circumstances.

6.4 Trust in the security of transactions

In addition to the other aspects of trust addressed in this chapter, since the Internet is increasingly a medium for the conduct of commercial transactions, it is vital that users have confidence in the trustworthiness of the partners with whom they are dealing. This is most sharply in focus when money is at stake, and especially when the user is asked to disclose his or her credit card or other such details online, but even making an inquiry about a product or service can open a user to a degree of risk.

A study undertaken by Cheskin Research and released in July 2000 under the title 'Trust in the Wired Americas' makes it abundantly clear that security and privacy are closely interrelated, and that many people are as concerned about the misuse of information about themselves as they are about misuse of their credit card details. The report also stresses that people from different cultures attribute different levels of trustworthiness to certain institutions and symbols, and that those organisations and groups wishing to engage a range of participants need to pay attention to intercultural differences in how trust is established and portrayed.

The issue of security is clearly vital in the case of explicitly commercial enterprises. Banks, stockbrokers and financial intermediaries, online casinos, and those selling products and services over the Internet have gone to considerable lengths to create secure trading conditions and, through the use of password protected sites and various features of Web design including the use of recognised and trusted logos and icons, such as a picture of a small locked padlock, to reassure their clients and customers that transactions are secure. Likewise, many education and training providers have grappled with the issue from the point of view of students who may wish not only to register and select their subjects online, to submit assignments and projects electronically, or to access their student records, but also to pay fees and purchase course materials online. Such institutions have had to develop robust, professionally designed electronic commerce solutions for their students or learners.

However, there is another diverse range of organisations which, although less overtly commercial in focus, are nonetheless engaging their members, subscribers or users in online transactions. Examples include orchestras, theatre groups and sporting teams; operatic and ballet companies; booksellers and software suppliers; publishers and information providers; professional and community-based associations that provide either for membership renewals or for the purchase of publications, products and services; and even libraries, art galleries, museums and archives offices, all of which are increasingly offering the potential for online transactions. Thus even those who are engaged in self-directed learning activities are increasingly likely to participate in various forms of online e-commerce, joining or renewing memberships, subscribing or purchasing tickets, and submitting orders for a variety of products and services. In all such cases, high standards of financial probity and professionalism are required.

6.5 Conclusion

It is evident that there are as-yet-unresolved issues that potentially reduce people's willingness to engage online. These concern the quality of the information they might encounter online, the credibility of the people they might deal with online, and their own sense of security and comfort about disclosing information—including financial information—about themselves. Taken together, these concerns resolve themselves into age-old questions of trust, which for years have exercised sociologists, marketing analysts and educators.

A useful model is proffered by Egger (2000) in his paper 'Trust Me, I'm an Online Vendor' in which he identifies three major clusters of issues that affect how people feel about online transactions. Basically these three are what the user already knows or believes about the person or organisation (pre-purchase knowledge), features of the website itself, including architecture, navigation and graphic design (interface properties), and what the site says about how risks are minimised and the vendor's attitudes toward issues such as privacy (informational content).

Although Egger's focus is on e-commerce, there are nevertheless strong parallels with the world of learning. People's willingness to engage online, especially when the information is provided by a particular organisation, is influenced by precisely these same considerations: what they know or believe about the credibility and reliability of the provider, how easy the site is to navigate and use, and whether or not there are any explicit statements about the recency, credibility or comprehensiveness of the information provided. There are thus weighty matters to be resolved as a precondition to people using online sources and resources to learn which need to be attended to not by the learners, but by those who would strive to support and encourage them to participate in the online world of learning.

7 Capturing Information: Matches made in Cyberspace

7.1 Introduction

If information managers are confronted with seemingly intractable questions about which information to preserve and in what form, and if learners and other users have to decide what information and which sites to trust, they share the same challenge: how can users best locate the information and resources they want? In those cases where the electronic address of the target information is known, it may seem like a relatively straightforward matter to access it, although there is a degree of transience and impermanence about digital information and, in particular, a problem of non-enduring locators or changing electronic addresses. But this pales into insignificance against the larger problems of how to locate information whose location is not known, or the very existence of which is not certain, in the face of the daunting scale and complexity of the Internet; a vast interconnected network of networks all holding diverse information in a variety of forms for a range of purposes.

In assisting the process of navigating the information landscape, there seem to be two dominant approaches, one on the demand side and one on the supply side. On the demand side, initiatives on the part of education providers and software manufacturers have been directed towards empowering users and amplifying their capabilities; on the supply side, various steps have been taken principally by information providers but also 'behind the scenes' by agreeing protocols, to organise and structure information so that it can be found more readily. However, before considering how demand and supply may be brought into equilibrium—in other words, how those seeking information and those offering it can find each other—it is necessary to gain some appreciation of both the scale and the structure of the Web.

This chapter therefore begins with a brief overview of how the Web operates, before turning to a consideration of, firstly, how search engines and other mechanisms have been developed and refined to assist information users to locate what they want and, secondly, how information can be 'tagged' and organised to enhance the likelihood of its being discovered as and when required.

7.2 The Internet and the World Wide Web

It is important to recognise that the Internet is not quite the same thing as the World Wide Web. The Internet, the older of the two concepts, traces its origins back to the 1970s, although some have claimed that its true progenitor lies in a series of memos written as early as 1962 by J. C. R. Licklider at MIT in which he put forward the concept of a 'Galactic Network'; an interconnected set of computers through which everyone could quickly access data and programs from any site. The networks of the Internet were themselves established for various purposes at different times, and the protocols that allow them to communicate with each other were developed principally by universities and research institutes. A number of applications run over the Internet, including FTP (File Transfer Protocol), email, Internet Relay Chat (IRC) and indeed the World Wide Web itself.

 As discussed in Chapter One, the Web was essentially the brainchild of one person—Tim Berners-Lee—who in the 1980s was working at the nuclear research facility CERN (Centre Européen de Recherche Nucléaire or European Organisation for Nuclear Research) in Geneva, and who envisaged the possibility of a powerful interlinked web of computers through which individuals and organisations could exchange information with each other in a variety of formats. The fulfilment of this vision necessitated essentially three conditions: first, that computers be able to link to each other (which they can through the Internet); second, that information generated and stored in different formats be able to be easily exchanged (which they can through Hypertext Transfer Protocol or HTTP); and third, that each computer have a unique 'address' and each document a unique identifying code (which they do through Uniform Resource Locators or URLs). The digital revolution has been fuelled by a further attribute of the Web, which is an emergent property rather than a condition of its existence, namely its ability to allow users to communicate with each other both synchronously and asynchronously.

It is impossible to know exactly how large the World Wide Web is, not only because of its continuous growth, but also because a large proportion of it is 'hidden' or 'invisible' and its decentralised structure means that no central authority exists to provide a definitive answer. In October 2001, the Online Computer Library Center (OCLC) estimated that the Web at that time contained some 8.4 million unique sites, compared to 7.1 million in the year 2000 and 4.6 million in 1999 (OCLC, 2001). Each site contains a number of documents—in 2000 it was estimated that there were as many as 550 billion documents altogether—so the process of unearthing particular information sought in an ocean of data, which conceptually involves locating first a site,

then a document, and then some particular information within that document, appears very challenging indeed.

As if the sheer scale of the Web were not problematic enough, the greater proportion of it is 'invisible' to conventional search engines. This does not necessarily mean that its contents are inaccessible, very often the right search engine can rapidly locate and bring to light highly relevant material, but rather that the most commonly used search engines do not scan the full extent of this vast storehouse of material (Sherman and Price, 2001). In a paper entitled 'The Deep Web: Surfacing Hidden Value,' Bergman (2001) notes that the deep or hidden Web is as many as 400 to 550 times larger than the World Wide Web as it is commonly defined. He writes:

- The deep Web contains 7500 terabytes of information compared to nineteen terabytes of information in the surface Web.
- The deep Web contains nearly 550 billion individual documents compared to the one billion of the surface Web.
- More than 200 000 deep websites presently exist.
- Sixty of the largest deep websites collectively contain about 750 terabytes of information—sufficient by themselves to exceed the size of the surface Web forty times.
- On average, deep websites receive fifty per cent greater monthly traffic than surface sites and are more highly linked to than surface sites; however, the typical (median) deep Web site is not well known to the Internet-searching public.
- The deep Web is the largest growing category of new information on the Internet.
- Deep websites tend to be narrower, with deeper content, than conventional surface sites.
- Total quality content of the deep Web is 1000 to 2000 times greater than that of the surface Web.
- Deep Web content is highly relevant to every information need, market, and domain.
- More than half of the deep Web content resides in topic-specific databases.
- Ninety-five per cent of the deep Web is publicly accessible information— not subject to fees or subscriptions.

This is contrasted with the experience of searching (or surfing) the so-called 'surface web' which, Bergman claims, 'can be compared to dragging a net across the surface of the ocean. While a great deal may be caught in the net, there is still a wealth of information that is deep, and therefore, missed. The

reason is simple: Most of the Web's information is buried far down on dynamically generated sites, and standard search engines never find it' (Bergman, 2000, p. 1).

Thus, understanding the scale and structure of the Web is vital to comprehending the challenges confronted in trying to locate resources, which are dealt with in the following section.

7.3 Locating information on the Web

The simplest way to access information online, aside from maintaining all needed resources locally, is to go to a known URL. There are three principal ways in which such an address might be found; first if it has previously been discovered and bookmarked by the user, second if it is recommended or linked to by someone else, and third if it is located by a search engine in its own cache of previously visited sites. However, it is a common experience for the web surfer to enter an address for a document or website, only to receive an error message indicating that the site is no longer accessible. There may be several reasons for such a situation. The first is the simple but common phenomenon of the user mistyping the address, where even a small difference such as a spelling error or an incorrectly placed punctuation mark will render the sought address incorrect. Despite the advances in 'intelligent' software, human error is still alive and well in the digital domain.

A second possibility is where the address is correctly entered, but the site itself has been demounted or moved to another electronic address. The owner of the site might have decided to withdraw the information; the host (such as an Internet Service Provider) might have gone out of business entirely; or a sponsoring organisation might have changed its name or altered its internal structure. Each of these scenarios has different consequences. In the case of the first two, the information (other than any archived or cached copy) is effectively lost and hence unavailable to future searchers. In the case of the third situation, the document or site might still exist but its electronic address would be altered. This latter problem is being attacked in two ways; one is by having a redirection order, much the same as one may advise the postal authorities to forward conventional mail to a new address. However, like a standard redirection order, such an approach will generally work for a limited period of time only, after which any inquiry at the old address is greeted with an 'Error 404—File Not Found' message. The second approach being pursued by information specialists is the concept of a system of Uniform Resource Locators (or URLs), which are persistent and unique identifiers that would be allocated to an Internet document as long as the

intellectual content remains the same. The URL would be embedded in the document itself, irrespective of where it might be hosted in the Internet.

Taken together, the impermanence of digital information, including the unilateral removal of documents and the problems associated with non-enduring locators, poses significant challenges for the future, not only for scientific, commercial, legal and other purposes, but also for learning and research, where there is no guarantee that needed information will continue to be available throughout the duration of a learning project. The issue is particularly acute in the case of public records, but even the removal of privately owned and maintained information is likely to have significant consequences, as we move into a future increasingly dependent on digital resources.

7.4 Gateways, portals and directories

All of the foregoing discussion relates to the situation where an electronic address is already known; however, an equally problematic and familiar scenario is where a user seeks information but is uncertain as to where that information is to be found online, or for that matter whether it even exists. In such a case, two courses of action are common: one is to consult some specialist subject gateway and to follow a series of leads in search of the hoped for information, and the other is to employ a search engine and to pursue a search strategy.

One of the great strengths of Cyberspace is that it is a huge, uncontrolled, essentially democratic environment; a marketplace for ideas (and many other things besides). On the positive side, since there is no overarching authority, it is a self-governing community, in which all sorts of people including experts and novices, providers and users, buyers and sellers, teachers and learners can meet and exchange information in a relatively egalitarian and frictionless way. On the negative side, because the Internet, and more particularly the World Wide Web, is a vast, sprawling and chaotic environment, it is difficult, and sometimes costly, for users, especially inexperienced ones, to locate what they are seeking. This is not to say, however, that there have not been a number of heroic efforts to bring some structure and order to Cyberspace.

Aside from top-level agreements about domain names and some standardisation with respect to both visible and invisible aspects of data storage and presentation, some of the most evident strategies to tame and domesticate webspace revolve around attempts to create portals, gateways, or directories of various kinds. As their names imply, portals and subject

gateways seek to provide a unified entry point for information seekers, suggesting a pathway into and through the labyrinth of information. They also commonly offer various value-adding services such as rating and providing links to various recommended or approved sites. Directories, on the other hand superimpose a hierarchical conceptual structure over the otherwise undifferentiated information landscape.

In common with other kinds of finding aids, there are certain criteria against which portals, gateways or directories may be judged as more or less useful by their intended users. Their currency and comprehensiveness are clearly vital, as is their accessibility and ease of use. Whether or not they provide a logical structuring of and access to the field of interest depends in part on users' expectations and in part on the diversity or complexity of the field itself; in this case those sites that are designed and managed by a human agent as opposed to relying on technological devices are more likely to meet the needs of users. However, an essential precondition for any such portal is that potential users are aware of its existence. Accordingly, there is a titanic struggle for survival amongst various information providers, especially those that are commercially based, to publicise the existence of their services so that those seeking information are more likely to think first of that particular access point to the Web in preference to any other. However, with the rapid and continuing advances in the design and usability of search engines, many information users are more likely to turn for help in the first instance to a search engine than to a subject-specific gateway.

7.5 Search engines and other mechanisms for the discovery of relevant resources

Although there is no statutory requirement for search mechanisms to be developed in tandem with the evolution of the digital environment, in practice there has been a parallel growth in the amount and complexity of information and in the systems, approaches and tools available to access it. Right from the outset, when Berners-Lee first conceived the World Wide Web, researchers, computer engineers and information specialists have been keen to provide ways of coping with its chaotic magnitude. Intriguingly, one of the first such devices was the search engine 'Enquire' developed by Berners-Lee himself.

Since then, there has been a proliferation of developments aimed not so much at mapping Cyberspace, or even parts of it, but at allowing users to locate needed information, or to make contact with other people through newsgroups and the like in the ever-expanding domain of Cyberspace.

Originally, many of these tools and devices started life as university assignments or as hobby projects undertaken by people enthralled with the technology and its potential. More recently, a range of commercially developed tools has appeared, many of them designed to make money through advertising endorsements or through offering various additional features attractive to their intended end-users. There is no central authority to oversee the multitude of search engines, portals, subject gateways and other approaches to the discovery and retrieval of resources, although in the organic way of the digital world, there are now several websites that make it their business to test, monitor and report on developments in the tools intended for general use or in relation to particular fields (see, for instance, www.searchengineguide.com or www.searchenginewatch.com).

Search engines utilise various strategies to continuously trawl the web, and make copies of what they find. When they receive a request, they simply search within their existing cache of previously visited sites for a character string (or sometimes for other clues such as related terms or syntactic structures) and report what they have located. Search engines do not review the entire web in real time, but rely on information that has previously been found and stored, with the result that they can, and often do, report sites that no longer exist or have shifted in the meantime. They also do not usually visit websites that are not in some way linked to other sites (especially those that are located in the 'deep web') with the result that a great deal of potentially valuable information is simply overlooked. Since individual search engines review different 'slices' of the Web, there are also 'meta-search' engines that refer the inquiry to several search engines and then present the combined results to the user. Both individual engines and meta search engines often return many thousands of 'hits' and therefore use some algorithm to sort their findings and present them in the form of a prioritised list. It is important to recognise that some search engines will promote those sites whose owners have paid a fee to be given greater prominence or a higher rating, and, moreover, that previous 'hits' may be one of the criteria used to give a higher rating, with the result that those scoring the highest number of hits might enjoy a multiplier effect since their prominence (not necessarily their relevance) is repeatedly reinforced.

While search engines commonly commence each inquiry with an empty or blank search field, there are other dedicated devices that can be programmed by the user to actively pursue particular topics or which in other ways act proactively on behalf of searchers. Referred to generally as Intelligent Agents, Personal Digital Assistants, 'bots' or 'web-watchers,' such tools can be tasked by the user with a variety of roles such as searching for particular online 'deals' or services, managing emails, organising calendars and meetings or other workflow issues, data mining, and otherwise

'managing manipulating or collating information from many distributed sources' (Bostock, 2002, p. 7). Like search engines, they incessantly patrol the electronic frontier searching for new information on behalf of their users. Such devices employ varying levels of intelligence to 'learn' what the user is interested in, and return not only prioritised but indeed customised lists of websites, newsgroups and other resources.

As indispensable and versatile as search engines and other agents are, as mentioned above, a major drawback is that few of them routinely access the contents of the deep web. Another problem is that many potentially useful resources may be effectively invisible to most search engines because they are in proprietary databases, stored in unconventional or ephemeral forms, or are not linked to other 'visible' websites, which is how most web crawlers would find them in the first place. This raises the question of how pages and websites are made visible to the search engines that might be looking for them.

7.6 Agreed protocols for the storage, tagging and retrieval of digital materials

It is tempting to assume that search engines behave the same way as human research assistants, in that they consult a large number of indexes or finding aids, or that they simply(!) go through millions, perhaps billions, of pages in real time, matching a string of characters (the search terms) with the internal contents of those documents or databases. While this might be true in broad outline, in fact different search engines operate in different ways. Some limit themselves to particular domains, some look only at the first few sentences of a document, some undertake a full text search, but of a limited number of sources, and some examine embedded information that is invisible to the end user but has been placed there by the owner of the information to make it visible to search engines. Most follow links between documents, so that if they detect a URL embedded in the text of a document, they store this information on the (not unreasonable) assumption that its content is somehow linked to the content of the referring page.

Armed with an understanding of these different search algorithms, there are various ways in which those providing information can make it 'visible' or more prominent to both human and automated searchers. One is to proactively nominate it to search engines, most of which have provision for websites to be registered with them. A second is to embed so-called meta-data tags—keywords—invisibly into the architecture of the website. A particularly good example of this is the Picture Australia website referred to earlier, where the ability to find a non text-based resource depends

critically on its having been coded by someone with one or more recognisable keywords. A third technique is by ensuring that the resource in question is, in fact, linked to and referred from, another visible website.

Unfortunately, all such strategies are open to abuse by unscrupulous operators, who may wish to highlight sites, especially those that operate on a pay-per-view basis, even though they might be incomplete, biased or unreliable. Thus the user—such as a self-directed learner—may be presented with incorrect, irrelevant or inappropriate sites for his or her consideration in pursuing an inquiry. Anyone who has surfed the Web is likely to have had the experience of completely irrelevant and uncalled for (and indeed at times quite offensive) sites being returned by a search engine.

7.7 The blurring of supply-side and demand-side approaches

Despite the apparently neat categorisation of discovery tools, the unremitting advances in the online world, combined with the phenomenon of convergence, mean that many of these differences are no longer relevant or apparent to the user. For instance, Bostock writes:

> *Users may be confused as to whether a particular site is a search engine or a directory because it may appear to offer both features. A directory will probably provide the option to browse by category and the option to search. The search feature looks for a match in the list of descriptions for each Web site in the directory. Conversely, a search engine may also offer a directory hierarchy for the user to browse through. The situation gets even more blurred today because some directories now extend their search features by calling upon the capabilities of a third party's search engine...* (Bostock, 2002, p. 3).

Not only is there a convergence in the functionality and design of many devices intended to discover relevant resources, but there are also advances in the degree of precision or granularity with which devices locate and present information for the user. According to Bostock, the key issues now for knowledge management and searching on the Internet are summed up as follows:

> 1. *The volume of information on the Internet is such that it is not feasible to manually search for and retrieve* all *relevant sources of quality knowledge on a given topic*
>
> 2. *Users would probably not have enough time to read all the relevant documents on the Internet*

> *3. This lack of time requires information extraction, to present only the relevant parts of a document.*
>
> *4. Knowledge management systems and search agents are needed to assist with the above*
>
> *5. HTML Web pages contain unstructured data, with no computer understandable 'meaning'* (Bostock, 2002, p. 2).

Bostock goes on to advocate a different method of coding documents (eXtensible Markup Language or XML) which makes it easier for a knowledge management system to identify and retrieve documents relevant to a user's request, then to extract information from the retrieved documents, aggregate content into a single location, and potentially even summarise the main elements of the document or database (p. 5).

When a vision such as this is combined with the possibility that, in the fullness of time, intelligent agents will respond not only to spoken commands but to natural language instructions, we are clearly approaching a much different information and learning context than the one we have at present; one in which the immense capacity of technology is actively harnessed by users in such a way that it amplifies human capacities. However, the ability to locate specific fragments of information may prove to be a mixed blessing, for what it offers in terms of enhanced 'reach' might be at the expense of reduced 'grasp,' especially when it comes to understanding information that is presented without the full context within which it was first developed and presented.

7.8 Conclusion

Alongside the exponential growth in the amount of information available in the digital domain, parallel developments including the increasing ubiquity of computers capable of linking to the Internet, more powerful and intuitive software, and the emergence of search engines and subject gateways have all combined to increase the availability of information. From the foregoing, it is evident that behind the apparent ease with which information users are able to locate needed information lies a complex technical structure, with embedded descriptors, metadata tags, and search algorithms that allow for the discovery and capture of potentially relevant resources.

Up to this point, I have described the processes of seeking and capturing information as if it were a static entity; however, information in the digital world is more elusive and more evanescent than this description may suggest. Not only is the amount of information in the digital domain constantly growing, which makes it difficult to locate, but much of it is constantly

changing. Indeed, much information is dynamically generated at the time of the inquiry and is created specifically in response to a search inquiry. Perhaps more importantly, not all information is held in digital form. As described in Chapter Five, much valued information is not yet in digital form, and thus inquirers need to be able to access and use conventional sources including those maintained by libraries, galleries, record offices and archives.

Perhaps even more importantly, much valued information exists in the heads and in the practices of groups and individuals; a lot of it is tacit and not documented at all. Thus, whatever changes have been wrought by the digital revolution in providing access to rich resources, relatively speaking these pale by comparison with the potential that it offers to facilitate communication and collaboration with other people and the knowledge that they carry around with them. Accordingly this is the focus of the next chapter.

8 Collaboration: Realising the Transformative Potential of Technologies

8.1 Introduction

In 1617, in his book *Prolusiones Academicae*, Strada wrote of a revolutionary new technology that would allow people to communicate even though they were at a distance from each other. He envisaged two identical devices, 'sympathetic needles,' which were to be mounted, each on a separate pivot, in the centre of two dials with the letters of the alphabet around the edge. Turning one of the needles to point to any particular letter would cause its companion likewise to swing in the same direction, so that by selecting a series of letters in succession, words could be spelt out over considerable distances.

> *Hither and thither turn the style and touch the letters, now this one, and now that… Wonderful to relate, the far-distant friend sees the voluble iron tremble without the touch of any person, and run now hither, now thither; he bends over it, and marks the teaching of the rod. When he sees the rod stand still, he, in turn, if he thinks there is anything to be answered, in like manner, by touching the various letters, writes back to his friend* (Strada 1617).

As Standage (1998) points out, there was a germ of truth in this story, because lodestones could indeed be used to magnetise needles and if those needles are placed on pivots close to each other, moving one will cause the other also to move, though not in the same direction and certainly not when they are separated from each other.

Over the centuries it has been one of humanity's most enduring endeavours to communicate with others at a distance. Technologies ranging from beacons to balloons, mirrors to morse codes, smoke signals to semaphores and telegrams to television have been utilised in an attempt to obviate distance and to pass information to people who are out of sight. A great deal of ingenuity and effort have been applied towards the pursuit of robust and reliable techniques that allow for the accurate transmission and receipt of ideas between people who cannot necessarily perceive each other directly. These attempts have been fraught with difficulties. Many of them depend on

very specific atmospheric conditions, or intervisibility or mutual audibility of the sending and receiving points. Most of them require both parties to be in attendance at the same time, and equally most of them involve some compression of the information—whether into dots and dashes, or puffs of smoke, or drum beats, or strings of coloured pennants, or flashes of light—using an agreed system of coded meanings. Many of them preclude the simultaneous sending and receiving of information, so that the sender receives no immediate feedback as to whether or not the intended message is being received and understood.

Within the past century or so, advances in technology have progressively overcome many of these difficulties and shortcomings. The artificiality of telegraphs and telegrams has given way to the greater fluidity first of telex, then facsimile and then email. The uni-directionality of radio and television has been joined by the bi-directional communication provide by telephones, intercoms, CB radio, interactive digital TV and other devices. The single channel of written or spoken words or moving images has been supplanted by interactive multimedia forms, and these in turn have seamlessly blended into mixed modes of communication that incorporate pictures, sounds and text. The limitations on the amount and form of data that may be exchanged have been largely obviated by broadband technologies, and the restriction of being tethered to wires and plugs is becoming a thing of the past with mobile phones and satellite-based data transmission. The expansion of these developments is so ubiquitous, frequent and it sometimes seems, inevitable that it is hard to believe how many significant technological breakthroughs have been crowded into a few short decades.

Of all these many advances and developments, perhaps the most stunning is the shift from bipolar communication technologies which allow for enhanced interactions between pairs of users, to multi-nodal and multi-modal forms, such as audio and videoconferences and chat rooms, which allow many people in different physical locations to participate simultaneously. Such advances form the basis of various kinds of virtual communities, including those that have learning as either a principal focus or at least a significant feature. In this chapter I will explore three different kinds of such online or virtual communities; those that arise more or less spontaneously from within shared interest groups; those that are sponsored and supported by government agencies, professional associations and business enterprises for the benefit of their members, employees or other immediate stakeholders; and, finally, those that are intended to reach a wider audience of clients, customers or community members.

8.2 Existing or emergent networked communities with whom to collaborate

As discussed elsewhere in this study, the World Wide Web has evolved in a mostly unplanned and uncoordinated way; as an open-ended experiment in self-government and information exchange. It is evident from the number and range of websites worldwide that at least one primary driver for this development has been the insatiable demand for information, at least some of which is learning-oriented. Indeed, there is evidence to suggest that such learners have not only accessed but have themselves contributed to the veritable cornucopia of online resources and repositories. But in addition to accessing a wide range of resources, users have needed little incentive to employ these technologies to communicate with others. The exponential growth in the sending and receiving of emails and SMS messages by mobile phone bears testimony to the powerful human need to be in touch with others, but so too does the proliferation of online forums, newsgroups, discussion lists, chatrooms and other technologically mediated social arenas. A further indication of the networking potential of the Internet is provided by the rise of peer-to-peer networking, including the free exchange of software and other digital information such as video and audio files (Brignall, 2002). Indeed, if any one feature exemplifies the democratic, almost anarchic, character of Cyberspace, it is the extent to which and ingenuity with which users have colonised the Internet and utilised it as a domain to locate and interact with like-minded people.

There is probably no topic of human interest that is exempt from the reach of digital technologies. Unfortunately, media attention is often focused on more sensational and less socially acceptable topics such as terrorism, political extremism, pornography, paedophilia, firearms, bombmaking and so on. However, a quick review of the .alt Discussion Lists, of which there are countless thousands, reveals people sharing about everything from archaeology to Zoroastrianism, and from Biblical exegesis to budgerigar breeding. Genealogists are amongst the most active users of the Web, but it is easy to locate groups interested in everything from fantasy games to organic agriculture, Esperanto, environmental studies, the Civil War, interpreting dreams, black and white photography, and a host of other specialised and esoteric interests.

Almost all of these many discussion groups owe their origins to particular enthusiasts, or groups of enthusiasts, who have explored the potential of the Internet to support collaboration and networking. While some of these groups are no doubt idiosyncratic and biased in their membership and views, others are both informative and extremely authoritative; and while some are stilted

and formal in their operation, others have a genuine conviviality and spontaneity about them. In short, they represent in many ways virtual counterparts or equivalents to real communities in which people come together to do the same sorts of things they do in real life, with the same sorts of dimensions of variation. The activities are diverse and include seeking companionship, exchanging information, sharing resources, learning from one another, and pursuing various agendas, such as environmental sustainability or social justice. However, in some ways they go beyond 'real' communities; and they offer hitherto undreamt of potential for ordinary people to disseminate their ideas, and to forge linkages with others, as Rheingold stresses in his book about virtual communities:

> *The technology that makes virtual communities possible has the potential to bring enormous leverage to ordinary citizens at relatively little cost—intellectual leverage, social leverage, commercial leverage, and most important, political leverage. But the technology will not in itself fulfil that potential; this latent technical power must be used intelligently and deliberately by an informed population. More people must learn about that leverage and learn to use it, while we still have the freedom to do so, if it is to live up to its potential. The odds are always good that big power and big money will find a way to control access to virtual communities; big power and big money always found ways to control new communications media when they emerged in the past. The Net is still out of control in fundamental ways, but it might not stay that way for long. What we know and do now is important because it is still possible for people around the world to make sure this new sphere of vital human discourse remains open to the citizens of the planet before the political and economic big boys seize it, censor it, meter it, and sell it back to us* (Rheingold, 1993, Introduction).

As Rheingold points out in this excerpt, 'it is still possible for people around the world to make sure this new sphere of vital human discourse remains open to the citizens of the planet,' and for this to occur, it is important to develop robust approaches to self-regulation in the online world. One of the most widely cited such attempts to deliberately create a self-regulating community is Barlow's 'Declaration of the Independence of Cyberspace,' which begins with the following words:

> *Governments of the Industrial World, you weary giants of flesh and steel, I come from Cyberspace, the new home of Mind. On behalf of the future, I ask you of the past to leave us alone. You are not welcome among us. You have no sovereignty where we gather.*

*We have no elected government, nor are we likely to have one, so I
address you with no greater authority than that with which liberty
itself always speaks. I declare the global social space we are building
to be naturally independent of the tyrannies you seek to impose on us.
You have no moral right to rule us nor do you possess any methods of
enforcement we have true reason to fear.*

*Governments derive their just powers from the consent of the
governed. You have neither solicited nor received ours. We did not
invite you. You do not know us, nor do you know our world.
Cyberspace does not lie within your borders. Do not think that you
can build it, as though it were a public construction project. You
cannot. It is an act of nature and it grows itself through our collective
actions* (Barlow, 1996).

The Declaration goes on in this vein for two pages, basically outlining the self-
governing ambition of Cyberspace's 'Netizens,' emphasising the absence of any
corporeal existence and the fact that Cyberspace spans all worldly jurisdictions,
and articulating some basic precepts to do with the nobility and humanity of
the 'civilization of the Mind in Cyberspace.' Not unexpectedly the Declaration
has been described as 'classic Utopian cant,' and attacked for, amongst other
things, its 'adolescent emotivism,' and its 'historically destructive Rousseauean
model of polity formation' (Jones, 1996). However, it is hard to deny the
authenticity of the sentiments that lie behind the Declaration, or the difficulty—
even impossibility—of extending conventional legal and political frameworks
into the 'world that is both everywhere and nowhere.' Moreover, there is no
doubt that, for some people at least, virtual communities can be truly
empowering, since they obviate distance and are blind to such characteristics
as age, gender, appearance and even educational attainments.

Nevertheless, there are subtle dangers in the virtual world as well. A defining
moment in the history of multi-user online communities came in the early
days of these interchanges, when a virtual community experimenting with
self-government was forced to address the issue of how such a society should
rule itself. This is the celebrated, if extreme, case known as the 'Rape in
Cyberspace' incident, reported in an article by Dibbell in *Village Voice* in
December 1993. In brief, the events took place in a multi-user space,
LambdaMOO, where one of the characters—Mr Bungle—caused some of the
other characters to perform lewd and obnoxious acts on themselves and on
each other. The perpetrator was eventually banished from the virtual space,
but only after a great deal of soul-searching on the part of the participants as
to what their community actually was, who or what should set limits and
monitor standards of behaviour, and whether or not the perpetrator could be
punished in the real world for sexual harassment, when it was carried out on
imaginary figures in a virtual environment.

A core issue in the whole sordid incident was the relationship between the real participants and their alter egos, the characters or avatars who represented them in Cyberspace. Dibbell reproduces an emotionally charged response by one of the users, a woman whose character was named 'exu' in the game space, in which she calls for quite explicit and destructive reprisals against the perpetrator. He writes:

> *Months later, the woman in Seattle would confide to me that as she wrote those words posttraumatic tears were streaming down her face—a real-life fact that should suffice to prove that the words' emotional content was no mere fiction. The precise tenor of that content, however, its mingling of murderous rage and eyeball-rolling annoyance, was a curious amalgam that neither the RL [Real Life] nor the VR [Virtual Reality] facts alone can quite account for. Where virtual reality and its conventions would have us believe that 'exu' and [another character] Moondreamer were brutally raped in their own living room, here was the victim 'exu' scolding Mr. Bungle for a breach of 'civility.'*

> *Where real life, on the other hand, insists the incident was only an episode in a free-form version of Dungeons and Dragons, confined to the realm of the symbolic and at no point threatening any player's life, limb, or material well-being, here now was the player 'exu' issuing aggrieved and heartfelt calls for Mr. Bungle's dismemberment. Ludicrously excessive by RL's lights, woefully understated by VR's, the tone of exu's response made sense only in the buzzing, dissonant gap between them* (Dibbell, 1993).

While most online users will never experience the depths of anguish endured by this particular person, it is nevertheless easy to forget that even in the virtual world one is dealing with real people who have genuine emotions. Virtual communities are more than disembodied entities communicating through flickering cursors, and thus, like all social networks, can lead to exclusion, misunderstandings and the formation of cliques.

8.3 Employers, associations and other groups sponsoring networked communities

If much of the energy and impetus for the creation and development of virtual communities has come from the spontaneous activities of countless thousands of ordinary citizens, a second major element has been the uptake of the same technologies by existing entities wishing to maintain contact with their employees, members, alumni or other communities of interest.

For obvious reasons, many clubs, societies, community agencies and special interest groups have seized on the opportunities afforded by the digital revolution to reach their members, and in fact to extend their membership, by offering the chance to meet and share online. Organisations such as schools, colleges and universities, along with other groups including sporting clubs and even military units, increasingly use websites to facilitate virtual reunions of their former members and alumni. From their point of view, this affords an immediacy, intimacy and interactivity that is usually absent from conventional mail-based systems. Moreover, it allows the target members to meet with each other more regularly and more conveniently than is commonly possible when reunions are sporadic and place-bound.

A similar philosophy lies behind the use of digital technologies by professional associations and other groups which recognise that, especially in an era when workers are geographically dispersed, and where there is commonly a rapid growth or turnover in membership, opportunities need to be provided to allow practitioners to share their insights and understandings. Some of the most innovative uses of virtual communities have been pioneered by professional associations which combine a range of functions: such as allowing for membership renewal or the purchase of various products and services, advising members about relevant developments in their field of interest or in its legislative context, offering opportunities for people to advertise job vacancies or to seek placements, providing various forms of continuing professional development, and of course keeping members in touch with the organisation and with each other.

Perhaps some of the most intriguing applications involve members engaging with each other in professional exchanges—either via email or threaded discussion, or in synchronous arenas such as chat rooms and MOOs.[1] Such groups have in many cases provided their members with specialised software that allows them to communicate with each other, and with dedicated databases that are specifically relevant to their field of practice. A compelling example of this is the Royal College of Physicians and Surgeons of Canada

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1   MOO is an acronym which stands for Multi-user-domain, Object Oriented. A MOO is an imaginary place where users interact with one another for social, educational or professional purposes, using nothing other than language. The 'Multi-user' part of the term means that people from different locations all over the world can meet and talk together in real time (synchronously) via their computers. The 'Object Oriented' part of the term refers to the kind of programming language the MOO uses. Everything in a MOO, including the settings, the characters, the furnishings and other items (such as books or paintings) in those settings, has been created textually by one or other of the players or participants. Players often construct separate rooms or spaces, and put other objects in those rooms. The players can move from room to room and can communicate with other players, both those with them in the room and those in other rooms in the MOO.

(RCPSC) which has developed and provided to its members both hand-held and web-based devices to allow them to keep track of their continuing, clinically-based professional learning. The educational potential of such practices will be discussed later in this study.

It is not only loosely-coupled community and professional associations that have capitalised on the potential for digital collaboration, but enterprises as well. Indeed with many companies now having globally distributed workforces, the potential to unite these 'communities of practice' electronically is manifest. Although different organisations use various terms to describe what is basically the same phenomenon, as Denning and his colleagues point out in a keynote paper prepared for the 2002 Global Summit of Online Knowledge Networks, 'in the new knowledge economy, knowledge sharing is *sine qua non* to survival.' They go on to argue:

> *Traditional hierarchical organisations cannot cope with fast changing client demands unless they are able to agilely share knowledge among employees, partners, and clients. Innovations and the creation of new business lines depend on communal rather than individual knowledge. The knowledge of the community is always larger than the individual's. Capturing what is already known by someone else in the group and adding one's own knowledge is faster and more efficient than an individual reinventing a solution. This requires that organisations develop knowledge sharing culture and processes. In this situation, knowledge sharing is not merely an alternative strategic option: knowledge sharing is required for organisational survival* (Denning, Pommier & Schneier, 2002, p. 19).

The paper goes on to describe the dynamics of such sharing in terms with which many non-commercial groups would probably also identify. After listing some of the synonyms used, especially in the business sector, the authors write:

> *Whatever the name, the formation of professional groupings where people come voluntarily together with others to share similar interests and learn from others' skills has become the common feature of knowledge organisations. Vibrant communities operate in an environment of trust and mutual understanding which encourages learning and candid dialogue. They are safe places where people who do not know can learn from those who do know. Learning and knowledge transfer is accelerated when community members are electronically linked to each other by email or the World Wide Web. Insufficient by itself to create knowledge, information technology is a catalytic tool which gives global reach to community members across*

large distances and time zones. This would have been scarcely possible even ten years ago (Denning, Pommier & Schneier, 2002, p. 19).

Employing organisations, even more than distributed professional and community groups, are able to establish standards of connectivity that explicitly allow for collaboration. Many businesses, therefore, have not only established Intranets to which most if not all of their operating divisions are linked, but have provided standardised software or groupware that assists directly in creating online communities. Commonly such groupware provides a number of features including group scheduling, email facilities, document management, news services, project support, central storage facilities, virtual team rooms, and chat features.

When everyone has the same software, with a high degree of interoperability, it allows for members of the group to share many activities including the joint preparation of documents and participation in virtual meetings. Facilitated collaboration of this kind is increasingly vital to competitiveness and to the full realisation of each organisation's potential in a networked knowledge economy. And for those who are accustomed to operating this way, it is perhaps a short step to embracing others outside the immediate structure of the organisation. It is to these kinds of extended networks that I will turn my attention in the next section.

8.4 Sponsored groups, including those with an educational role

In addition to those collaborative endeavours that have sprung up more or less spontaneously, and those that comprise an extension of existing organisational structures, there is a third kind of online group; namely those that are sponsored for a variety of purposes. The distinguishing characteristic of such clusters is that their membership is open and generally uncontrolled. For instance, broadcasters often offer the opportunity for their listeners or viewers to engage online with their presenters either during or at the end of a program; this is an extension of the time-honoured formula of talk-back radio or phone-in television. Publishers have increasingly provided the opportunity for online engagement with their journalists and authors, and booksellers are allowing scope for readers to contribute reviews of books or even to engage in guided study circles of books they sell. Likewise, providers of entertainment, including films, sporting events and video games who attract loyal bands of adherents and fans, have taken steps to help in creating and supporting online fan clubs and discussion groups.

In the commercial world, too, manufacturers and distributors of various products often use their websites to provide advice and support to their customers, to collect feedback, and sometimes to sponsor user groups which share information about their experiences with the product or service. Banks not only offer online banking, but also provide links to investment information; even health service providers such as hospitals, clinics, pharmaceutical companies or medical appliance manufacturers sometimes afford the chance for those using their product or service or with particular injuries or illnesses to ask questions or to offer and receive assistance through mutual help groups.

Among the best known such applications are cultural institutions including libraries, archives offices, museums and art galleries, which not only provide online tutorials about how to conduct research or how to get the most out of a visit to their repositories, but also offer guest books, feedback forms, online assistance, and even chat rooms where patrons can discuss recent or upcoming exhibits or exchange information about their interests. In short, many of the group-based activities that used to be sponsored, supported, encouraged or facilitated in the real world by those responsible for the manufacture, supply, maintenance and dissemination of various goods, services and experiences now have digital counterparts, and users, customers, members and participants are able to enlarge their circle of contacts, increase their knowledge base, and share their own views and understandings with others in Cyberspace.

8.5 Conclusion

I began this chapter by discussing the dualistic nature of the digital revolution—the 'information' and 'communication' elements that are reflected in the abbreviation ICT—and argued that each element has contributed to the rapid advances that have been made in the creating and handling of information. In an essay called 'New Rules for the New Economy,' Kelly (1997) argues that the radically transformative element, that which has lifted the computer from being just an aid to personal productivity, is the potential it offers to network with other computers and, in particular, with other users. 'The grand irony of our times,' he writes, 'is that the era of the computers is over.' He explains this provocative thesis in the following terms:

> *All the major consequences of standalone computers have already taken place. Computers have speeded up our lives a bit, and that's it. In contrast, all the most promising technologies making their debut now are chiefly due to communication between computers—that is, to*

*connections rather than computations. And since communication
is the basis of culture, fiddling at this level is indeed momentous.*

*And fiddle we do. The technology we first invented to crunch
spreadsheets has been hijacked to connect our isolated selves instead.
Information's critical rearrangement is the widespread, relentless act
of connecting everything to everything else. We are now engaged in a
grand scheme to augment, amplify, enhance, and extend the
relationships between all beings and all objects. That is why the
Network Economy is a big deal* (Kelly, 1997, p. 140).

While there are major efforts to enhance connectivity worldwide, there is little
that governments or other agencies can do to create connected communities
which, after all, tend to arise, develop and flourish more or less
spontaneously. The World Wide Web seems to have grown almost organically,
in response to the opportunities it presents. Indeed, much of the activity and
discussion around the Web—including about online learning—revolves
around attempts to explain, control or capitalise on phenomena that have
evolved unexpectedly and spontaneously. This is the essence of Turner's
'frontier thesis' discussed in the Introduction to Part I.

However, although there may be little need or opportunity for intervention in
creating or disseminating online groups, there are, nevertheless, many ways in
which such networked communities, once established, can support the efforts
of shared interest groups including self-directed learners. Some of these
strategies and initiatives are dealt with in Part III of this study, where I
consider various types of support for online self-directed learners.

Part III Self-directed Learning in the Digital Environment

From Vannevar Bush's 'Associative Trails'…

In 1945, just as the Second World War was drawing to a close, the Director of the US Office of Scientific Research and Development, Vannevar Bush, published a paper entitled 'As We May Think,' in which he speculated about the possible progress of scientific research and in particular about the shape of information management in the post-war era. His paper, which appeared both in *Atlantic Monthly* and in an illustrated form in *Life* magazine, is commonly hailed as one of the most significant pieces of scientific-technical writing of the 20th century, although as Buckland (1992) points out, many of those citing Bush fail to recognise his place in a long historical continuum.

As Bush himself acknowledges, many of the devices and scenarios about which he wrote were little more than an extrapolation of existing technology and current practice; however, one of the more arresting images in the paper is his 'memex' machine. He begins by describing the machine in the following terms:

> *Consider a future device for individual use, which is a sort of mechanised private file and library. It needs a name, and, to coin one at random, 'memex' will do. A memex is a device in which an individual stores all his books, records, and communications, and which is mechanised so that it may be consulted with exceeding speed and flexibility. It is an enlarged intimate supplement to his memory.*

> *It consists of a desk, and while it can presumably be operated from a distance, it is primarily the piece of furniture at which he works. On the top are slanting translucent screens, on which material can be projected for convenient reading. There is a keyboard, and sets of buttons and levers. Otherwise it looks like an ordinary desk.*

> *In one end is the stored material. The matter of bulk is well taken care of by improved microfilm. Only a small part of the interior of the memex is devoted to storage, the rest to mechanism. Yet if the user inserted 5000 pages of material a day it would take him hundreds of years to fill the repository, so he can be profligate and enter material freely.*

> *Most of the memex contents are purchased on microfilm ready for insertion. Books of all sorts, pictures, current periodicals, newspapers,*

are thus obtained and dropped into place. Business correspondence takes the same path. And there is provision for direct entry. On the top of the memex is a transparent platen. On this are placed longhand notes, photographs, memoranda, all sorts of things. When one is in place, the depression of a lever causes it to be photographed onto the next blank space in a section of the memex film, dry photography being employed.

There is, of course, provision for consultation of the record by the usual scheme of indexing. If the user wishes to consult a certain book, he taps its code on the keyboard, and the title page of the book promptly appears before him, projected onto one of his viewing positions. Frequently-used codes are mnemonic, so that he seldom consults his code book; but when he does, a single tap of a key projects it for his use. Moreover, he has supplemental levers. On deflecting one of these levers to the right he runs through the book before him, each page in turn being projected at a speed which just allows a recognising glance at each. If he deflects it further to the right, he steps through the book 10 pages at a time; still further at 100 pages at a time. Deflection to the left gives him the same control backwards.

A special button transfers him immediately to the first page of the index. Any given book of his library can thus be called up and consulted with far greater facility than if it were taken from a shelf. As he has several projection positions, he can leave one item in position while he calls up another. He can add marginal notes and comments, taking advantage of one possible type of dry photography, and it could even be arranged so that he can do this by a stylus scheme, such as is now employed in the teleautograph seen in railroad waiting rooms, just as though he had the physical page before him (Bush 1945a).

While it is interesting to consider, as some historians of technology do, the extent to which Bush based his ideas on the work of other earlier innovators, of particular interest for the present purpose is his description of how the memex might be used by a self-directed learner. First of all, he establishes the concept of linking documents or ideas together:

… associative indexing … is the essential feature of the memex. The process of tying two items together is the important thing. When the user is building a trail, he names it, inserts the name in his code book, and taps it out on his keyboard. Before him are the two items to be joined, projected onto adjacent viewing positions. At the bottom of each there are a number of blank code spaces, and a pointer is set to

indicate one of these on each item. The user taps a single key, and the items are permanently joined…

Thereafter, at any time, when one of these items is in view, the other can be instantly recalled merely by tapping a button below the corresponding code space. Moreover, when numerous items have been thus joined together to form a trail, they can be reviewed in turn, rapidly or slowly, by deflecting a lever like that used for turning the pages of a book. It is exactly as though the physical items had been gathered together from widely separated sources and bound together to form a new book. It is more than this, for any item can be joined into numerous trails (Bush 1945a).

This is a remarkably prescient description of how documents are linked by hypertext in the digital age. Bush goes on to give an example of a real learning project:

The owner of the memex, let us say, is interested in the origin and properties of the bow and arrow. Specifically he is studying why the short Turkish bow was apparently superior to the English long bow in the skirmishes of the Crusades. He has dozens of possibly pertinent books and articles in his memex. First he runs through an encyclopedia, finds an interesting but sketchy article, leaves it projected. Next, in a history, he finds another pertinent item, and ties the two together. Thus he goes, building a trail of many items. Occasionally he inserts a comment of his own, either linking it into the main trail or joining it by a side trail to a particular item. When it becomes evident that the elastic properties of available materials had a great deal to do with the bow, he branches off on a side trail which takes him through textbooks on elasticity and tables of physical constants. He inserts a page of longhand analysis of his own. Thus he builds a trail of his interest through the maze of materials available to him (Bush 1945a).

Bush even gives a glimpse of how a self-directed learner might be able to collaborate with someone else, by sharing his or her resources along with the linkages between them:

And his trails do not fade. Several years later, his talk with a friend turns to the queer ways in which a people resist innovations, even of vital interest. He has an example, in the fact that the outraged Europeans still failed to adopt the Turkish bow. In fact he has a trail on it. A touch brings up the code book. Tapping a few keys projects the head of the trail. A lever runs through it at will, stopping at interesting items, going off on side excursions. It is an interesting trail, pertinent to the discussion. So he sets a reproducer in action, photographs the

> *whole trail out, and passes it to his friend for insertion in his own memex, there to be linked into the more general trail* (Bush 1945a).

While one might lament the fact that both the learners in this case seem to be male, and argue (in common with Buckland) that this kind of associative trail is rather too individualistic and too idiosyncratic to be of much use to other researchers or learners, nevertheless Bush's evocation of an independent learning project using a variety of resources, combined with his conception of creating a series of hypertext links and subsequently sharing the results with others, captures perfectly many of the features of online learning.

Indeed, Bush even acknowledges the potential contribution that the self-directed learner may make to those who come afterwards. He paints a picture in which the associative trails blazed by someone become a starting point for the inquiries of others; in the process foreshadowing the concepts both of CD-ROMs and of websites:

> *Wholly new forms of encyclopedias will appear, ready made with a mesh of associative trails running through them, ready to be dropped into the memex and there amplified. The lawyer has at his touch the associated opinions and decisions of his whole experience, and of the experience of friends and authorities. The patent attorney has on call the millions of issued patents, with familiar trails to every point of his client's interest. The physician, puzzled by a patient's reactions, strikes the trail established in studying an earlier similar case, and runs rapidly through analogous case histories, with side references to the classics for the pertinent anatomy and histology. The chemist, struggling with the synthesis of an organic compound, has all the chemical literature before him in his laboratory, with trails following the analogies of compounds, and side trails to their physical and chemical behaviour.*

> *The historian, with a vast chronological account of a people, parallels it with a skip trail which stops only on the salient items, and can follow at any time contemporary trails which lead him all over civilization at a particular epoch. There is a new profession of trail blazers, those who find delight in the task of establishing useful trails through the enormous mass of the common record. The inheritance from the master becomes, not only his additions to the world's record, but for his disciples the entire scaffolding by which they were erected* (Bush, 1945a).

…towards a model of online learning

In Part II, I explored a number of the contextual issues that need to be dealt with before people can engage in the digital domain for any purpose, although clearly my principal focus is on learning. I have identified six clusters of issues—Connectivity; Competence; Content; Credibility and Confidentiality; Capturing information and Collaboration—and have argued that collectively these represent the elements of a multi-faceted image of the 'digital divide.' In other words, these threshold conditions must be in place before people can cross the threshold to engage in the digital domain for learning. I have also proposed that where they are not, it will require some unusual and indeed extraordinary partnerships in order to realise the broad vision of a connected community.

The purpose of this Part is to focus on the next level of specificity, that is to deal with the considerations that specifically affect learning online. If learning comprised only the acquisition of information, then ensuring its availability, or at least dismantling the barriers to its availability, would be significantly achieved by the shift toward online provision. There is undoubtedly an unprecedented amount of information available in the digital domain and, while some obstacles to its access and use have yet to be overcome, in principle at least we are on the threshold of a new dispensation with regard to learning.

In this Part, I will explore a range of ways in which digital technologies may be used to support self-directed learners and, in particular, to support various configurations of learning conversations. I begin from the proposition that online learning entails considerably more than simply accessing and 'acquiring' information, irrespective of how comprehensive, elegant, current, reliable or valuable that information might be. As I have argued throughout this study, although principally in Chapter Thirteen on 'Reconceptualising,' learning is essentially a constructive process in which the learner comes to view some part of his or her world in a new way. It involves a conversational interaction; with another person, with someone else's published ideas, or even with one's own existing understandings. One of the great strengths of digital technologies is their capacity to put learners in contact with plentiful resources, and with other people, thereby enabling them to reflect on their own understandings in a rich conversational framework.

Moreover, I believe that the process of learning, far from being unidirectional and linear is instead cyclical and recursive, seamlessly doubling back to earlier insights before again moving forward; it is probably best to consider it as a complexly linked ecology. Nevertheless, for analytical and explanatory purposes, I have developed and articulated a six-part model of online learning: engaging with the learning project, locating information sources or

assistance, evaluating sources and resources, assimilating information and insights, reconceptualising understandings, and finally networking and contributing to the community of learners. In this Part, I devote one chapter to each of these elements as a way of framing an exploration of the processes of online learning.

However, as discussed in Chapter Two, there are many different types and levels of self-directed learners, with a variety of motives and learning approaches, and each category will have different requirements in terms of support. Accordingly before considering the support that may be afforded to learners at each stage or phase of their engagement, in Chapter Nine I will consider some broad categories of learners, before turning to a consideration of the generic considerations that are likely to influence their different levels and types of engagement in self-directed learning online.

9 Engaging with Learning in the Digital Environment

Whether we like it or not computers are beginning to assume an increasingly important role in our society. No longer a novelty, the computer is quickly intruding into both the vocational and social lives of many adults who, as a result, feel increasingly urged to gain information technology (IT) skills. However… it has become apparent that there are many individuals who, for various reasons, feel averse to using computers and are resisting the changes that IT presents in their lives. Nevertheless there is a growing need for the IT 'reticent' (Turkle, 1988) to overcome this avoidance of using computers. In many areas of life it is in fact becoming no longer acceptable to be 'computer shy' (Selwyn, 1997, pp. 395–6).

9.1 Introduction

Learning is as old as humankind; indeed curiosity and the capacity to learn are among the defining characteristics of what it means to be human. Most of this is incidental and unplanned, occurring continuously and unbidden in the context of the full range of life's activities: to live is to learn. Against this backdrop, there is that kind of learning which occurs within formal settings, in schools, colleges, universities and training centres. It is intentional, planned and organised, with someone—a teacher, trainer, lecturer, professor or facilitator—taking responsibility for organising certain aspects of the instructional organisation, and the learner making a deliberate decision to participate.

Between formal education on the one hand and informal learning on the other is a huge domain of *non-formal* learning. It is orderly and structured, but does not lead to the award of any certificate or diploma. It occurs in a diverse range of settings—in the workplace and the community, in clubs and societies, in libraries and museums—much of it being planned by the learner, who judges its value against his or her personal goals and objectives.

Given the increasing ubiquity of information and communication technologies for all sorts of purposes, it might be expected that an increasing proportion of all three types of learning—formal, nonformal and informal—will occur online. In many cases this is because it is the easiest and most convenient way to locate information or to solve a problem; in other cases it may be the

only way to do so. Indeed, increasingly, it may be expected to be habitual, as it simply becomes second nature as part of our cultural landscape.

In many situations, however, the adult learner is confronted with a range of alternative ways in which he or she might answer a question, solve a problem or learn something new. One possibility might be to enroll in a course of study, although this is far from inconsequential in terms of time, effort and money. Other choices include informally consulting someone else—either face-to-face or on the phone—accessing a library or other information repository, purchasing a book or CD-ROM, joining a society or group with shared interests, or, and this is happening more often, accessing the Internet.

It is not simply as Information and Communication Technologies have become more ubiquitous, nor even as they have blended into the background, as Bruce puts it, 'disappeared' and people have become more comfortable with them, that it might be assumed that this latter choice will be increasingly commonplace. Certainly for many young people, and for those who have already seamlessly incorporated ICT into their daily lives, the choice may be relatively straightforward. But for many others, including older people who have not grown up with or do not feel completely at home with technology, the decision to go online to learn may not come naturally. Indeed, for a variety of reasons it may represent an unlikely or even an impossible choice.

In the previous Part of this study, I discussed the various conditions and circumstances that need to be in place before it is possible to engage with digital technologies for any purpose. However, it is clear that the simple fact that certain technologies exist and are available does not mean that they will necessarily be used. In the Introduction to Part I, I invoked Rogers' theory of the diffusion of innovation; while the same context might exist for everyone, the opportunities will be taken up differently. To take electronic commerce as a case in point, even within a single industry or given geographic location, some businesses will adopt e-commerce and others will not.

In this Part, my focus is on the issues and considerations that specifically affect the decision to learn or, in the case of a commitment already made, to persist with learning online. It is to be expected that such a decision would be a complex amalgam involving the learner's interests and motives, the topic of his or her inquiry, the social context in which he or she lives and works and, above all, his or her basic stance—both conscious and subconscious— towards technologies and beliefs about their appropriateness in general terms and in relation to this particular situation. Just as there are many types of learners in the offline world, there is as much variety when the learning takes place in the digital world. Therefore, it is necessary to acknowledge the diverse range of motives that impel adult learners, before moving to a

consideration of the issues that might affect their decision about whether or not to engage in learning using technologies.

9.2 Towards a typology of self-directed learners

Back in Chapter Two, I referred to Houle's pioneering work in articulating a typology of adult self-directed learners. Houle proposed that there are really three different categories of learners: those who are pragmatically **Goal Oriented**, who have in mind a very specific learning outcome, and usually desist as soon as their objective is reached; those who are **Activity Oriented** and whose participation is related to some purpose other than the ostensible objective of the activity (such as a social purpose or simply to obtain a formal qualification); and those who are **Learning Oriented** and who simply enjoy it, and see learning as good in and of itself.

In the decades since he first offered this typology, a great deal of theoretical work has been done on researching people's motivations both for self-directed learning and for participation in formally organised classes, courses and programs. Although a number of alternative classificatory schemes have been advanced, this is still a relatively useful way of thinking about why people engage in learning, especially when it is recognised, as Houle himself did, that any one person's motives for participation might be a combination of the above, or that his or her motives might differ from one learning domain to the next.

Of course Houle's framework was ventured many decades before the advent of the digital age, and it is therefore appropriate to ask whether or not the widespread availability and uptake of electronic technologies has fundamentally altered motivations for learning. In other words, is this model still relevant? A case might be made that digital technologies are having an effect on *how* people learn, both because of the amount of information now available and the relative ease with which learners can collaborate, and because of the ways in which such technologies engage with people's conceptual frameworks (see particularly Chapter Thirteen); however, there is less convincing evidence that they have brought about any significant shift in *why* they do so.

There are two ways to apply Houle's typology. The first is that different types of learners might approach learning *about* technologies (in other words, their ICT literacy) in different ways, and the second is that different types of learners might expect the technologies to *support* their learning efforts in different ways.

In relation to the first approach, a Goal Oriented learner might be expected to be very instrumental and narrowly-focused in his or her acquisition of technological skills. He or she might learn only enough about any given software package or application to enable the fulfilment of some other specific learning goal. An Activity Oriented learner, on the other hand, might view learning about technologies as an opportunity to meet other people or as a chance to acquire a certificate of completion, but without any other learning goal or objective in mind. Lastly, a Learning Oriented person might well enjoy the challenge of exploring every aspect and function of each program or software package, and develop a high level of technological fluency because he or she finds it intellectually challenging and rewarding to do so.

However, learning about technologies themselves is only part of the story, and if Houle's model does have its analog in Cyberspace, then it is plausible that each kind of learner might have different expectations about how the technology will support his or her learning objectives generally. The Goal Oriented learner, for instance, would utilise technology only to the extent that it allowed him or her to rapidly locate needed information or solve some learning problem or inquiry. Since the purpose is to achieve a specific outcome (such as to locate information about a particular phenomenon, date, location, formula, event etc.) then any aid to that end would be welcomed.

The Activity Oriented learner, as already discussed, might engage in learning for a number of purposes, including as an antidote to isolation or loneliness or in order to obtain social recognition or esteem. Such a learner would probably value the interactive features of technologies, either to meet people online, to gain a sense of importance or indispensability or perhaps to demonstrate his or her erudition or capacity to help others.

In the case of the Learning Oriented person, the online domain is probably a godsend. In the pre-digital world, this kind of learner was reasonably recognisable. In relation to the topic of interest, typically he or she would be widely read, would watch or listen to documentaries and educational broadcasts on radio and television, would be likely to belong to groups with similar interests, would probably attend conferences and meetings that pertain to the area of interest, and may well also collect books and other paraphernalia relating to his or her passion. In the online world, digital technologies potentially expand his or her universe and place an abundance of information at his or her fingertips. As previously mentioned, such a learner would not only want to learn a great deal about the capabilities and limitations of the technology, but would use it in creative and adventurous ways to learn about the world, to follow up matters of interest and to make contact with people who share the same interests and passions.

There are two specific points to be highlighted in this framework. The first is the diverse range of interests and capacities that self-directed learners (or for that matter, any learners) are likely to bring to bear in learning about technologies. The second is that any attempt to support self-directed learners—whether in the design and use of the technology or in the human contacts to which it gives access—needs to recognise the complex pattern of motivations that underlie individuals' engagement in learning in the first place.

Of course, Houle's model is not the only one that has been advanced in relation to adult learning and information seeking. To the contrary, many other researchers have proposed different ways of understanding how and why adults engage in learning. For instance, in the late 1980s, Palmer undertook a study of biochemists, entomologists and statisticians working in agricultural research, to examine the ways in which personality, field of study, and organisational structure interacted in relation to information-seeking behaviour. In 1991, the results of this study were published under the title 'Scientists and information—II: Personal factors in information behaviour.' The following five-part model was proposed:

The first group comprised the **non-seekers** who, at least at the time of the study, were not interested in pursuing new information or learning. Whilst this category might seem somewhat far-fetched, if not irrelevant, one of the features of the digital environment is the increasingly common use of various marketing strategies and techniques to attract the attention and pique the interest of anyone logging on, including those who have not yet engaged in or seen the necessity for new learning. This is an interesting example of the use of 'push' technologies, the blending of marketing and learning, in ways that have really only become possible in the online world. I will return to this theme later in this chapter.

The second group were referred to as the **lone, wide rangers**. By this Palmer (1991) meant those who like to work alone, who seek information broadly and, because of their long experience in the field, tend to have a wide range of personal contacts when seeking information. It is not difficult to envisage how such information users might utilise digital technologies, particularly discussion lists and the like, as an extension of their preferred information collection strategies.

The third group Palmer dubbed the **unsettled, self-conscious seekers**. Such people were commonly new to the field, tended to visit the library quite often, and commonly sought help from other colleagues because of their lack of security both about their role and about how best to locate needed information. Generally, such people were responding to an imposed assignment, rather than an inquiry of their own making. It is possible that such people would view the Web as a huge virtual library, and would

accordingly value devices and applications that might assist in locating information in such an environment.

The fourth group were identified as **confident collectors**, who tended not to put a lot of overt effort and energy into their inquiries, but rather kept an eye out for new relevant information. Their confidence came through because they had commonly been in the field a long time and could easily pick up any new information or recent developments without a great deal of exertion. This kind of learner might value applications such as web watchers or personal digital assistants (PDAs) which, like themselves, constantly survey the field looking for new developments.

Palmer also identified a fifth group, referred to as **hunters**. In this case, they happened to come from biochemistry, but their distinguishing features were that they worked in a rapidly-changing field and that they had developed their own entrenched methods of scanning for new information, such as daily visits to the library. They were also distinguished by their range of professional contacts, both at home and abroad. Once again, the digital world could prove a fertile field for their information gathering approaches, with respect both to online resources and to networks of professional colleagues.

Palmer's work, like Houle's, also predated the emergence of the World Wide Web. However, it is not difficult to see how one's interests, level of expertise and even personality might combine in distinctive ways to affect how one chooses to use technology to seek information or to engage with others, and accordingly what kinds of functionality might be valued in the technology.

A more recent typology of information seekers and learners, which is emphatically located within the digital environment, is that offered by Lonsdale in her major survey and review of *Online Knowledge Networks* and of the gateways or portals available to access them (Lonsdale, 2002). In the introductory essay to that review, Lonsdale posits an elegantly simple typology that comprises four categories of information users.

The **searcher** has a **task-specific** approach, for example, to find a job, lesson plan, look up a word, locate something (such as an organisation, service, course). This kind of activity is functional and focused and involves a targeted search rather than browsing. Users in this category log on to the gateway and want to gain a relatively quick response to their query. They are on a seek-and-find mission and are not interested at this particular time in tasting what else the site may offer.

The **explorer** has a more **general** goal in mind, for example, to research a topic or subject, such as Renaissance history or the Samurai in Japan; to find out what professional development opportunities exist for a school principal; to find out what issues are currently occupying vocational education and

training researchers globally. In this kind of activity the user knows roughly what he or she is looking for but is open to suggestions that may be outside the original parameters of the search, and is prepared to explore the pathways offered by different links. Such a learner would expect any subject gateway to be a useful resource, but perhaps an uncertain repository in terms of what it might yield.

The **self-improver** is committed to **self-learning** as an objective, for example, to improve skills or expand knowledge, such as participating in an online tutorial about web page creation; to improve skills related to interviewing, résumé writing or job searching; or to find out about the kind of curriculum that is taught in a given country or at a given grade level. This kind of activity can be work related, study related or simply undertaken for personal enrichment.

The last category, the **participator**, has an essentially **social** purpose in mind, for example, to participate in some form of online community or to exchange ideas and views. Such engagement may also be either for work-related or non-work-related purposes (Lonsdale, 2002, p. 32).

Several points may be made about Lonsdale's typology. The first is that, unlike Palmer, she does not explicitly include the 'non-seeker,' yet it is evident from the rest of her report that she is acutely aware that informational gateways, which after all are the main focus of her study, can be a means of attracting the interest of casual browsers. Second, there is her inclusion of a new category: the participator; which is reminiscent of Houle's 'activity oriented' learners. Third, there is her explicit recognition both that websites may simultaneously have to meet quite different needs, and that learners' purposes do not remain fixed. She writes:

> *In practice it can sometimes be difficult to determine whether a site is catering for the needs of a seeker rather than a browser because both types of users may find a site map helpful even though their purposes in using it may be quite different. Again, it could be expected that some categories of users may change their intention once they have logged on to a site and become aware of the full range of services offered* (Lonsdale, 2002, p. 32).

This then leads Lonsdale to address the fact that a site must be sufficiently versatile to simultaneously meet a range of diverse needs. For instance, 'a gateway/portal is said to meet the needs of the **task-specific searcher** if it provides a search facility. The more refined the facility the more likely it is to meet the needs of this category of user…'

On the other hand, Lonsdale writes, 'A gateway/portal can be said to cater for the needs of the **task-general explorer** if it provides opportunities for browsing. Sometimes a browse box may be supplied but more commonly this

need is met by providing a list of subjects or table of contents or a site map so that the range of options and links is clear.'

Both these categories refer to reasonably straightforward information seeking: the preferred method of what Houle referred to as the 'goal oriented' inquirer. What of the person who has much wider ambitions, or who develops a broader interest in learning as a result of his or her online experience or some other stimulus? 'The needs of the **self-improver** are catered for,' Lonsdale writes, 'when the gateway/portal provides opportunities for self-paced/self-directed learning or links to courses.' She offers examples of several websites which explicitly aim to link would-be learners with various learning resources or opportunities, although her examples tend to be drawn from the world of formal education and training. 'Learn.com,' for example, specialises in providing user-initiated content, offering an eclectic range of online learning opportunities for the user to follow up.

Finally, there are the needs of the social learner, the **participator**, which as Lonsdale states 'are generally met through the provision of such interactive opportunities as joining a forum discussion, linking up with peers in their field of expertise, or taking part in a virtual interview' (Lonsdale, 2002, pp. 32–33).

9.3 Engaging with learning

If categories of learners such as the above provide one useful way of thinking about engagement in learning, another is the nature of the learning endeavour itself. Over the years, many different typologies have been suggested; essentially they resolve themselves into those that are responding to extrinsic requirements (such as to obtain or retain a job or to meet some external expectation), or alternatively those that are based on an intrinsic motive such as to fulfil some personal interest, ambition or self-expectation. Both of these are as relevant and applicable in the online environment as they are in the face-to-face context. But neither adequately addresses why a particular learner might undertake a given learning project online. To understand that, it is necessary to explore the learner's individual situation, personal purposes, experiences and understandings. A great deal of the literature pertaining to online learning examines the issue from the provider's point of view; not unexpectedly, those who place information into the digital environment, and those who develop and maintain search engines, stress the quality, range and accessibility of the information or communication potential so provided. However, learners or would-be learners often have a different perspective, commonly reflective of their own previous experiences.

A good example of learners' perceptions may be found in the field of online language learning. Advocates point out that there are many strengths and advantages to using technologies for language learning; they are flexible, permit repeated practice at one's own pace and allowing for individual strengths and weaknesses, provide access to authentic cultural and language resources and experiences, and are often fun to use. However, as many learners recognise, on the whole they provide only limited opportunities for authentic speaking practice, which is central to most people's reasons for wishing to learn another language. Accordingly, potential learners are right to be wary about relying too heavily on these technologies when attempting to learn another language; indeed, as Felix points out; 'it takes a very special person to learn and, especially, to speak, a language without face-to-face communication' (Felix, 2001, p. 8).

While this is an example where there is a good justification for learners' perceptions and preferences, such opinions are not always correct and perceptions may be incorrect in one of several ways. People may considerably under- or over-estimate either the quality or quantity of information available in the digital domain; they may misjudge their capacity to navigate in a new or unfamiliar field; or they may be mistaken about the technical difficulties they will encounter or the level of support available to assist them in pursuing a learning project online. Since at least some of these dimensions are personal rather than objective, there is probably no substitute for the learner's experience, certainly the self-directed learner, lighting out on a new and uncharted endeavour, may experience greater delights or more alarming terrors than they anticipate.

9.4 Features of the online environment

In the sections that follow, six particular qualities or characteristics that are often claimed about the digital world are examined: that it is **convenient**; that it is **anonymous**; that it is **neutral** and non-judgmental; that it is **comprehensive** in its coverage; that it is **versatile** and adapts to a variety of learning style preferences; and, finally, that it is an **enjoyable** way of learning. Each of these six claims is evaluated as part of establishing a model that might help in understanding how and why learners engage in learning in the digital environment.

Availability

One of the most common, and indeed most incontrovertible, claims made about Information and Communication Technologies for adult learning is that

they are increasingly accessible, being both widespread and available 24 hours a day, seven days a week (now abbreviated in the inimitable argot of the net-savvy to 24/7). Of course, the printed book, once it was small enough to be carried and cheap enough to be mass-produced, was also available 24/7, and was likewise extremely convenient and versatile as a mechanism for adult learning. But the Web has advantages over the book, including being searchable and not having to use it within a library, withdraw it from a library (especially one with limited opening hours), or wait for it to come from a distant bookshop or repository on interlibrary loan.

Thus, for adult learners pursuing busy lifestyles, the fact that information is potentially available wherever and whenever they want it is a major attraction. In this context, ICT is most assuredly a convenient adjunct to self-directed learning, especially those forms that are dependent on access to resource databases or which involve asynchronous communication. However, as I discussed in Chapter Three, unless and until there is widespread connectivity the availability of information is only one part of the story. It is easy for those who work with technology all day long—whether in business and industry, government, education, libraries, museums or other professional settings—to assume that access to technology is as ready for users as it is for them. However, it is apparent that many people have only limited and conditional access to the technologies that they require.

Assuming, however, that in the fullness of time digital technologies will be as ubiquitous as, say, telephones are today, there is still a problem that most digital applications, especially those that involve more than the spoken word, currently rely on technologies which, like mediaeval chained libraries, are place-bound. There are two alternative approaches to solving this problem; one is through the use of wireless technologies, whereby freestanding and portable devices are able to send and receive information independently. It is increasingly common to see people with small handheld devices, often about the same size as a mobile telephone or an organiser, accessing email and even websites while sitting in meetings, travelling on public transport, or working from home. The alternative approach, in the case of those devices that are still 'tethered,' is the use of some kind of 'smart' card, duly encoded, which gives the user access to his or her information and communication resources anywhere in the world. As Dickinson and Stewart write; 'At the moment for many people their access utility is in a fixed place and may be controlled by someone else—most likely their employer. However if the access utility were on a smart card in their own possession they would be able to realign it as they felt the need to in line with their circumstances' (Dickinson & Stewart, 2001, p. 203).

No doubt as technologies become more widely available, issues of access will recede. But there is still the unpredictability and open-endedness of many learning projects, which commonly take unexpected twists and turns. Few people can anticipate accurately how long they will need to devote to learning in an entirely new field, and the Web environment can prove even more challenging, as Collis and Meeuwsen (1999) point out;

> *How much time will be taken up by unforeseen technical problems and deviations? How much more time will be needed for searching the WWW, maintaining bookmarks, printing, file management tasks, and recovering lost files? How much time will be needed for properly linking files and images via relative and external paths? To converting figures and formatting to forms appropriate to WWW publishing? And on top of this, as the [learner] gains more opportunities to interact with others via Web-based environments, planning and maintaining tempo become increasingly complex, in that he or she becomes dependent on the planning and tempo-maintaining skills of others, often with very different contexts for their contribution to a common task* (Collis & Meeuwsen, 1999, p. 30).

One of the greatest inconveniences for the online learner is the issue of intermittent or unreliable connections. It is extremely frustrating and annoying if a connection keeps dropping out during a session. Obviously this can be particularly disruptive in the midst of a 'live' chat session, but it can also be disconcerting if attempts to send emails are constantly thwarted, or if downloading needed documents or websites cannot be completed in a straightforward way. Whilst there may be little that can be done if technology keeps dropping out during an interactive exchange, an increasingly common solution is the integrated use of CD-ROMs with relevant websites, which offers the best of both worlds—keeping download times to a minimum, allowing high fidelity graphics and sounds, yet also permitting interaction with experts and other learners, as well as with rich but volatile digital resources.

In summary, while digital technologies promise much in the way of convenience, there is still a long way to go before they will be seamlessly and invisibly woven into our learning efforts. In part this is because of differential access to technologies themselves, in part because of different levels of technical proficiency of users, and in part because of inherent limitations such as the deep web or how information is stored in accessing needed information. Nevertheless, there seems to be considerable evidence that digital technologies will become increasingly indispensable in the armamentarium of the self-directed adult learner.

Anonymity

Convenience is one aspect of online learning; confidence in one's identity being protected online is entirely different. In Chapter Six, I discussed the importance of users being assured of a suitable level of anonymity. On the one hand, it appears that people are more willing to seek information about, for instance alcoholism or cancer (or even the progress of unsuccessful sports teams!) in the world of 'bits' than of 'atoms,' although this has its downside since they likewise seem more willing to engage in activities like online gambling and accessing pornographic sites, when they feel that there is no social stigma attached. Thus, the willingness of people to do research into various 'taboo' topics, combined with the asynchronous nature of some Internet based communications might open up the potential for learning on the part of people who would otherwise be unable or unwilling to do so if they had to turn up to class, use a library or make a telephone call.

These examples relate to informational sites; what about the use of computers when there are live human beings on the other end? Once again, there is confirmation that people will be more adventurous or 'disinhibited' in their learning than they have been in 'real life.' There is for example considerable evidence to show that impersonating others through the use of 'avatars' or aliases (including gender swapping) is relatively more prevalent in Cyberspace. As Jazwinski puts it, 'When physical appearance and social context cues are missing, gender, age, disability and formal social status are harder to determine. Therefore these variables should have less influence. In Cyberspace, people can experiment with new, creative and more egalitarian ways of relating to one another' (Jazwinski, 2001, pp. 173–174). The negative side to this disinhibition, however, is 'flaming' (excessive and potentially hurtful remarks, critical and inflammatory comments, etc) which, notwithstanding the decline in civility generally, is likewise more common online than face-to-face.

Even without turning to the extremes of people who experiment with different personas, or deliberatively present themselves as someone other than their 'real' identity, research conducted by providers of online courses confirms that the digital world seems to change, perhaps even reverse, conventional patterns of social interaction. Noisier or more flamboyant participants can be more subdued when everything is written down and they do not have an audience; conversely quieter and shyer participants can actually shine when they have the freedom to contribute in a more measured, asynchronous way. As Harasim et al. (1995) point out, computer mediated communication provides a whole array of electronic bridges that enable students to bypass some of the conventional blocks on participation; no powers of public oratory, interruption, or loquaciousness are necessary,

rapid exits from unpleasant or threatening encounters are viable, and no physical presence is required (Grint, 1989).

Yet, despite these potential protections for the shy or uncertain learner, many are still afraid or unwilling to engage with the technology. For obvious reasons, those who are inexperienced, or feel that they are likely to make a fool of themselves in front of other users may be hesitant to engage, especially in those forums that involve communication with others;

> *Communication anxiety is a common experience for first-time users. It is, however, a fear of not communicating rather than a fear of communicating… This is especially true for asynchronous environments where typically there is no immediate response to entries. Anxiety associated with whether their message was sent properly and arrived successfully is common among novices. A related source of anxiety is whether the message was somehow foolish or inappropriate and thus not worthy of a reply* (Harasim et al., 1995, p. 221).

Perhaps counterintuitively, it is not always the inexperienced or maladroit user who becomes tongue-tied when it comes to deciding how to present him- or herself in Cyberspace. In engaging interactively in a learning community, Mann (herself an academic and experienced computer user) writes:

> *Contrary to my expectation that working online would allow far greater freedom of self-presentation, the paradox emerged for me of being more self-conscious online than face to face. There is a record of everything one says. One becomes visibly inscribed in the text. I was conscious of asking myself: How much do I disclose? How anonymous do I remain? My introduction of myself to the group shows how, in dropping the 'I', I seem to be expressing a certain shyness or diffidence about asserting my identity in the group. … I am conscious of the idea of visibility and invisibility. All I have here are words on a screen and a sense of a void out there with unknown respondents. I have a strong feeling that I don't know who is out there. There is no instant 'feedback' and no capacity for instant re-adjustment of one's self in relation to others. … I am learning a new means of communication and I lose my day-to-day fluency* (Mann, 2002, p. 71).

Those interested in the dynamics of learning groups have long recognised that most new members of a group are concerned about they come across to others. As Mann comments; 'This to me was exaggerated online rather than mitigated' (Mann, 2002, p. 72). Thus not only is anonymity a mixed blessing with respect to online learning, it is also a feature which exercises every

online participant, from the least to the most experienced. I will address these dynamics at greater length in Chapter Fourteen on Networking.

Neutrality

In the same way that some users report feeling at ease with Information and Communication Technology because it is perceived as providing anonymity, some regard the technology as good for learning because it is 'unbiased' and 'fair.' Citing work by Hess and Tenezakis (1973) Clark (1983) claims that many learners regard the technology as even-handed and fair (especially in an instructional situation); in the view of some, computers respond to inquiries with precision rather than emotion. Similarly, users also report feelings of comfort in engaging with technology because of its inexhaustible patience; 'they can review and reread what has taken place as often as needed for understanding and retention. They can take as long as is needed to reflect on what they are reading and decide what questions to ask or comments to contribute to the discussion…' (Harasim et al., 1995, p. 194).

However, for each person who values this objectivity and lack of judgmentalism, there are others who find the experience alienating and dehumanising. Many learners prefer the warmth of interaction, the gentle correction of a human teacher who detects and responds to their confusion or uncertainty, the subtle redirection of a misdirected or poorly formulated inquiry into something that is more likely to result in a productive learning outcome. Yet even when there is another person responding to an inquiry or comment, some users find the transaction stilted and unauthentic. Partly this is because, as Mann points out, the rules governing writing online are not yet fully developed; 'One can argue that language used in networked learning involves a combination of speech utterance, letter-writing and formal written text. It might also have something of the nature of classroom discourse about it. It is clear however that like all communicative events it is a social and linguistic practice' (Mann, 2002, p. 73).

It is important to note that these seemingly incompatible comments can simultaneously be true (they are after all subjective responses), and that the acceptability of ICT as a medium for learning depends partly on the topic or subject to be learned, and partly on the expectations of the learner him or herself. With respect to the context-dependent nature of the decision, a learner might be perfectly happy with a dispassionate and objective response when seeking a dictionary definition, a weather forecast or an answer to a telephone directory inquiry, but be less than enchanted with the same quality if he or she were struggling with some complex issue, an existential dilemma or a topic where a range of perspectives was possible.

The issue of perceived neutrality extends beyond the technology to include the mechanisms used to gain access to information (search engines and portals), the information itself, and the links between items of information (hypertext links and pointers). The issues pertaining to search engines and portals are dealt with in Chapter Ten, on Locating Information, and those relating to the information itself are discussed in Chapter Eleven where I deal with Evaluating Sources and Resources. However the matters raised by hypertext linking are examined below. There are a number of differences between the Web environment and conventional instructional settings. In the case of learning from a textbook, for instance:

> *...the web represents a tremendous educational resource for students, especially because of its potential for self-directed and active learning. A reader may choose his or her own path through web documents, reaching beyond the confines of the narrow narrative path that traditional text must follow. With such flexibility, the reader experiences the joys of discovery-based learning. Self-directed control of what is read next leads to more intrinsic interest in content, more motivation to learn, and more excitement in the learning process...*

> *However, ...the linear structure of a text [actually] serves an important function, as it gives the reader a way to navigate through information and a starting point for developing a representation of the text. While ... [learners] may enjoy the empowerment and freedom of having their own navigational control, navigational choices may also overload the capabilities of the reader in some cases. While the linear structure inherent in most lectures and texts limits readers, it also supports their understanding. Access to an infinite number of choices gives readers the agency to follow their own interests and may allow for more intrinsic motivation to enter the learning context, but unless the reader has a great deal of knowledge about the content, or a good understanding of the web space, a lack of organisational structure can often leave students 'lost in hyperspace.' A major question for web-based education is how to support both navigation and representation while allowing for flexibility* (Wiley & Schooler, 2001, p. 249).

So neutrality, like anonymity, turns out to be a double-edged sword. Not only do some users experience the online environment as cold and alienating, where others find it comfortingly non-judgmental and patient, but where some enjoy the opportunity to make up their own mind, others may find the decontextualised nature of information to be off-putting unless they already have good knowledge of the subject matter.

Accessibility and reliability

The explosive growth in the availability of digital resources, both those created in a digital format and those that have been converted into digital form, is nothing short of spectacular. In an extraordinary range of disciplines, a stunning array of databases, websites and specialist software have been developed, most of which are available to support the efforts of non-institutional self-directed learners.

This has given learners unprecedented access to resources. Indeed, some have come to believe that everything that is worth knowing is in the digital environment. In a paper about networked learning, McDowell & Pickard (2000) write:

> *One key feature is that the electronic information world (represented mainly by the Internet or the World Wide Web) is seen as extensive, comprehensive, perhaps even infinite. A library, or a set of encyclopaedias, however large and daunting the building or the ranks of bound volumes, has clear physical limits. People seem to have more difficulty in conceiving of limits in virtual worlds. It was not uncommon to find interviewees referring to the Internet using terms such as 'huge', 'unlimited', 'information from everywhere' (HE study) and 'loads of information', 'everything is on there' (School study). This can be an enticing prospect and the excitement of finding highly valued information is clear...*

However, it is not only the amount of digital information but also its quality that impresses. As discussed in Chapter Five, a great deal of digital information has been provided by authoritative sources including Government departments and agencies, corporations, professional associations, educational providers, libraries and other cultural institutions, not to mention a diverse array of special interest groups, clubs and societies. Given the respectability and perceived authority of many of these providers, information users have often formed the view that what they encounter and download from their website is probably also very authoritative.

For those information users who are sceptical about so-called authorities, or who have a distinctive perspective or worldview, Cyberspace can seem particularly liberating. One of the features of the online environment is that it is relatively democratic, with the possibility of a variety of perspectives and points of view being 'published.' This means that learners need not be captive to any orthodoxy; they are at liberty both to pursue their inquiries in whatever way seems appropriate to them and, likewise, to make up their own minds based on the range of evidence available.

Moreover, the World Wide Web provides remarkable opportunities for the widespread dissemination or 'publishing' of one's own views, understandings and findings. Therefore, if the learner has information that he or she believes is useful, but is not as widely available as it should be, websites and personal home pages, forums and discussion groups, weblogs and online journals may be used to rectify any perceived deficiency in the available information base.

The digital environment thus affords a veritable cornucopia of resources from every corner of the globe and from a diverse range of perspectives, with the result that learners are empowered as never before to pursue their inquiries in personally satisfying and significant ways. Yet while the range and quality of information available in the digital domain is indeed impressive, and has the potential to significantly increase both the amount and quality of learning worldwide, it is important to recognise some of its shortcomings.

One of the most obvious limitations is that the amount of information may indeed be excessive, especially to a learner attempting to navigate it without any external guidance. Ironically, the opposite can also be true; many young learners in particular, those who have grown up with digital technologies, have the view that anything not in the digital environment is irrelevant. As I discussed in Chapter Five, this is patently wrong in relation to a number of disciplines. In their paper about information literacy in the digital environment, McDowell & Pickard (2002) cite the case of a higher education lecturer who evidently felt the need to explicitly caution students about some obvious limitations:

> *I advise them to use the Web [only] as an extension of the library*
> *because anything published before 1990 is unlikely to be on the*
> *Web in my subject area unless it's absolutely fundamental.*
> (emphasis in original)

It is not only the currency of information that may be deceptive, but its relative impermanence. The fact that information is constantly changing, as some sites are removed or no longer supported and others are launched or augmented means that there is a dynamic pool of resources, and that it would be unwise for any learner, especially a beginner, to make a decision about the adequacy of information resources, without first ascertaining whether or not the needed information is available.

Availability is, of course, a relative concept and while very large amounts of useful resources to support a diverse range of learning needs and interests are in the public domain, free of charge, some relevant resources are only available through proprietary databases or pay-per-view websites. This has equity implications for those whose socioeconomic circumstances preclude their being able to pay for such sites, especially when the price is geared to

the corporate not the individual pocket or, as often happens, it is necessary to pay for access to an entire site just to obtain one small piece of information thereon.

These two issues, the constantly expanding quantum of information combined with the diverse range of sources, raises a related problem, which is the difficulty of judging the quality of the information that is located. The pool of information on the Web is constantly expanding, and by its nature some of the sources have been subject to less stringent quality control measures than others. The novice in any given field is likely to have a less fully informed opinion about available resources than does a more experienced learner. There is something of a paradox where the self-directed learner, who almost by definition may be among the least well equipped to evaluate the adequacy of learning resources, is the very one making the decision about which resources to use or what knowledge claims to believe.

Admittedly this same problem is confronted by the self-directed learner in the offline world, but unless and until there are robust and reliable starting points from which to obtain a conspectus or overview of a new domain, the would-be learner might find it difficult to know either the general shape of a field of inquiry or its current state of development. In the offline world, a useful analogy is the three-tiered structure of the *Encyclopaedia Britannica*, which comprises 'an introductory volume called a Propaedia, that sets forth a classification of knowledge, a 10-volume ready-reference dictionary called a Micropedia, and a 19-volume Macropedia filled with longer essays on major subjects' (Grimes, 2001).[1] The digital domain, having various visualisation tools, the potential for exploding or expanding bodies of text, and a range of hypertext documents, should be ideally suited to this kind of conceptual ordering and scene setting.

The situation of the beginner in any field is dramatically different from that of the more experienced learner or researcher. Thus, while a neophyte may well experience difficulties in making informed judgments at the outset, his or her expertise should expand and deepen as a learning project proceeds. As discussed in Chapter Eleven, on 'Evaluating Sources and Resources,' it seems probable that the learner's ability to be discriminating with respect to the quality of online information is likely to increase as his or her expertise improves. But expertise is of two kinds; that which pertains to the substantive area of inquiry, and that which relates to technological proficiency (ICT literacy).

What happens when a learner is unable to locate what he or she is looking for? Assuming that the information does actually exist, one of two

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1 Grimes, W. (2001). Mortimer Adler, 98, Dies; Helped Create Study of Classics. New York Times, June 29th, 2001.

alternatives is possible; on the one hand, the searcher might assume that there is something wrong with his or her search strategy and abandon the search—'throw in the towel' so to speak. On the other hand, the searcher might seek an alternative search strategy, or turn to a more experienced person for help. What would influence an unassisted self-directed learner in making such a choice?

I will consider this issue in Chapter Ten, but in conceptualising the dilemma from the learner's point of view, a potentially useful metaphor is that of self-directed learning as a journey, and, as previously discussed, Cyberspace as an 'information landscape.' It is instructive to consider how learners might perceive this landscape in terms of the destination they are seeking to reach, the usefulness of experience gained in other journeys, the topography of the field, the dangers and challenges that confront the unwary or ill-equipped explorer and, perhaps most importantly, what aid or assistance might be available to help them to navigate the various dangers and pitfalls they are likely to confront.

When a learner is thinking about embarking on a learning endeavour, among the most influential considerations is likely to be the amount, quality and accessibility of information sources. We have not yet reached the stage where the majority of information required to learn about most disciplines and fields of endeavour is in digital form, indeed there will always be some domains where learning is best conducted face to face. However, as technologically assisted learning becomes more common and as necessary resources become more comprehensive and reliable, online contexts are likely to be increasingly attractive and viable to a wide range of potential learners.

Versatility

One of the strengths of the online environment as a context for learning is that it is not restricted to any one medium of communication, and therefore may not unduly advantage learners with particular learning style preferences. It is certainly true that a great deal of online content has been created simply by converting text-based documents into HTML format, with the result that a significant proportion of resources encountered online consists of words. Indeed, the screen is not particularly well suited to the reading of large numbers of words, and consequently many users find themselves simply printing out large documents, thus effectively diminishing the interactive, or at least searchable, nature of the documents in the first place. However, because of the convergence of digital technologies, it is also possible for the learner to access multimedia materials such as photographs and diagrams, scanned original documents, simulations and interactive models, streamed audio and

video clips and even hand-drawn diagrams that may appear on the screen alongside textually based materials.

In the case of networked learning, using Voice over Internet Protocols and small cameras mounted on the console, it is increasingly possible for users to enjoy interactive video conferencing, both one-to-one and in groups. Recent advances in telecommunications, which include handheld devices that incorporate mobile telephones and data communications—miniature digital cameras and Lilliputian video screens—herald the dawn of a generation of even more versatile and user-friendly mobile learning devices. The result of all this is that learners with very different learning styles are catered for by the technology, and those with a preference for auditory or visual learning can participate alongside those whose preference is for the written word.

Whilst this is the vision, for the majority of learners it is still some way in the future. Setting aside the issues of cost and connectivity already alluded to, the fact is that by far the majority of currently available online resources are text-based, and as a result the medium is substantially—even quintessentially—a written one. The need for facility with reading and writing, and in particular the ability to type reasonably quickly and accurately—which some refer to as 'talking with your fingers' (Harasim et al., 1995, p. 208)—may disadvantage or exclude some learners. So, too, might the disembodied nature of online communications. Many users report finding it an impoverished and artificial channel of interacting, which misses out on some of the tacit elements of communication:

> *In an online learning environment the same language processes [as in live face to face communication] will be taking place, except that the indexical signs or contextualizing cues normally available in spoken discourse have been limited by the written discourse processes required. Furthermore given the implicit nature of language … the possibility for misunderstanding is greater and therefore the work required for 'conversational management' to mitigate this is even higher in this new environment* (Mann, 2002, p. 73).

Yet the absence of familiar 'paralinguistic cues' has actually spawned some ingenious applications, including the widespread use of 'smileys' or other 'emoticons.' And not everyone feels that the written exchanges are 'ponderous.' Some research suggests, for instance, that this mode of communication, especially when it is asynchronous, actually favours those who are communicating in, for instance, a second language because they can make considered responses and contributions.

Overall, there is little doubt that digital technologies do permit much richer, multifaceted and interactive exchanges than do, for instance, conventional correspondence education or even independent text-based research. Nevertheless, it is probably also true that as an educative medium it is still in

its infancy and, consequently, the experience of many self-directed learners is of a heavily literate medium, which does not yet fully realise the potential for interconnected hypermedia applications.

Enjoyability

Despite the 'wordy' nature of many online learning encounters, whether with rich text-based resources or with synchronous or asynchronous networked communications, it is interesting to find users—especially younger users—describing the online environment as 'fun', 'new' 'easy' and 'quicker' as a way of learning. In a paper on networked learning, McDowell & Pickard (2002) quote a member of a university's academic support staff who commented '[Students] will say to me quite categorically, they don't want books, they just want it up on the screen, you know, and if they can't get it up on the screen they are not interested.'

In view of attitudes like this, it is little wonder that many advocates have stressed the interactive potential of online learning and, in particular, the possibility of using games and simulations as learning environments. Under the heading 'Learners Just Want to Have Fun,' Shepherd writes:

> What's the single, biggest obstacle to E-learning continuing to grow and fulfiling its potential? Is it the cost of development? The lack of human contact? The reluctance of training departments to make the change? No, none of these is irresolvable. The problem is much more likely to be plain boredom. Too many courses deal with abstract concepts, rather than real-world practice; they're passive, when learners want to be doing things; they're sterile, when what's required is a little excitement. In other words, they're just plain dull, and dull won't hack it with a generation reared on techno music, action movies and video games....

> ...according to learning games advocate Marc Prensky (2001), effectiveness—let alone fun—is not always the primary driver for trainers: 'The problem with most companies' use of learning technologies, from the learner's point of view, is that they are used today primarily to make things easier for the trainer. Most of what exists so far in terms of web and other technology used for learning is so elementary or old-fashioned in its learning approaches that, apart from remote delivery, it adds little to learning and often subtracts from it (Shepherd, 2001, p. 1).

This perspective resonates with the finding of Felix who, in her study of 'perceived advantages and disadvantages of Web-based language learning,' found that approximately 10 per cent of the reported advantages revolved

around the sheer enjoyment of learning with and through technology. While younger learners tended to report this more often than their older counterparts, a significant number of respondents reported their enjoyment in learning using this medium. A typical comment was; 'It enables you to access games, quizzes and other activities that are different to normal classroom teaching. It makes it more fun to learn' (Felix, 2001, p. 339).

Clearly, people's ideas differ with respect to what constitutes fun. For some, it refers to the range of high quality materials—graphics and sounds particularly—made available or accessible via the Web; for others it refers to the opportunity to engage in quizzes and games; and for others again it pertains to the opportunity to interact with other people—whether synchronously or asynchronously. Not unexpectedly, this aspect relates at least in part to the users' learning style preferences, with some enjoying the kinaesthetic and tactile aspect of the human computer interaction, others being more impressed by its visual or auditory capabilities, and yet others reporting that human contact is vital to their learning enjoyment. As in face-to-face learning contexts, human variability asserts itself in online learning as well.

One obvious place where learning and entertainment most nearly converge is in concepts such as 'infotainment' or 'edutainment.' Over recent years, high quality software and websites have become available which, whilst focusing on entertainment, also subtly teach the user or player about social history, language, international relations, anatomy, economics, flight simulation, writing, or any one of a number of topics or disciplines. Many of these sites or applications have been developed by commercial providers predominantly for entertainment, and may lack academic rigor and balance. However this is not always the case, and commercial origins need not equate to mediocrity; indeed many software houses have set very high standards in terms of quality, appearance, interactivity, currency and technical reliability of their products, thus making online learning an engaging experience, whether alone or in conjunction with others.

In fact computer-based games and simulations, even those whose main purpose is entertainment, can take learners to places that other learning tools cannot, safely and reasonably cheaply. However, it is important for learners to make informed judgments about the quality of the games or simulations in which they are engaged, and to recognise the different assumptions and purposes of the designers. What might seem, on the surface of it, to be objective and rigorous might well have some built-in bias or omission, or some other shortcoming not immediately apparent to a neophyte. The issue of judging the quality of software and websites is dealt with in the chapter on Evaluating Sources and Resources.

Even more insidious is the seductive and even addictive nature of many such applications. The literature—both scholarly and popular—is replete with examples of people who become infatuated with the world made possible by the computer. While this can be extremely rewarding (for instance in the case of a learner who finds him- or herself engaged and embraced by an online community, and drawn ineluctably into social and intellectual encounters with others online), it also requires a high degree of self-discipline to ensure that such absorption does not get out of hand, interfering with users' real-world relationships and commitments, or becoming a substitute for balanced social engagements. Even in situations that are not highly interactive or socially engaging, learners may need to exert discipline to avoid being drawn away from their core purpose. The anarchic and boundary-less nature of the World Wide Web, for instance, can lead to following a series of links into increasingly uncharted territory which, as well as being wasteful of time, can be confusing to the neophyte.

However, the problem of becoming over-involved with online learning has its opposite: the situation in which a learner procrastinates and puts off tackling a challenging task. While this may not be too calamitous where the learning is entirely self-motivated, in fact a lot of self-directed learning has at least some external imperative, and the decision to defer or curtail some activity can have negative consequences. Although writing about formal courses, the comment by Harasim and others is also true of self-directed projects; 'The freedom of self-activation, however, carry[s] with it the responsibility for the timely investment of effort. It is far too easy, with this technology, to put off to tomorrow what should be done today' (Harasim et al., 1995, p. 194).

9.5 Conclusion

In reviewing and summarising the issues raised here, it is evident that the willingness of learners to engage with online learning can in no way be taken for granted, and that it depends on a complex blend of their motives and understandings, feelings of confidence and competence, whether they believe there is any content available that is relevant to the inquiry, and more generally their perceptions of the qualities of the technologies themselves. What one person sees as neutral, another might interpret as dehumanising and impersonal; what one person views as a challenging abundance of information another might experience as an overwhelming profusion of contradictory claims; where one learner might enjoy the anonymity afforded by the Internet, another could feel overwhelmed by the challenges of communicating with faceless others; where one user equipped with the latest in gadgetry and broadband connectivity might relish the challenge of adapting the technology to his or her personal purposes, another less technologically minded person could

experience the attempt to communicate—whether with other people or with selected databases—as an exercise in futility and disappointment.

Engaging with online learning is, therefore, every bit as complex, challenging and context dependent as in the face-to-face environment, and glib assertions that the technologically mediated learning avoids or obviates all the problems of the real world are simply not supportable. To be sure, some individuals and maybe even some groups of people (such as those who are employed, those who live in densely populated metropolitan areas, the highly literate and those with access to necessary technology) are advantaged by the shift towards ICT, but until these technologies become more ubiquitous, intuitive, familiar and affordable, for every person who is advantaged and empowered there is likely to be someone else who feels diminished or disenfranchised.

In exploring the considerations that might affect the uptake of technologies for learning, in those cases where the learner actually has a choice, Collis and Moonen have written; 'an individual's likelihood of voluntarily making use of a particular type of technology for a learning-related purpose is a function of 4 E's: the environment context, the individual's perception of educational effectiveness, ease of use, and the individual's sense of personal engagement with the technology' (Collis & Moonen, 2001, p. 2). Elsewhere they comment about how these '4 E's' interact with one another to influence 'an individual's likelihood of using a network-related application in his or her…learning.' In their book Flexible Learning in a Digital World, they write:

> When the hypothetical vector sum of effectiveness, ease of use and engagement results in a vector of a high enough value to approach the likelihood-of-use threshold, then we say that the individual is likely to make use of the network application in his or her own situation. The height of the threshold is critical; environmental conditions can lower it, so that a less-strong vector sum of effectiveness, ease of use and engagement is needed to result in likelihood of use (Collis & Moonen, 2001, pp. 52–53).

At some point, an individual, especially one pursuing a 'problem-driven learner-centred inquiry' (Norman & Spohrer, 1996) is likely to make the decision to 'take the plunge,' to connect with the vast and sprawling but unseen online world. The decision to do so will no doubt be based on a complex set of conditions and considerations that will differ from one individual to another. However, in each case, the learner needs to confront and resolve certain issues and work through similar challenges. In the ensuing chapters, I will propose a model of online learning and will examine some of the dynamics that are involved in learning in this context.

10 Locating Information Sources or Assistance

10.1 Introduction

In 1856, London publishers Houlston and Stoneham produced a book that was destined to become one of the most enduring and successful of the nineteenth century. Entitled *Enquire Within Upon Everything*, it was an encyclopaedia of sometimes quirky and obscure facts, mixed with information about etiquette, which was to be reprinted many times and run into hundreds of thousands of copies overall. The spirit of the book is captured by the following introductory comments from its editor, Robert Kemp Philp:

> *Whether you wish to model a flower in wax; to study the rules of etiquette; to serve relish for breakfast or supper; to plan a dinner for a large party or a small one; to cure a headache; to make a will; to get married; to bury a relative; whatever you may wish to do, make, or to enjoy, provided your desire has relation to the necessities of domestic life, I hope you will not fail to 'Enquire Within.'*—Editor.

In many ways, *Enquire Within* was a perfect metaphor for the nineteenth century passion for self-education and self-improvement; a passion that was to see the establishment of the Society for the Diffusion of Useful Knowledge (SDUK), the publication of journals such as the *Quarterly Journal of Education* (1831–36), *Penny Magazine* (1832–45) and *Penny Cyclopedia* (1833–44); books such as Craik's *The Pursuit of Knowledge Under Difficulties* and Smiles's *Self Help; with illustrations of Character, Conduct, and Perseverance*, and of course the establishment and spread of the mechanics' and literary institutes, lyceums, athenaeums and other mutual improvement societies that spread throughout the nineteenth century to virtually every corner of the English-speaking world.

More than 120 years later, in 1980, *Enquire Within Upon Everything* was to provide the inspiration for a program named 'Enquire,' which was arguably the first Internet search engine, written by Tim Berners-Lee, the inventor of the World Wide Web, while he was a researcher at CERN in Geneva (see, http://infomesh.net/2001/enquire/manual/).

When modern-day users of the World Wide Web type a few search terms into a Search Engine, they are doing much the same as their ancestors did when they

consulted the extraordinary index of *Enquire Within*. But the millions of items that their search may turn up would be many thousands of times greater than their predecessor might have hoped to locate. And it is not just the number of 'hits' but rather the quality of the information that is an issue, throwing into stark relief the need for judgment and evaluation in the online world.

For many self-directed learners, the digital revolution has proven to be a boon. Since time immemorial, those wishing to learn something have had recourse to a variety of information sources including friends, professionals (such as librarians) and experts they can consult. They have also been able to 'look things up,' for themselves in libraries, archives and other repositories. The emergence and development of the World Wide Web and electronic technologies have not only added new sources to these established and familiar avenues, but also made it easier in some senses for people to access and use traditional sources in pursuit of the learning activities and projects in which they are engaged.

The very ubiquity of the technology, reaching as it does into an increasing number of homes, workplaces, schools, and other community settings, means that those wishing to locate relevant resources have an unprecedented capacity to engage directly with information sources (including repositories, individual correspondents, and groups of like-minded people). However, this abundance of information can overwhelm the learner. If someone wishes to pursue his or her inquiry using the Internet, and assuming, as discussed in Chapter Three, that he or she has access to the appropriate technology (connectivity, hardware and software) this is still no guarantee that the search for information will be straightforward. Cyberspace is such a complex and diverse environment, where analogies with the physical world can prove partial at best and misleading at worst, that the would-be learner confronts a host of challenges.

In this chapter I will examine a number of issues about locating and retrieving information in the online environment, and the relationship between this activity and the broader issues of self-directed learning in the digital age.

10.2 Keeping all information on hand

In the familiar offline or pre-digital world, learners could easily access needed information by keeping copies of what they wanted at hand. Whatever information was not to be found in the compendious *Enquire Within Upon Everything* could be kept in a personal library, with other information being retained in some sort of filing system. This could take many different forms,

ranging from a bookshelf to a notice board, a personal organiser, a shoe box or a filing cabinet containing a variety of folders with different levels of headings and sub-headings, perhaps cross-referenced in some way. A less methodical, but nonetheless common approach was the makeshift, but highly effective system of placing Post-it Notes on the refrigerator door (a practice which, incidentally, has inspired the Microsoft Social Computing Group [http://research.microsoft.com/scg/] to develop a shared space where families or other groups can maintain a common information resource—just like a family's fridge door).

In much the same way, information in the digital environment, once it has already been discovered and extracted, can also be cached and organised. Probably the most obvious way of capturing needed information is to print it out, so that it is preserved intact for later analysis and reference, although this surrenders one of the principal advantages of digital information since it is not subject to rapid automated searching. It also suffers from the familiar problem of how to store and index large amounts of hard copy material. An alternative is to capture the information digitally by downloading it to some local server. This, however, also has drawbacks, not the least of which is the likelihood of exceeding available disk space, especially if, as so often happens, the user has no idea of the size of the file or the amount of room it is likely to take up.

10.3 Going straight to the source

For the majority of people, whether in the offline world or its digital counterpart, it is impractical to keep everything on hand. Apart from the amount of information that might be called for, very often one does not know that certain information will be required until the need actually arises. Therefore, it is sensible to leave information somewhere else in case or until it is specifically needed. Before the era of the Web, if the desired information was not immediately known, but its source was, the learner could readily locate what he or she required simply by going straight to the relevant reference. A telephone number, for instance, could be found by checking the relevant phone book or ringing directory assistance; a Latin motto by consulting a phrasebook or dictionary; the best time to plant particular bulbs by contacting a nursery, botanic garden, garden centre or talk-back radio program; or the fate of a particular US Civil War unit by going to a major reference library.

In the digital environment, the equivalent is to use the World Wide Web itself as a storage mechanism, which has the advantage that the inquirer need not maintain all the information locally; this service is provided by someone else.

Since every document, site and source on the Internet has a unique 'address,' the learner need only bookmark the preferred site, or enter this information into the address line of a browser or other interface and, barring any technological hitches, it should be instantly available.

If, however, the information has moved, because its owner has taken it off the Web or changed its electronic address, the searcher is confronted with a challenge. We have all had the experience of locating a book we are seeking in a library catalogue, only to discover that it is no longer on the shelves. Sometimes the librarian will advise that it is out on loan, being rebound, or has been recatalogued, in which case a little further detective work and some patience usually leads to its turning up. However, it is doubly frustrating to be told that it is still in the library somewhere, but that someone must have placed it on the wrong shelf. This is analogous to the situation where an electronic source probably still exists but, because of the lack of agreed protocols either for developing persistent identifiers or for redirecting users when addresses alter, its whereabouts in Cyberspace are a mystery.

Of course, impermanence in the location is only one problem confronted by the learner in the digital environment. Again to use an example from the familiar world of hard copy; if an inquirer discovers a useful resource in a book, magazine or journal, and makes a note of the call number, it is very probable that next time the same source is consulted the information will be the same. In the world of digital resources, however, it is possible for a site to change—often quite markedly—from one visit to the next.

This is to be expected in the case of those websites that have a limited shelf life, such as newsgroups and threaded discussions where, because of the volume of traffic or the timeliness of the information, particular items of interest might be retained only for a brief period before being archived or demounted from the server. It is also to be expected in the case of those sites that are designed to track a changing variable (such as weather details, stock prices or exchange rates, the progress of some effort or endeavour, current addresses or contact details, changing scores in a game, or some other new information that can be updated as it comes to hand). The fact that information can be constantly updated to maintain its currency is one of the strengths of the digital environment.

However, it is also possible for a site to change because of human intervention without a user being aware that it is different, perhaps even in material ways. For instance, a historian might change his or her website because a new publication has appeared, additional data has come to light, or he or she has changed his or her interpretation on the basis of feedback. Not all such changes are as benign, however, and the owner of a website might make material changes with the explicit intention of confusing, deceiving or

misleading users. Changing information, irrespective of the intention or the cause, is problematic in those cases where a user has once before located what he or she took to be reliable and durable information, only to find subsequently that it has unexpectedly altered. This issue was alluded to in Chapter Six, in considering the credibility and trustworthiness of information, and it does throw up some serious questions about the dependability of knowledge claims in the digital domain.

There is one further point with respect to going straight to the source, and that is not so much the evanescence or variability of the site, but the fact that its usefulness might not be recognised at an earlier point in a learning project. As discussed elsewhere in this chapter, one of the distinctive attributes of any adult learning project is that it unfolds progressively and often in unexpected ways. It is in the nature of a learning endeavour that the learner frequently— perhaps usually—does not know where it will end up, and thus the relevance or utility of sources that are unearthed early in a project may not become apparent until much later. While this phenomenon has always bedevilled any open ended learning (or research) activity, information in familiar forms such as pictures, recordings, broadcasts, books, newspapers, archival repositories and so on can often be recovered through notes that were taken at the time augmented, very often, by a well developed capacity for recalling the forms in which information was first encountered.

But what happens in the case of information in the digital environment that is viewed early on during a research project, but whose relevance is only belatedly recognised? How is it possible to go directly to it at some later time, when it is frequently embedded several levels or layers down within a hypertext[1] document, or is otherwise invisible and intangible? Technologies are increasingly available that allow users to retrace their steps—either within a particular session, or over a period of time (such as 10 or 20 days)—and these may be supplemented by user interventions in the form of bookmarking or otherwise recording potentially useful sites. But the fact remains that learning in the digital environment can be made more difficult by the profusion of information, its tendency sometimes to look the same on the screen, and its lability. This is a significant difference between learning projects that are conducted in the online and offline worlds.

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1   Hypertext documents comprise blocks of words (or images) that are linked electronically by multiple paths or trails. They are thought to approximate textually the way in which the human brain actually operates. The term is commonly attributed to Theodor Holm Nelson who in the 1960s in his self-published work Literary Machines, defined it as 'non-sequential writing…that branches and allows choices to the reader.' Nelson also coined the term hypermedia, which applies the same principles to various media, not only text.

10.4 Searching for information and answers

It is in the nature of self-directed learning that the instances where the learner already knows where and what to look for, represent only a very small proportion of projects. Using the analogy advanced in Chapter Nine, where a learning project was likened to a journey, a more common situation is where the learner is navigating in uncharted territory, seeking to locate appropriate resources in an unfamiliar domain. The first and most obvious problem in such a situation is how to frame a question about a phenomenon of interest, especially one where the novice inquirer, by definition, does not know what information might exist.

Fortunately, the advent of the Internet, and more particularly the World Wide Web, has placed untold riches at the fingertips of even the most inexperienced searcher. Information which was previously available only to the most expert or well-resourced researcher is now commonly accessible through publicly available databases. While some of these resources are explicitly educational in intent, notably those created by schools, colleges, universities or training providers, by far the majority is educative rather than educational. They extend from resources made available by museums, art galleries, libraries and archives, to those generated by reputable individuals and organisations including professional societies and special interest groups, through to those created—often for quite different purposes—by businesses and corporations, as well as national and international government departments and agencies. And this does not even touch on the proliferation of chat rooms, forums, discussion lists and opportunities for both synchronous and asynchronous exchanges with others—both learners and experts.

However, this volume of information is not an unmixed blessing. In discussing how online language learners experience and evaluate the digital resources available to them, Felix comments:

> *the complaints about complexity are not going to be easily dealt with.*
> *The Web is an immense world, and it is undoubtedly true, as*
> *[learners] say, that it is hard to find a way through the complexity*
> *and easy to get lost. The search for information is not guaranteed to*
> *end successfully. Since that is the nature of the Web, there is not*
> *much to be done about it, though teachers [and other learning*
> *facilitators] can at least provide a structure for Web activities to avoid*
> *the problem as much as possible. (Some would say that this would*
> *defeat the purpose of using the Web in education.)*
> (Felix, 2001, pp. 347–348).

Thus, the sheer volume of information now available is something of an obstacle for learners, as is its variable quality; however, its ready availability, on the surface at least, must be a boon to the self-directed learner. Assuming, therefore, that relevant information does exist, and that it is available on a site somewhere, the challenge is to locate it amidst the hundreds of millions of pages, and billions of words, sounds, numbers, images and other material that constitute the World Wide Web. There are two principal aspects to this task: search tools and search strategy. In reality, these are mutually interdependent, but for the sake of analytical clarity I will treat them separately.

Search tools

The first and most obvious kind of research tools are those which bring some kind of order to the chaotic profusion of the online environment. There are many specialised lists, directories or indexes that have been compiled to keep track of the ever-expanding and constantly changing resources on the web. Given the awesome complexity of the digital information world, it is nothing short of miraculous that attempts have been made to corral related resources and to impose some sort of structure—even a hierarchy—on all this material. Since this process of classification and grouping is not generally undertaken by those who generate the information in the first place (although the allocation of keywords and, in some cases the embedding of invisible meta-data tags does contribute to the sorting), it is principally imposed after the event on the basis of what a review reveals about the content.

Some of these lists and directories are generated automatically, on the basis of cross-referencing from one document or site to another, or using some algorithm that looks for repeated patterns of access by cohorts of users. Others are compiled, and even maintained by human readers, who trawl through hundreds or even thousands of websites; linking to some, clustering others together, and sometimes revisiting them to ensure that their content has not changed too radically since they were listed. Irrespective of whether the classification is done manually or electronically, the structure of the Directory is inevitably a human artifact, representing the conceptual framework and epistemological assumptions of its inventor. As such, it may itself be subject to the same vicissitudes as the information it purports to capture.

A particular category of specialised finding aid along these lines is referred to as a 'portal,' which is developed with the intention of providing a point of entry to the treasury of information on the web. Such portals are essentially of two types, either horizontal or vertical. Horizontal portals tend to have a narrow client group (for instance the employees in a company or the students in a university) but give access to a very broad range of services and sources. Vertical portals (or 'vortals') on the other hand, tend to have a broad user group

but give access to a relatively narrower range of resources, such as the collection of a particular library. These latter (sometimes referred to as 'subject gateways') are often topic-specific and, like reading lists in conventional libraries, provide a starting point for the inquiry. Interestingly, as long as ago as 1970, in discussing the potential of computers to facilitate scientific progress and communication, Swanson presaged the concept of portals when he wrote:

> *It is characteristic of our diverse, decentralised and pluralistic 'system' of scientific and technical communication that the most effective and sophisticated information services are those developed by highly specialised, relatively small groups of users to meet their own immediate needs. A variety of primary and secondary sources is searched, filtered, and reprocessed to produce detailed indexes, abstracts, bibliographies, and selective dissemination services* (Swanson, 1970, p. 369).

Despite the amount of effort that goes into producing them, it can be difficult for the inquirer, especially if he or she is new to an area, to even know of the existence of such 'portals'; in any case, a simple listing of other sites and sources is relatively useless. Thus, portals frequently include some classificatory mechanism or protocol (such as guided questions) to help the user in locating the object of his or her search. A good example is the step-by-step procedure employed by online telephone directories to allow a user to locate a particular number. In discussing the potential of E-learning in the corporate world, Rosenberg writes:

> *Dozens of new 'learning portals' have emerged on the Internet. The sites offer a one-location gateway to a variety of additional learning resources, some sponsored by universities, some by commercial training companies, and some by individuals. Want to learn something—English literature, computer programming, how to manage people or fix a faucet? Simply query the portal for a three-hour or a three-minute learning program. Some are free, some are supported by advertising, and others charge a course or subscription fee* (Rosenberg, 2001, p. 26).

While much of the preceding discussion assumes that the learner knows, or at least believes, that a particular source actually exists to support his or her inquiry, one of the greatest advantages of the convergence of Information and Communication Technologies has been the ability of learners to locate resources that they did not previously know about or even suspect.

Given the vastness and complexity of the Internet, and of the Web, what is required is a device that can rapidly review many millions of items of information to determine which, if any, are likely to fulfil the inquirer's needs.

To facilitate this, a number of devices, commonly called search engines, have been devised. There are more than 2000 different search engines in existence, some of which purport to be general, while others are quite quite deliberately linked to certain kinds of information or databases.

Search engines trawl through (mainly HTML documents) that have been identified and assembled by automatic devices sometimes referred to as Web Wanderers, Web Crawlers, or Spiders. The terminology here is more metaphorical than actual; as Koster puts it in his useful site 'The Web Robots FAQ,' 'The names [Web Wanderers, Web Crawlers, or Spiders] are a bit misleading as they give the impression the software itself moves between sites like a virus; this not the case, a robot simply visits sites by requesting documents from them' (Koster, n.d.).

Given the ever-expanding nature of the Web, how do these devices operate? Basically they search for words, phrases or other character strings and bring back a number of 'hits' that might be of use to the inquirer. Some review only the top-level information in each document, whereas others explore the whole content. Some engines will only return findings or 'hits' when all the search terms are present within the document; others will routinely identify a document if any of the terms is present. Most search engines have an advanced option, which allows the user to override these defaults, but then the user encounters a further restriction, which is that all search engines limit their coverage. Some, for instance, will limit themselves to certain languages, or to particular domains (such as .org or .com or .edu or .gov).

In any given inquiry, then, the first step for the searcher is to select a search engine, but this is not as easy as it sounds. It is all very well to recognise that experienced researchers utilise a range of strategies and different search engines to solve information challenges. However, as Lyman puts it in her chapter 'Internet-based learning: What's in it for the adult learner?'

> *Novices and even expert users of the Internet are hard pressed to understand the relative advantages and disadvantages of different search engines and their appropriateness for different purposes. Even as one may gain, often through personal trial and error, familiarity with a few favourites, new engines become available whose specific search capabilities are unknown. In addition, even if one has mastered the features of search engines and has a fix on the topic or question that forms the basis for the search, the very nature of the Internet as a hyperlinked web of information calls for skills, that while heretofore not as critical, are indispensable in the context of the learning medium of the Internet* (Lyman, 1999, pp. 113–114).

Search strategy

If selecting a search engine is the first step for an inquirer, what are the dynamics of using it to locate needed information or to contact others? Clearly, much will depend on the specific information being sought, although at a macro level two alternative strategies are possible; one is very precise and targeted, and the other is more like casting a net to see what is 'trapped' in it. People who consume information have been called 'informavores,' where information is portrayed as the quarry or the prey. One kind of informavore behaves like a wolf, tracking its prey with precision and deliberation, whereas the other type is more like a spider, building a web, and waiting for the prey to come to it. Both these views are interesting, provocative and colourful ways of thinking about the search for information; indeed the wolf-spider gave its Latin family name—Lycosidae—to the search engine Lycos.

Most searches, whether of a 'task specific' or 'task general' nature, entail an iterative process in which the results of one search are cycled through the search process until the desired result is reached. However, on the whole, such searches presume a relatively stable objective. By contrast, most self-directed learning projects entail a cyclical process of refining and redefining the actual research question itself, with the result that the process of inquiry is both iterative and recursive:

> *In real life searches in manual sources, end users may begin with just one feature of a broader topic, or just one relevant reference, and move through a variety of sources. Each new piece of information they encounter gives them new ideas and directions to follow and, consequently, a new conception of the query. At each stage they are not just modifying the search terms used in order to get a better match for a single query. Rather the query itself (as well as the search terms used) is continually shifting, in part or whole. This type of search is here called an evolving search.*

> *Furthermore, at each stage, with each different conception of the query, the user may identify useful information and references. In other words, the query is satisfied not by a single final retrieved set, but by a series of selections of individual references and bits of information at each stage of the ever-modifying search. A bit-at-a-time retrieval of this sort is here called berrypicking. This term is used by analogy to picking huckleberries or blueberries in the forest. The berries are scattered on the bushes; they do not come in bunches. One must pick them one at a time...* (Bates, 1989, pp. 409–410).

According to Bates, there are six different ways in which a berry-picking inquiry can proceed:

- Footnote chasing

- Citation searching

- Journal run

- Area scanning

- Subject searches in bibliographies and abstracts, etc

- Author searching (p. 412)

While all of these approaches are familiar in the offline world of traditional searching, potentially at least they ought to be easier in the digital domain. Bates goes on to comment that 'The searcher should be able, with a single command, to call for a search mode and screen that is set up for one of the six techniques above (or others)…Hypertext approaches appear tailor made for berrypicking searching…' (pp. 420–421).

One prototype for this kind of linked searching is provided by websites such as the online bookshop 'Amazon.com,' which allow the user to link to other books by the same author, or to other books on the same topic, or to reviews of books by other purchasers or even to related non-print media. Likewise CiteSeer is an Autonomous Citation Index (ACI) which is generated entirely automatically without human intervention (see http://www.neci.nec.com/homepages/ lawrence/citeseer.html). It places every document it finds into a chain, through which it links to those sources from which it is derived, and to those in which it is mentioned. Like familiar searching aids such as the Science Citation Index, this approach allows the user to intersect with the chain at any point and to trace upwards, downwards or sideways (to other related citations).

Yet despite this vision of the self-directed learner heading off in various directions and tracking down leads in the manner of a detective, in a study of actual search behaviour, Tauscher and Greenberg state, 'We found that 58% of an individual's pages are revisits, and that users continually add new web pages into their repertoire of visited pages. People tend to revisit pages just visited, access only a few pages frequently, browse in very small clusters of related pages, and generate only short sequences of repeated URL paths' (Tauscher & Greenberg, 1997, p. 1). It appears then, that many users have a rather restrictive approach to searching, and that they often return to the security of a familiar group of well-known sites.

To some extent, the willingness of any learner to break away from the traditional and familiar, and to seek information in radically different environments, depends on the interaction between three broad headings

which Choo, Detlor & Turnbull (2000) label as **cognitive**, **affective** and **situational** respectively. They begin their discussion of information seeking by observing that:

> *Information needs arise from the problems, uncertainties and ambiguities encountered in specific situations. Such situations and experiences are the composite of a large number of elements that relate not just to subject matter, but also to situational factors such as goal clarity and consensus, magnitude of risk, amount of control, professional and social norms, time and resource constraints and so on…*(Choo, Detlor & Turnbull, 2000, p. 6).

They then proceed to elaborate on each of the three dimensions in the following terms. With respect to **cognitive dimensions**, they claim that 'the individual would select a source that is perceived to have the greater probability of providing information that will be relevant and useful. Moreover, the individual would be concerned with the accuracy and reliability of the source…' (p. 9).

At the **affective** level, they argue that:

> *the individual's degree of personal motivation and interest in the problem or topic would determine the amount of energy that he or she invests in information seeking. Kuhlthau (1993) suggests that as the information search progresses, initial feelings of uncertainty and anxiety fall as confidence rises. If a clear theme is developed to focus the search, the individual may become more highly motivated, and if the search proceeds well, there is a growing feeling of satisfaction and accomplishment (p. 10).*

Finally, with respect to the **situational dimensions**, they point out that 'the selection and use of resources is influenced by the amount of time and effort that is required to locate the source and to interact with the source to extract information…' as well as 'the complexity of the task or the uncertainty of the task environment… A complex task characterised by numerous interdependent task elements that can behave and interact unpredictably may require broader information gathering and processing. Analogously, a task environment marked by volatility and turbulence may induce greater information scanning' (p. 12).

It is apparent then that the learner's search strategy is influenced by a number of variables, including the level of detail he or she is seeking, the complexity or volatility of the task, the learner's existing level of familiarity with the field, his or her emotional commitment, and his or her preferred information seeking style. Finally, Choo, Detlor and Turnbull also make an important point when they state that expert users may not be seeking an answer or a

specific item of information, but rather some information or insights to stimulate their own thinking. This could have important implications not only for the search strategy, but indeed for the design of search engines that might permit some opportunity for serendipity or lateral connections between 'hits.'

Browsing versus searching

This last point leads to a consideration of the way in which an inquiry can change over time—sometimes broadening, sometimes narrowing, or sometimes changing entirely. Very often, discussions of learning, including self-directed learning, are presented as if the inquiry has an inevitability about it: a single unidirectional trajectory moving unerringly toward some invariant objective. In fact, both the question that is being pursued and the means of attaining it are bound up with each other, and a change in one can have a reciprocal impact on the other.

In the early 1980s, Spear and Mocker wrote of the 'The Organising Circumstance' as a way of understanding the recursive, serendipitous and progressively evolving nature of a learning project. Essentially, they argued, each discovery might unexpectedly lead to a new angle, another possible source or a different way of framing a project. If this was true in the pre-digital world, how much more likely is it to be today with the amount of information, the rapidly changing nature of what is in the web environment, and the new information processing tools represented by search engines and portals:

> *Information seeking, with emphasis on the seeking, implies that the goal might change as more information is learned; the question can be further refined; the initial question may be realised as too broad; or the information discovered while seeking the answer changes the question altogether. With the advent of the relatively easy to use Web browser and proliferation of information on the Web, users can move rapidly through larger amounts of information. These two activities, information retrieval and browsing, combine to cover the broad spectrum of information seeking; information retrieval is more suited to highly organised information like databases and strongly-typed text while browsing is more conducive to non-standardised text and other multimedia* (Choo, Detlor & Turnbull, 2000, p. 148).

Thus, there is a difference between browsing and more directed searching and information retrieval. Whilst at some point most learning efforts do entail the identification and extraction of specific information, it is in the nature of learning something new that, at the outset at least, the learner does not know what to search for. Accordingly, there is an important place for inquiries that are more open-ended and which proceed through more generalised

immersion rather than targeted searching for specific information or insights. For instance in their paper 'Characterising browsing strategies in the World Wide Web,' Catledge and Pitkow (1995) discuss the differences between what they call open and closed tasks. They write:

> *Closed tasks have a specific answer and often integrate subgoals. Open tasks are much more subject oriented and less specific. Browsing can be used as a method of fulfiling either open or closed tasks... Intuitively it would seem that browsing and searching are not mutually exclusive activities. In Bates's (1989) work on berrypicking, a user's search strategy is constantly evolving through browsing. Users often move back and forth between strategies....*

Most search engines are designed to support searching; however, as Catledge and Pitkow argue, 'supporting browsing may be a more difficult task.' They go on to observe:

> *Both Laurel [Laurel, 1991] and Bernstein [Bernstein, 1991] approach the topic of how to assess and design hypertexts for the browsing user. Laurel considers interactivity to be the primary goal. She defines a continuum for interactivity along three variables: frequency (frequency of choices), range (number of possible choices) and significance (implication of choices). Laurel contends that users will pay the price 'often enthusiastically—in order to gain a kind of lifelikeness, including the possibility of surprise and delight.' Bernstein takes a slightly different approach with his 'volatile hypertexts' [Bernstein, 1991]. He argues that the value of hypertext lies in its ability to create serendipitous connections between unexpected ideas.*

Given that information users tend to move backwards and forwards between browsing and searching, the challenge for software designers is to create applications that allow for this kind of fluid movement between these two modalities (Catledge & Pitkow, 1995, p. 2). A possible approach may be to gain a better understanding of how humans actually search for and then process new information. As Wiley and Schooler put it:

> *There are certainly some significant parallels between navigations through the Cyberspace of the World Wide Web and navigation through the mental space of the mind. In both cases sophisticated search engines sort through a huge network of information to provide associations that are most relevant to the target information. Admittedly web search engines are not as effective as human search engines (yet), but perhaps as the parallels between the two become fleshed out, development of web search engines may become increasingly informed by our understanding of cognitive search mechanisms* (Wiley & Schooler, 2001, p. 255).

This then leads to a consideration of how we cope with the dynamics of navigating in the limitless and multidimensional domain of hyperspace.

10.5 Navigating in hyperspace: Locating information in context

To this point, the argument has been presented essentially in terms of locating relevant websites and documents in relation to a learning inquiry, whether that inquiry is specific or general. However, information rarely comes neatly packaged in a single document. Whether one is looking for the date of enlistment of a nineteenth century Royal Marine, the botanical name of a now-extinct species of plant in Mauritius, the most recent auction sale price of a particular racing horse, how to cope with a rare medical condition in a child, or any other item of information that an independent learner might be wanting, such information is likely to be embedded within a larger document; in the case of a broader inquiry, the chances are that the needed information will be found not in one place, but in a series of different documents or websites.

When a searcher is seeking within the 'physical world' for a specific item of information, such as an opinion, a turn of phrase, a date, or a particular statistic, there are well-established ways of keeping track of search strategies. In a library, for instance, an inquirer can simply note down the title (and, where appropriate, the volume number or location) of each item as it is consulted. Likewise, there are established mechanisms for navigating within a book or journal: tables of contents, indexes, page numbers, chapters, sections, even locations on a page constitute a means for locating information as well as a way of noting and recalling where it was found. However, in the world of hyperspace, there are fewer 'landmarks,' which makes it difficult to recall precisely where something was finally located, fewer routines for 'backtracking' when one becomes lost, and likewise, fewer ways of recalling the path one has actually used to arrive at a particular destination. This is particularly problematic in those cases where the utility of some resource is not recognised at the time, but only at a later point in the learning project.

While it might be notoriously difficult to navigate in Cyberspace, on the Web, what about the situation of the CD-ROM or DVD, which at least is a physical object containing a bounded amount of information (albeit quite a lot of information in some cases)? Both CDs and DVDs differ in significant ways from their earlier counterparts such as books, films or cassette tapes;

> *Skim a book from beginning to end and you know you have seen its entire contents. Watch a film from opening titles to closing credits*

and you know you have seen it in its entirety: nothing is hidden. You can re-read or re-view for different interpretations, deeper knowledge, but you won't encounter previously unseen text. (Plowman, 1996, p. 3).

But as Plowman goes on to point out, 'Seeing everything on a CD-ROM, however, is contrary to its purpose. One of the selling points is the sheer quantity of data which can be included—and much of this will never be seen or encountered by an individual user. This clearly has implications for the user's construction of narrative.'

Elsewhere in this study, notably in the next chapter, I have discussed the importance of narrative to the understanding of particular knowledge claims in context. In most expository writing, including fiction, the writer reveals what he or she wants the reader to find in a specific order at a particular point in the narrative. Even in those instances of writing where there is a hidden level of meaning, it has been deliberately put there to reward deeper or more attentive reading. There is a kind of tacit collusion between the author and the reader in relation to the construction of meaning. But, as Plowman goes on to argue:

We do not get this sense of collusion between the author and the user with CD-ROMs; if anything, our relationship with the designer is based on frustration. The user gets little assistance with construction of narrative and the secrets of multimedia are more likely to be unearthed serendipitously than as a result of special scrutiny. The invisible material on a CD-ROM has equal status to the visible. In a book all text is equally visible and accessible, but some sections of a CD-ROM can be so deeply embedded in a nested structure that a whole sequence of interactions is required to get deep into the text. For large databases this is known as information mining—an apt metaphor with its connotations of seeking nuggets of information in an unfriendly environment which has no easily discernible boundaries. The paradox is that all data on a CD-ROM is equally accessible to the computer... (Plowman, n.d., p. 3)

If there are challenges in locating meaning (as opposed to simply locating words or concepts) within a self-contained artifact such as a CD or DVD, how much more difficult is it to locate information, including subtle and complex arguments, in Cyberspace where different sites are the products of different authors? It is a common experience for learners in the digital world to locate a number of independent references or 'hits' on the topic of his or her inquiry. Somehow he or she must decide which of the many potential sites is relevant to his or her purposes, and this may involve reading a lot of text or consulting many sites to be sure that the information sought is what is required.

Beyond this, however, starting with a single document or website, it is usual to pursue a series of hypertext links, each one taking the searcher in a new direction, further and further from his or her original starting point. This confronts the learner with two challenges; the first is to be able to reconstruct what Vannevar Bush called the 'associative trail,' without having to go back to the beginning and re-enact the entire mental process. The second, and in a way more difficult challenge, is to 'locate' the information he or she finds in a changing contextual environment, since each link is likely to have its own logic. Thus, the concept of locating takes on a second meaning; that of positioning or situating pieces of information, knowledge claims and assertions within some broader conceptual, historical or analytical framework.

Back in Chapter Seven, I quoted from an article by Bostock in which he advocated the use of XML (eXtensible Markup Language) to facilitate 'information *extraction*, to present only the *relevant parts of a document*' (Bostock, 2002, p. 2). This is manifestly a clever technical solution to one aspect of the proliferation of sites and documents on the Web, but it may end up representing a trade-off between locating information in the sense of finding or tracking something down, and locating it in the other sense of situating it or placing it in context: it makes the former easier, but leaves the latter challenge entirely up to the user.

10.6 Personalised portals and personal web watchers

Despite the massive changes that have been wrought in the information landscape by the digital revolution, in many senses the basic paradigm—at least for the self-directed learner—remains unchanged. The person wanting to learn something must, either alone, or with the help of others, seek out relevant resources and appropriate them to his or her search for meaning.

However, there is one truly transformative and novel application that has been ushered in by the spread of electronic technologies, and that is the potential use of personalised portals and of dedicated web-watchers that can be programmed to selectively harvest and present information that meets the exact needs and interests of the individual. Dickinson and Stewart explain the concept in these terms:

> *Most computer learning uses pull technology—the user either searching through directories or employing search engines to find the information required. Within certain sectors of the [IT] industry, in particular customer relationships management and online shopping, push technology is employed. In this way, users can be targeted with*

advertising relating to previous purchases, can be sent details of commodities in which assumptions about lifestyle are based on postal codes, and so forth. The technology to achieve this is simple using a cookie … to call up the relevant information (Dickinson & Stewart, 2001, p. 204).

As these authors point out, this technology has been used successfully by marketing and customer relations applications, but in theory there is no reason why learners could not receive information tailored to their specific learning needs. A particular version of this concept is the personalised portal, in which, with a greater or smaller degree of intervention, the user's usual log-on interface is reconfigured to suit his or her individual needs and interests. This customisation can include everything from the layout of the screen, to the sort of resources that are retained and how they are presented. In some cases, portals are personalised through the use of login codes and passwords, or else they are invoked automatically whenever a particular user logs on by a cookie that resides on the user's machine. However as we move towards an age of ubiquitous computing, where users may utilise 'public' machines scattered throughout their workplace or around the community, it has even been suggested that:

the cookie sits not on a particular hard drive but on the user's smart card or other input device. [Then], when the smart card is inserted into any access device on the user's available network it takes the user straight to a personal portal…Once the portal is accessed, so too can any pushed information, for example email, information that the smart card has gleaned from its neighbourhood … and so on (Dickinson & Stewart, 2001, p. 204).

Interestingly, a similar possibility was envisaged as long ago as the 1960s. Writing at that time about the potential use of computers in museums, Lee paints a picture of a virtual museum visit, where the user would be able to interact with the exhibits and even shape what he or she sees according to his or her interests. He explains that:

at the end of the inquiry session, on the basis of the profile developed on him [or her] the visitor would get a personally tailored set of suggestions as how he [or she] might most benefit from and enjoy his [or her] visit to the museum that day. In addition the visitor would get an individually unique 'key card' which he [or she] can use to start any of the interaction exhibits that augment the art objects on display in the specialised museum galleries. By means of this key card, the visitor's information profile would be available to all of the computerised exhibits throughout the museum. Each of these gallery exhibits will then be able to tailor its content and its style of

> *presentation to suit the needs, wishes, background and even the personality of the individual visitor. Not only will the connoisseur be treated differently from the novice, but each connoisseur and each novice will be treated differently from each other.*
>
> *By exploiting the adaptive capabilities of the computer, the museum of the future can become a place where every visitor, in a very real sense, creates his [or her] own learning experience* (Lee, 1968, pp. 383–4).

A further elaboration of the 'smart' portal is of a device that could be programmed to trawl the Internet between sessions, looking for new sources or updates to previously visited sites, and to provide alerts whenever the user logs on. Such an approach closely resembles another 'push' technology that can be recruited to the purposes of the self-directed learner; an 'intelligent agent' that is able to make suggestions about how to proceed with an inquiry or learning project and, in some cases, even undertake searches independently.

Researchers at Carnegie Mellon University have developed a 'Web Watcher' and even a 'Personal Web Watcher' whose role it is to 'learn' what users are searching for and then 'to assist users both by interactively advising them as they traverse web links in search of information and by searching autonomously on their behalf.' The system is explained as follows:

> *WebWatcher is an information search agent that is 'invoked' by following a web hyperlink to its web page, then filling out a Mosaic form to indicate what information is sought… WebWatcher then returns the user to (a copy of) the web page from which he or she came, and assists the user as they follow hyperlinks forward through the web in search of the target information. As the user traverses the web, WebWatcher uses its learned knowledge to recommend especially promising hyperlinks to the user by highlighting these links on the user's display. At any point, the user may dismiss WebWatcher, … indicating either that the search has succeeded or that the user wishes to give up on this search…* (Armstrong et al., 1997, p. 1).

It is important to stress that such devices merely supplement the prerogatives of the learner, who:

> *remains firmly in control and may ignore the system's advice at any step. We feel it is important for the user to remain in control, because WebWatcher's knowledge may provide imperfect advice, and because WebWatcher might not perfectly understand the user's information seeking goal.'* (Armstrong et al., 1997, p. 3)

The paper goes on to conclude that while this technology is only at an early stage of development, in the opinion of the authors, 'based on our initial

exploration, we are optimistic that a learning apprentice for the World Wide Web is feasible. Although learned knowledge may provide only imperfect advice, even a modest reduction in the number of hyperlinks considered at each page leads to an exponential improvement in the overall search' (Armstrong, Freitag, Joachims & Mitchell, 1997, p. 7).

10.7 Getting help from others: The virtue of networking

To this point, the process of self-directed learning, at least insofar as it relates to the location of resources, might seem like a lonely and individualistic activity, even down to the use of web watchers and digital assistants to help with the identification of likely resources. However, this is not an inevitable consequence, or defining characteristic, of self-directed learning. Indeed, to the contrary, many self-directed learners form part of interdependent webs with other learners who share similar interests. The most obvious examples are hobbyists and special interest groups whose members commonly swap information, meet each other periodically, publish information both formally and informally, support one another, and generally represent the importance of their interests and concerns to the wider community.

These networks need not be absent from the digital world, indeed one of the most powerful aspects of digital technologies is their capacity to dramatically extend the 'reach' of individuals to include a worldwide network of other learners and 'experts' in their field of interest. I have already discussed this issue in Chapter Eight, and will again connect with these ideas in Chapter Fourteen. In the present context, however, my focus is on how learners can use the knowledge base of others, both experts and fellow learners, to help in locating relevant resources.

One obvious way of networking is to email individuals, whether personally known to the learner, those who may be recommended by mutual friends or other contacts, or who have been identified through the public media or through various specialist websites or publications. The point is that very often expert knowledge resides in other people and not exclusively in books, journals, websites or other published sources.

Another method of seeking help in locating resources is for a learner to participate in chat rooms and other synchronous forums devoted to his or her particular interests. As with text-based resources, however, it is necessary for the learners to discover the existence of relevant groups, but the electronic environment has the dual advantages of being available from the comfort and

convenience of one's own home, workplace or community, as well as potentially including like-minded individuals from around the world. Learners are not limited to those they know personally or who are in their immediate geographical region.

Finally, if a learner has a query that cannot be answered directly through his or her own efforts or immediate circle of acquaintances, it is possible to post questions on lists and bulletin boards that pertain to the subject of interest. The capacity to reach invisible 'experts' around the globe through such a mechanism is truly awesome, and emphasises the networking potential of these technologies. This is a subject to which I will return in Chapter Fourteen on Networking: Contributing to the Community of Learners.

10.8 Conclusion

In their study of what they term 'vicarious learning,' which occurs online as a consequence of being in the presence of other learners, Mayes and his colleagues (1996) in the Vicarious Learning Project distinguish three different types of courseware. Primary courseware, in their view, encompasses all the basic building blocks of understanding or conceptualisation, including text, hypertext, multimedia and various kinds of intelligent tutoring systems. Secondary courseware consists of those tools which learners use to operate on this primary material; it includes concept maps, templates that assist people with writing tasks, specialised software applications, and various kinds of visualisation and presentational tools. Finally, tertiary courseware comprises the structures that support dialogue and meaning-making among learners and between learners and experts (in their case, tutors), as well as those approaches that allow for the capturing and portrayal of such discussions for others who were not part of the original learning group.

Using the terms of this typology, the major focus of this chapter has been on 'primary courseware,' the basic ingredients or building blocks of any learning endeavour. It has been argued that the online environment has generated unprecedented amounts of information, along with various devices, applications and strategies that allow learners to locate and capture such information. However, the chapter has also emphasised the evolutionary and developmental nature of many learning endeavours, stressing the fact that locating information is not a simple matter of seeking a single answer to an invariant problem, but is rather a recursive and cyclical process of refining the question in the light of new findings and in turn looking for new, additional or alternative information in the light of the new questions.

It has also been emphasised that the processes of browsing and of more directed searching by a self-directed learner is influenced by the interaction between the information and the information seeker. As Choo, Detlor and Turnbull put it in their paper at the 1999 Meeting of the American Society for Information Science (ASIS):

> *The research presented here suggests that people who use the Web as an information resource to support their daily work activities engage in a range of complementary modes of information seeking, varying from undirected viewing that does not pursue a specific information need, to formal searching that retrieves focused information for action or decision making. Each mode of information seeking on the Web is distinguished by the nature of information needs, information seeking tactics and the purpose of information use* (Choo, et al, 1999, p. 13).

In this chapter, the word 'locating' has been used in two different senses; first, in the sense of finding or tracking something down (as in locating a definition or locating a missing set of car keys), and second in the sense of situating or placing into context (as in locating a single battle in the context of a whole war, or locating a particular economic decision in the framework of a government's overall economic policy). This double-sided concept of locating is vital to understanding the process of learning, in particular how new insights are assimilated into a bigger picture (see Chapter Twelve) and how learners come to reconceptualise a field of inquiry (see Chapter Thirteen).

The advent of the Internet, and latterly of the World Wide Web has brought an abundance of resources within the reach of a much larger range of learners and potential users. In doing so, it has placed greater emphasis on certain fundamental skills, which I have referred to in Chapter Four as ICT literacy. However, the whole issue of locating resources is clearly much more than a technical exercise, depending as it does on an evolving understanding of the subject.

In a study reported by Hölsher and Strube (2000) on 'Web Search Behaviour of Internet Experts and Newbies,' it was found, not unexpectedly, that those who enjoyed the greatest success in rapidly identifying relevant resources were those with double expertise, in other words, with high levels of technological fluency and of subject-matter expertise. In the final analysis, the Web has been a boon to experienced and dedicated self-directed learners, but it has not solved the age-old problem of actually making sense of what is found, and accordingly this is dealt with in the next chapter.

11 Evaluating Sources and Resources

The new education must teach the individual how to classify and reclassify information, how to evaluate its veracity, how to change categories when necessary, how to move from the concrete to the abstract and back, how to look at problems from a new direction— how to teach him [or her]self. Tomorrow's illiterate will not be the [person] who can't read; [but rather the person] …who has not learned how to learn (Herbert Gerjuoy, n.d.).

11.1 Introduction

In an era characterised by continuous change, there is an imperative for continuous learning. Some of this learning is accomplished through participation in formal programs of education or training; however, most of it occurs incidentally and unplanned, as a consequence (and in the context) of going about everyday life. Between these two extremes, there is a vast array of deliberate learning efforts, many of which depend on the self-directed activity of independent learners.

For those who undertake some part of their learning through formally structured programs, there is a reasonable expectation that the experiences they undergo, the teaching sessions they attend and the resources they are asked to consult will provide a carefully orchestrated and arranged selection from the total universe of available learning material. While this in no way detracts from the requirement for such learners to exercise their critical faculties, nevertheless, one of the reasons they might choose to enroll in a course or program is precisely because of the overwhelming amount and variable quality of information that is presently available.

The self-directed learner, on the other hand, whether through choice or force of circumstance, has the opportunity to decide for him- or herself what is worth pursuing; to read some articles but not others, to listen to some opinions but not others, to participate in some experiences but not others, to entertain some ideas but not others. While the 'student' and the 'learner' both have ultimate responsibility for judging the quality of the ideas they each confront, it could be argued that there is a greater onus on the self-directed learner to evaluate and decide amongst alternative resources and contentions:

this is one of the trade-offs that the self-directed learner makes, that of freedom over convenience. With that freedom comes the difficulty of discerning relevant from irrelevant, credible from unbelievable and reliable from unreliable knowledge claims and sources. This capacity, which forms a major component of the concept of 'information literacy' (see Chapter Four) is challenging enough for the expert: it is even more difficult and demanding for the neophyte.

The digital environment further complicates this picture, by presenting the learner with an essentially limitless amount of information, much of it indeterminate both as to its origin and its reliability. The focus of this chapter is on information literacy in the context of learning through digital and online resources.

11.2 Ratings provided by search engines and portals

In addition to the vast treasury of information now made available by the digital revolution, one of the great boons provided to the inquirer is the fact that search engines automatically rank the sites they identify. This means that, despite the often overwhelming number of 'hits' obtained, the searcher may be able to narrow his or her inquiry fairly quickly by concentrating only on those items that appear toward the top of the list. Furthermore, as search engines become 'intelligent,' and are able to 'learn' from the successive search terms employed, and sites actually chosen and viewed, by the user, in theory they should become more selective and refined in their search criteria.

Of course, it is not quite as neat as this description implies. For a start, as discussed in the previous chapter, the search tool can only identify those websites that it can 'see' and there is an ever-present possibility that the information being sought might be in the 'deep' as opposed to the 'surface' Web, if it is on the Web at all. Perhaps more importantly, there is the question of exactly how various search engines arrive at the ranking or rating they allocate. Some use a popularity rating, so that more frequently visited sites are given higher prominence. Ironically, of course, this has a tendency over time to be self-reinforcing, since such sites receive further 'hits' from searchers due to their prominent ranking. Others might rate the sites according to their number of links with other sites, or the number of times various search terms appear in the site (at least in the first few lines of text). Some are rated on the basis of linguistic cues embedded in the text, and some by complex inferential formulae that predict the likely usefulness of particular sites to individual users. Some might be commercially 'promoted,' which means that the site's owners pay to have their article or site featured by the search engine.

It is important to recognise that whatever prominence or priority may be accorded by an automated program, it is still the role of the searcher to exercise his or her own judgment about the relevance, currency, utility or reliability of the sites and sources 'recommended' by the search device. Moreover, as will be discussed later in this chapter, such criteria are not fixed and invariant but rather are iteratively refined during the progress of a study or project.

In an era replete with frauds and fakes, counterfeits and misinformation, information overload and data smog, information users turn for advice wherever they can. Recognising the opportunity—indeed the obligation— to provide some sort of guidance to users, attempts have been made by reputable organisations, government departments and agencies, universities, publishers, professional associations and other trusted authorities, to place some sort of imprimatur or seal of approval on those sites they have assessed as trustworthy and reliable. In particular, the maintainers of portals are increasingly claiming that any websites to which they connect or refer directly have been subject to some sort of quality assurance process and are therefore trustworthy.

However, one of the greatest strengths of the web, namely its complex and unconstrained interconnectedness, can also be a weakness. While a portal may be able to vouch for the quality of the websites to which it links directly, it is impossible for it to offer the same assurance about those that are at one remove or beyond. Thus a learner, progressively and unwittingly following a series of links and leads, can start from a known and trusted source and before long find that the quality and credibility of the information has diminished with distance from the starting point. It may be impossible to say for certain at what point he or she passes beyond the 'safe' limits of the approved site to the uncharted 'wilderness' that lies beyond. Indeed, even back at the start of such a search chain, at the core of the information web for that particular inquiry, the information user must first of all be personally satisfied that the approving authority, and the approval criteria it uses, are themselves dependable and not able to be counterfeited or simulated; that the seal of approval for a particular website is both genuine and not lightly bestowed.

11.3 The ability to access primary sources

In our society, a lot of information comes in predigested form. It is commonly compiled, assessed, edited, condensed, or otherwise transformed by a diversity of agencies such as educational institutions, the media, publishers,

companies and corporations, Governments, professional associations or various special interest groups. In fact, such distillation or crystallisation of material is probably a blessing, given the huge amount of information there is to deal with and to digest. Most people have preferred providers of information—journals they read, documentaries they watch, friends they consult, commentators they trust, authors they follow, even websites they access frequently—which act as intermediaries between them and the overwhelming profusion of available information.

As a strategy this makes perfect sense, but in reality it simply shifts the burden of processing and integrating large amounts of information onto a third party, which means that the information user is to some extent placing his or her trust in someone else's judgment. This raises the question of the reliability of that other person or organisation. In extolling the virtue of dispassionate and objective professional journalism, Shenk writes:

> *Journalists help explain our own lives and society to us. If not journalists, who else will expose medical frauds and careless doctors? Who else will hold politicians to their promises? Who else will examine the design, intent, and honesty of advertising? Who else will monitor the link between campaign contributions and political favours? Who else will monitor airline, train and automobile safety?*
> (Shenk, 1997, p. 166).

Of course journalists perform other informational tasks additional to their role as watchdogs. Shenk goes on:

> *The journalist's loyalty is to some semblance of fairness, if not pure objectivity, whereas the loyalty of marketers is to sales of a particular product.*
>
> *In fact, journalists are more necessary in the glutted world. As a skeptical analytical buffer and—now more than ever—as an arbiter of statistical claims, the new media is an indispensable public utility, every bit as vital as our electricity and gas lines. In a world with vastly more information than it can process, journalists are the most important processors we have. They help us to filter information without spinning it in the direction of one company or another. Further, as society becomes splintered, it is journalists who provide the vital social glue to keep us at least partly in tact as a common unit. For democracy as we know it, a bypassed media would be a disaster*
> (Shenk, 1997, pp. 166–167).

As vital as the role played by the media is, reading selections, condensations, simplifications or interpretations derived from other sources is not always the best way to learn. Often there is no substitute for reading or viewing the full

original document report or data set, partly because only the learner knows what he or she is looking for, and partly because important information may otherwise be lost or inadvertently distorted by an intermediary. The online environment affords unparalleled opportunities for searchers to consult, and to examine for themselves, the full text of documents and websites related to the object of their inquiries.

There are many areas of learning, including history, literature, art, geography, architecture, music, philosophy, sociology and so on, where access to digitised images, or other faithful reproductions, can be extremely powerful aids to learning and to independent inquiry. In the case of many self-directed learners, the online environment provides an opportunity to compare original documents, manuscripts, statistics, maps, certificates, musical scores, photographs, paintings or other resources with the secondary sources and interpretations based on them. For instance, it allows a learner to compare an original scanned document with a transcript; an original map with a later map of the same area, a set of statistics or data sources with the analysis of them by another researcher. It can bring archaeological sites, works of art, historical documents, artifacts, photographs, manuscripts, patents, architectural or engineering drawings to learners in a way that was scarcely possible before. It can allow information to be collated, juxtaposed, rotated, transformed, recalculated, superimposed, or otherwise manipulated in a way that previously or otherwise would only be available or accessible to the specialist. In short, it permits learners to make informed judgments and not be forced to rely wholly on the opinions, interpretations or perspectives of others.

Of course access to original resources is not always positive or desirable. Whilst access to original information such as government or other official reports can make a significant contribution towards informed citizenship, as Shenk points out in Data Smog, too much information can ironically be as detrimental to full and active civic participation as too little. There is a spirited debate in relation to e-Government about how much information is too much. Politicians wishing to appear open to their electorates and their constituents may simply provide so much information, in such detail, that it would be difficult—perhaps even impossible—for the average person to digest, analyse and develop an informed opinion about the issue at stake.

11.4 The mixed blessing of speed on the Web

When engaging in critical evaluation and review, one of the best ways of assessing a knowledge claim is by locating other sources to either corroborate or contradict a particular perspective. In research, this is commonly referred to

as triangulation, a metaphor derived from the field of surveying where the true location of a particular point is determined through measuring it in relation to two or more other points of reference whose location is already known. In the digital world, the user has the advantage of being able to assemble additional evidence, supplementary information or alternative viewpoints with remarkable rapidity. While this was certainly possible in the offline or pre-digital world of learning, it was commonly difficult to locate alternative information; especially material that contradicted or questioned the orthodox or common view. Even when it was available, it might take a long time to assemble needed information and hence to pursue an inquiry and to compare and contrast differing perspective or points of view.

In the online environment, on the other hand, a set of search terms commonly yields a large number of 'hits,' some of which can be counted on to contain alternative, even diametrically opposed viewpoints, thus affording an opportunity for the learner to judge the veracity of particular knowledge claims. Therefore, a search for additional information, whether contradicting or supporting a particular point of view, can often produce results within a short time—sometimes minutes if it is already online—with assistance frequently coming from unexpected quarters or informants halfway around the world. Thus, it is relatively easier to assess the claims of competing authorities, or to triangulate by seeking out supporting evidence, than it was in past times.

The speed of the digital world is, however, a mixed blessing. While it can help to garner and harvest information, it can equally lead to hasty and ill-considered opinions, and can detract from the careful consideration of alternative points of view. In the online world, one rarely hears terms such as 'study,' 'analysis' or 'reflection.' Instead the medium lends itself to 'clicking,' 'surfing' or 'browsing'; activities that are not usually redolent of considered contemplation. It is well established that screen-based technologies are not particularly suited to the presentation of large amounts of textual material, partly because of the physical difficulty of reading from the screen, partly because it can be hard to follow an argument or line of reasoning across several screens, and partly because—unlike hard copy—most sites do not readily allow the user to make notes, highlight text or underline salient points.[1] The evaluation of information, therefore, may tend towards the superficial, a particular concern when the learner is new to a field and requires much more careful and thoughtful attention in order to form a considered opinion.

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1 It must be acknowledged that this last limitation is actively being addressed through the development of software that allows users to annotate documents or websites, sometimes with spoken comments (a small icon being inserted in the text), but more often with textual additions, some of which resemble self-adhesive 'Post-It' notes superimposed on the document.

11.5 Multimedia nature of the technology

Despite these reservations, many information providers—not only schools, colleges, universities and training organisations, but also government departments and agencies, professional associations and other groups—routinely place very large documents onto their websites. Such approaches make it difficult for learners to absorb, much less to evaluate, the quality of what they are reading and seeing. As a result, they are commonly forced to download and print these documents in order to read them in a more thoughtful and considered way, which can easily end up aggravating the learner's sense of 'information anxiety' or fear, either of being unable to use technologies or of being overwhelmed by too much information

One of the great (but frequently underutilised) strengths of ICT for learning is its capacity to present information in an interesting and appealing way. Static textual information can be enlivened, for instance, through the addition of graphics including photographs, drawings, charts and diagrams. More dynamic information can include video clips, 'sound bites' (music, sound effects or spoken words), and even interactive demonstrations of hard-to-explain or difficult-to-see phenomena such as the internal working of a piece of equipment or the operation of an internal organ within the human body. Networked applications can allow for the incorporation of exchanges, synchronously or asynchronously, with other users.

In terms of evaluating information presented in such a variety of ways, the juxtaposition of information in more than one format—for instance spoken, written, and illustrated—can facilitate the evaluation of any one part simply because multiple perspectives are simultaneously available. Even if the information is not present in one place, and has to be accessed separately from several different websites, the learner is still in a better position to judge the value of each individual component because of the existence and ready availability of a variety of ways of understanding the point.

However, the existence of such additional perspectives, and sources of information, may have some negative aspects. For a start, more elaborate sites inevitably take longer to download and indeed many learners with antiquated equipment, constricted communications channels, or high telecommunications charges may simply be unable to access very sophisticated sites with multimedia content. Assuming, however, that the learner can access the information in a range of formats, he or she needs to guard against the possibility of being swayed simply by the attractiveness or novelty of a particular website. This point is dealt with later in this chapter in discussing the evaluation of websites.

Finally, there is the fact that sites do not remain static and that information can alter between visits. One of the strengths of digital technologies alluded to earlier is that they allow for mutability, either on the basis of monitoring changes in some variable—such as stock numbers, temperatures or prices—or because they have been deliberately designed to be altered by the owner or by visitors to the site: for example, weblogs, discussion lists and forums. In both cases, the changes can alter the site and hence the value that a user might ascribe to it. But as discussed elsewhere in this study, it is possible for a site to be modified insidiously, in a surreptitious or inappropriate way. Unless the user is particularly observant, he or she may be unaware that alterations to the content or structure of the site have been effected, which, if it were evident, would significantly change their judgment about the site. The volatility of information online is particularly problematic, and will be considered further in the next chapter.

11.6 Following hypertext links

Learning nearly always involves following a trail. As discussed at the start of this chapter, in the case of learning through a course or program of study, the trail is commonly laid out by the teacher, trainer or facilitator, usually on the basis of established convention blended with that person's own previous explorations in the field. In the case of the self-directed learner, on the other hand, the trail is largely if not entirely blazed by the learner, with few restrictions, but equally with few landmarks or other aids to prevent becoming lost. The digital environment can allow the learner to pursue lines of inquiry that seem logical or appropriate to him or her, unconstrained by the conventions or orthodoxies of the field. It might therefore be surmised that the digital revolution will open up scope for lateral thinking, to unexpected and unprecedented connections between ideas being made both within and between fields, and that it will be experienced as truly emancipatory.

Indeed, Cyberspace is generally speaking a less deterministic location for learning than the physical world. In his book entitled *Out of Control: The Rise of Neo-biological Civilization*, Kelly notes:

> *Many participants prefer the quality of writing on the Net to book writing because Net writing is of a conversational, peer-to-peer style, frank and communicative, rather than precise and self-consciously literary. Instead of the rigid canonical thinking cultivated by the book, the Net stimulates another way of thinking: telegraphic, modular, non-linear, malleable....*

> *There is no central meaning, no official canon, no manufactured consent rippling through the wires from which one can borrow a viewpoint. Instead, every idea has a backer, and every backer has an idea, while contradiction, paradox, irony, and multifaceted truth rise up in a flood* (Kelly, 1994).

However, the same open-endedness within hypertext documents and links can make it difficult for a learner to evaluate the sources that he or she is accessing. As discussed in Chapter Ten, when learning from familiar resources (including the printed word in hard copy), the learner is usually able to recall the steps taken to reach a particular point in his or her journey. Familiarity with the artifacts of the world of atoms, rather than of bits, means that learners can usually remember both where they are up to and how they got there, although for obvious reasons, this is more difficult if many events intervene or if the resources do not seem particularly relevant at the time. As discussed in the previous chapter, the process of finding resources in Cyberspace can be difficult for the person more familiar with the look, feel and organisation of other learning resources. In the digital world, on the other hand, the process of following a hypertext trail can leave the learner removed by many 'clicks' from his or her starting point.

The familiarity of written and spoken words has another anchoring tendency, because the flow of ideas renders it relatively easy for the novice to locate new ideas in a context provided by other concepts and the 'narrative structure' of the argument. However, when he or she 'clicks' onto a series of links, it is easy to lose track of the way in which particular knowledge claims are related to each other, if indeed they are at all. As mentioned previously, the hypertext nature of the digital environment allows for a diverse range of (sometimes contradictory) information to be assembled and juxtaposed; however, this often means that a learner may have difficulty in creating a conceptual model of the field and in evaluating the utility, reliability or comprehensiveness of any given set of information he or she encounters. This issue is dealt with in the next chapter.

11.7 Judging the quality of online resources

As discussed in Chapter Four, few of the tacit criteria used to evaluate hard-copy material carry over directly and unproblematically to the digital environment. The multimedia nature of online resources is one significant difference, as is the inherent changeability of electronic materials. Even the appearance of websites and other digital resources makes it difficult to apply familiar and conventional criteria to this context, as the physical appearance

of websites is not always an infallible guide to their quality. The same authoring tools are available to those who place high quality, well-researched and thoroughly dependable information into the digital environment as it is to those who contribute incomplete, biased, misleading or poorly conceptualised material. There are relatively fewer marks of quality because the web pages of frauds, con men and tricksters can look every bit as authoritative and reliable as those of reputable authorities; a fact that underlies the practice of stealing entire websites ('page jacking') and making minute changes to address lines so as to trick visitors.

While the experienced searcher or subject matter expert may be able to distinguish good sites from poor ones, it is more difficult for the beginner. As a result, a number of checklists have been developed to allow users to discern the quality of the resources they find. Many of these may be found in Auer's detailed 'Bibliography on Evaluating Internet Resources,' which is a mixture of print-based and Internet-based resources. The bibliography itself can be accessed online at http://www.lib.vt.edu/research/evaluate/evalbiblio.html [accessed 7 November 2002].

Despite the utility of various checklists, they can never substitute for the hard intellectual work of actually forming judgments about the acceptability or otherwise of various sources. This process of evaluation is a complex one that is affected by the learner's intentions, his or her growing level of expertise, and even the particular purpose for which a resource is needed. As Nilan et al. state, it is assumed 'that users are active, creative individuals who perceive themselves as moving through a constantly changing time/space where the individual's role is to make sense of the ever-changing environment' (Nilan et al., 1988, p. 163).

While this comment was made in 1988, well before the widespread availability of the Internet or the invention of the World Wide Web, it remains fundamentally true today; indeed, if anything the environment is more changeable now than it was then. One of the changes has been the development of new modes of communication, including hypertext and email. Accordingly it is worth asking, as Bawden (2001) does, whether there is an epochal shift underway, and whether conventional notions of information literacy should give way to an electronically defined version such as 'Digital literacy.'

In a paper entitled 'Extending the Meaning of Literacy,' for instance, Misson and Mason make the point that email is an emergent 'textual modality' that is becoming increasingly commonplace in learning environments:

> *New ways of writing, new genres are being created as people are discovering that they can relate to each other in different ways*

through email technology. Literacy is a social phenomenon, developed to communicate information between people, and this new medium gives a rare opportunity to examine the ways in which textual forms are shaped by and in turn shape human interactions. The conventions are quickly being established, as are distinctive patterns of usage. Undoubtedly notions of what is 'done' in email and what isn't will firm up. Research will need to be done as a basis for both teaching students to use email appropriately, and to release its full potential both as a general communicative medium and as a major educational tool (Misson & Mason, 1997, p. 4).

They also stress that hypertext too is a new way of communicating information which is developing new forms of literacy, partly because of the invisibility or embeddedness of the information to which the links lead and partly because of the open-ended nature of the multiple pathways they provide. Not everyone agrees that hypertext represents a truly new dimension to textual communication. Lee, for example, writes:

Despite claims to the contrary by some theorists, hypertext is neither new nor innovative. In nearly all cases … it is simply providing links … guiding [users] to other explanatory information or to supplementary material. In other words, exactly the same type of thing good teachers have been doing for centuries, or an imitation of the function of notes in good teaching texts (Lee, 1999, p. 21).

In my view, however, digital hypertext does represent more than the supplementary materials that may be provided by a teacher or the references within a printed text, partly because of the multiple alternative pathways that may be pursued by the reader. They seem to go beyond conventional cross-referencing between ideas, and accordingly call forth new kinds of literacies.

11.8 Evaluation and the learning community

The process of learning, even self-directed learning, need not be a lonely or isolated one. The mere fact that someone makes a decision to plan and undertake his or her own learning does not preclude the possibility of being part of a community of learners with similar interests. In fact, many self-directed learners are part of groups which share often quite deep and rich connections around their area of interest.

Sometimes these learning groups revolve around professional or work concerns, others may be more geographically defined, with a city town suburb or other community forming the basis of shared learning. Topics in this context

might include environmental degradation, local educational provision or town planning. There are also groups drawn together by a shared interest or concern. Examples range from families where one or more members suffer from some serious and debilitating injury or disability, through people with a shared linguistic, ethnic, religious or cultural identity, to geographically dispersed individuals united by a common passion around some topic or theme such as colonial history, renaissance music, Spanish literature, rose gardening, still photography, sports or any one of the myriad other interests around which clubs, associations and societies form and develop.

Across this full range of situations, such groups are powerful settings for learning and, because their members are generally volunteers, their motivation is strong. But in addition, groups like these afford an opportunity for learners to contribute to the insights and understandings of others. Since the dawn of time, learners have been teachers and teachers have been learners in an ongoing cycle. The triumph of the professional pedagogue is both relatively recent and relatively minor in the total pattern of learning that goes on throughout the lifespan (Cremin, 1978). In many of the settings referred to above—learning in workplaces, local communities and common interest groups—learners have the opportunity to share their insights and discoveries with each other in truly democratic and egalitarian ways. Even in formal education, tutorial discussions are commonly led by students for the benefit of other students and, in the upper reaches of the academic enterprise, including the scholarly community, when experts submit their work for review and evaluation by others, there is the underlying value of input, feedback and comment from peers.

These same dynamics have also been harnessed and made available in the digital world, so that the process of evaluating sources and resources may be facilitated through consultation with others. At one extreme there are peer-reviewed scholarly journals, where nominated readers have the opportunity to offer insights to an author before an article is formally accepted and published. At the opposite end of the spectrum, at least in relation to formality, there is the often incidental learning that occurs through sending and receiving emails or participating in discussion groups—both synchronous and asynchronous—or, as Mayes and his co-researchers in the Vicarious Learner Project point out, even being a party to other people's learning, since the questions they raise and the comments they make commonly challenge existing conceptions and understandings.

I will deal with this subject at greater length in Chapter Fourteen on networking, but in the current context there are two major points to be made. First, that the learner may explicitly seek the expertise and ideas of others when making judgments about resources he or she encounters in the digital

world. There is always someone else with more expertise, greater experience or more specialised knowledge to whom to turn for help and, in the online world, such people need not be in the learner's immediate circle of acquaintances—or for that matter even on the same continent—for their help to be available. Second, each learner can contribute to others' learning, by offering useful information, insights or opinions on a topic of interest. A good example of such learning in the digital era is afforded by the way in which commercial sites such as online booksellers provide a forum within which customers, in this case readers, may review products and offer their opinions and experiences for the information and guidance of others. It is not necessary to have met the reviewers for their comments to be helpful and instructive. Thus the virtual world offers many advantages in terms of the evaluation of materials, ideas and resources; it can considerably extend the reach of the self-directed learner.

Naturally, however, a degree of caution is advisable in treating the views expressed by others. Without knowing who they are, or what perspective they espouse, it is difficult to know how much weight to place on their comments. Moreover, it can be difficult to understand fully the subtle nuances in an expressed opinion without some of the vital paralinguistic cues—facial expressions, posture, body language, or the opportunity to raise an eyebrow or look quizzical in return—that are so vital to effective communication in the face-to-face world. In making judgments and expressing values as mentioned previously, the online context offers distinct advantages in increasing learners' 'reach,' but corresponding disadvantages in narrowing their 'grasp.'

11.9 Conclusion

It is apparent that the World Wide Web provides unprecedented access to information on just about every topic imaginable, much of it from the comfort and convenience of the searcher's own workplace, home or community. But the negative side of this availability is the proliferation of information of dubious provenance, and the abundance of incorrect, out of date, misleading, mistaken or biased material. It is incumbent on the searcher to bring to bear the critical faculties needed to distinguish correct from incorrect information.

The capacity to evaluate resources is fundamental to all learning, but it is particularly vital in the case of self-directed learning, where a failure to exercise a discernment about information can lead to misdirected efforts or, worse still, to mistaken learning outcomes. This capacity to judge the quality of information and resources is itself built up progressively; it is both context dependent and constantly evolving. In other words, the more a searcher

learns about his or her domain of inquiry, the finer and better informed are the criteria he or she uses to evaluate resources. Thus, a resource such as a website that may appear perfectly adequate at the start of a learning endeavour, may appear flawed or at least incomplete after the searcher has looked at a number of other resources; conversely, at a later stage in a learning project, he or she may find some materials to be highly relevant that were previously discarded, all because of more recent insights.

In the online environment, the imperative to make informed judgments is actually exaggerated by a number of factors. The sheer volume of information and the pace at which it is expanding place an additional burden on the self-directed learner. So too does the fragmented and boundary-less nature of the Internet, with its concomitant ability to seduce a learner further and further from a known starting point through a series of uncontrolled and often effectively invisible hypertext links. The apparent uniformity of appearance of information found in the digital world emphasises the requirement for the learner to exercise his or her critical faculties, although the ability to triangulate and to corroborate knowledge claims quickly and easily may facilitate this process.

What emerges time and time again is that, although this capacity includes some generic elements including information-seeking and retrieval, technological facility and critical thinking, above all it entails knowledge of the subject under consideration. Thus, for a person to be truly information literate, he or she must have passed beyond the rudiments of the subject. There is a distinctive quality to the ignorance of the beginner in any field; it is only after he or she begins to become more knowledgeable that the ability to make informed judgments about the subject of his or her inquiry manifests itself. This developmental and evolutionary construction of understandings also underlies the process of assimilating new information and insights, which is the focus of the next chapter.

12 Assimilating Information and Insights

Maybe it would help if we didn't call it a computer, which has all those overtones of counting and reckoning. The French call the universal machine l'ordinateur, which I find much more satisfying, since its roots are in the Old French word for ordering and arranging, more illustrative of the machine's functions than mere counting. (In a final bit of poetic closure, that Old French word comes from the Latin technical term for the order of threads in the woof; weaving…being the mother of text.) (McCorduck, 1985, p. 50).

12.1 Introduction

As discussed throughout this study, digital technologies have made impressive advances in recent years; so much so that for many people they are now an indispensable component of their lives. As the amount, quality and accessibility of information has increased, as well as the networking capabilities they offer, technologies have become the preferred (and in some cases the only) way to obtain information in support of learning projects and other inquiries. In the same way that the spread of libraries and literacy fuelled the great explosion of self-directed learning in the mid-nineteenth century, the spread of digital technologies and ICT literacy is creating a new wave of learning in the twenty-first century. In fact, research in the United Kingdom has shown that people who have Internet access are twice as likely to be learning as those who do not (Aldridge and Tuckett, 2001).

However, it is not simply access to information and other resources that accounts for this upsurge in online learning activity. Developments in hardware, software and other applications have combined with the rapid increase in the reservoir of digital resources to support the activities of self-directed learners. In particular, digital technologies have provided hitherto unprecedented opportunities for self-directed learners not only to discover and to access, but to retrieve and manage, to manipulate and transform a wide range of high quality resources, and to engage in networked learning activities. Issues to do with locating resources were dealt with in Chapter Ten; this chapter and the following two are concerned respectively with the three activities of assimilating information and insights, reconceptualising understandings and networking with others.

Whilst it is usually accepted that most learning involves more than simply accumulating and storing isolated 'facts' and insights, like collecting stamps or butterflies, nevertheless in the course of any learning project or activity a considerable amount of information, including insights, knowledge claims and leads, is likely to come to light or to be generated. The challenge for the learner is to keep track somehow of what he or she finds or, in other words, to assimilate information that comes in a variety of forms from a diversity of sources.

This act of assimilation involves two aspects, three if the learning involves collaboration with others. The first is assembling, collocating and managing information, the second is integrating new insights and pieces of information into the learner's existing and developing frame of reference, and the third is exchanging both items of information and overarching frameworks with others. These activities are interrelated in the sense that the mechanics of identifying, sorting and arranging information are predicated on the learner's existing and emergent understandings; but these understandings—the learner's conceptions of the subject—are in turn modified and enhanced through the information gathered, and through seeing new relationships and connections.

In this chapter, I will typify the first aspect of assimilation as 'organisational', the second kind as 'conceptual,' and the third as 'shared' and, although I will consider the three as if they were separate and distinct, in fact they are inextricably intertwined.

12.2 Managing information in a learning project

As identified by Lonsdale (2002) and discussed in Chapter Nine, learning efforts extend from the very simple and straightforward, such as discovering and using a phone number, a business address or the call number of a library book, right through to extensive, complex and lengthy inquiries that may go on for years, such as tracing one's family history, learning about growing and exhibiting bonsai plants, or understanding the art of the documentary film-maker. Clearly the complexity of the endeavour will temper the approach used to manage the information found, although one complication is that many learning projects have quite small beginnings, and it is not until some way into them that the learner realises that he or she should have been more systematic from the outset. Moreover, there is the challenge of knowing which resources to capture, since it is in the nature of many learning activities and investigations that the value of a particular item often only becomes apparent some way into the project.

At the most basic level, assimilating new information such as a person's changed address or how to operate a new appliance is relatively simple and straightforward. Most adults have their own preferred way of dealing with such material and storing it for later reference; a filing cabinet, a kitchen drawer, a storage box, a note book, a personal organiser or, in the case of digital information, a computer disk. The new information is placed into this 'system' and retrieved when needed.

However, when a learning project begins to develop into something more extensive and complicated, such ready-made approaches are rarely adequate to the task of dealing with large amounts of information. It is not simply how the resources are to be physically stored, although this is clearly a consideration, but rather how the information can be captured in such a way that it may be searched and retrieved reasonably easily. Anyone who has attempted a research project will, in all likelihood, have tried various strategies such as using catalogue cards, sorting documents into files or folders, or simply placing information into different piles on the desk or on the floor. Depending on how many resources are involved, their shape or form, and how similar they are to one another, such a system can work well enough, although it becomes difficult to manage when there are large amounts of information, or it is in various forms (for instance textual material, statistical or other numeric data, audio or video records, photographs, maps, plans, charts, diagrams, physical objects and artifacts, etc) that are not amenable to being 'filed' in the ways listed above.

Central to any attempt to file information so that it can be retrieved later must be a classification system. The more complex the topic and the larger the collection of resources, the more comprehensive the system has to be. Furthermore, since most resources deal with more than a single theme or idea, it is possible that any given item might appear under more than one heading or classification. A good example is a library catalogue, where the totality of knowledge covered by the collection is broken down into a number of categories or classes, and each is likewise subdivided into more and more detailed subcategories. New acquisitions are classified on the basis of their content (sometimes more than once) according to certain agreed rules. This has several advantages; the user can easily identify a particular resource and its location, any given item can often be located using different descriptors and, finally, since similar holdings are clustered or grouped together most material pertaining to a given topic is likely to be found nearby. A consequence of this latter is the potential for chance discoveries of relevant material whose existence was either not suspected or had been overlooked.

While few learners or even researchers (except those trained in knowledge management) are likely to develop such complex multi-level systems for

sorting materials, once their collection of resources reaches a certain size, some kind of system is needed. The categories used will be representative of the way in which the learner thinks about the topic, and the headings he or she applies are therefore inclined to be in that sense idiosyncratic. The main drawback of this individualistic approach is that others are unlikely to have the same mental model of the field and, even if they do, they may use different descriptors, with the result that identifying and sharing information can be somewhat difficult. However, the main point is that the ability for a learner to assimilate new information is dependent on his or her developing some kind of 'map' of the domain and, as will be discussed later in this chapter, such a map is likely to be enhanced and refined as a learning project evolves and develops.

12.3 Managing information digitally in a learning project

As digital technologies have become more widespread, and software applications more user-friendly, it is hardly surprising to find that their use in managing information has become more commonplace. In the case of information repositories such as libraries, museums and archives offices, old-fashioned card catalogues (and before that, leather-bound registers of holdings) have given way to electronic public access catalogues, and latterly to web-based versions. Organisations including corporations, professional associations and special interest groups, instead of having catalogues might offer portal or directories through which a range of resources are assimilated under various headings and made available.

For their part, many information users themselves, such as researchers and other self-directed learners, have seen the potential of technologies to assist not only with locating, but also keeping track of diverse resources they discover or create in the course of their projects. However, the use of digital technologies to aid in assimilating information goes well beyond their ability to manage conventional 'hard copy' sources since the digital revolution has also led to a veritable explosion in the availability of information in digital form. Thus, it is important to recognise that digital information management may be applied to resources that are either digital or non-digital. To meet this need, a number of software packages have been developed and marketed; collectively they are referred to as 'personal bibliographic software,' and each offers particular features and attributes.

To take a simple hypothetical example, imagine a learner with an interest in Egyptian archaeology. Through the use of search engines as discussed in

Chapter Ten, he or she may discover a range of relevant resources around the world. Some artifacts may be found scattered in various museums whose catalogues are available via the Internet. Likewise, a number of books and articles may be discovered in the collections of various libraries, again through a search of catalogues accessible via the Internet. In addition, the searcher may locate digitised information relevant to his or her interests, such as journal articles and conference papers that can be downloaded and read, as well as images including maps of dig sites, photographs of hieroglyphs, inventories of burial chambers, and diaries and field notes of researchers.

Such a treasury of information clearly allows the armchair archaeologist to do a great deal of research from the convenience of his or her home or office. At the same time, it also raises the issue of how to keep track of such a diverse range of sources and resources, especially those that are in digital form and thus both invisible and intangible. As discussed earlier in this study, the learner could print out materials and file them along with other printed sources. He or she could download relevant documents onto disks or CD-ROMs or cache them on local servers. Finally, the resource may be left where it is, to be consulted at a later stage, although this approach assumes that the location will remain fixed.

While issues of how to capture and where to store digital resources are important to learners, more relevant in the present context is the question of how data about the sources is to be organised in support of a learning project. It is here that digital technologies have been found to be particularly useful, since they allow for information to be recorded in a form that is flexible and portable, readily shared with others, and easily searchable. If a learner wishes to assimilate information from a diverse range of sources, he or she has either to code the resources themselves, or else to create a separate index or database that is linked to the resources. In the former case, the digital world permits the embedding of useful information (keywords, descriptors or meta data tags) direct into the resource itself, often into an invisible field. However, this requires a high degree of technological proficiency and, in any case, is only relevant for those documents or other resources over which the learner has direct control, not those in the public domain.

The alternative is to create some kind of database with, where appropriate, direct links to the documents or sources being referred to. Basically, two alternative approaches are possible: the use of dedicated, subject-specific software, or of general-purpose software. In the first case, it is possible that specialised software exists which is capable not only of helping to locate and to harvest relevant resources, but also of managing the information that has been found. In these cases, the classificatory system is already built into the software, commonly using fields and descriptors recognised within the

particular domain. To take a familiar example, one of the most common uses of digital technologies for self-directed learning projects is for people to trace their family histories. As a result, there are not only many online resources and websites, but also entire suites of purpose-built software to facilitate the process of collecting, collating and analysing information that can be assembled from diverse sources (for instance records of births, deaths and marriages, parish records, census records, shipping passenger manifests, family bibles, military service records, wills, land transactions, and so on.) Commonly, such information is painstakingly acquired and pieced together one fragment at a time. However, different information about the same individual can be gathered together and merged, creating a more comprehensive picture of the individual, or even of a whole family. What is more, depending on the software used, the consolidated family tree can be shared digitally with other researchers, whereupon it may be integrated into even larger agglomerations such as collective genealogies of interlinked families within a village.

In the majority of cases, however, where specialised and domain-specific software has not been written or is not available to the learner, he or she will probably use a simple and commonly available database or spreadsheet instead, in which case the structure of any resultant database will represent the personal and sometimes idiosyncratic views of the learner. In either case, whether the software is dedicated and purpose-built or generic, the mere fact that it is available does not mean that self-directed learners will be able to use it. They must first of all be aware of its existence, be able both to obtain and to install it on their own computer, and finally have sufficient technological proficiency to use it effectively. Thus, as discussed in Chapter Four, there are issues of Information technology literacy which, as digital technologies become more widespread, will need to be attended to in the curricula of disciplines and fields of study in schools, colleges and universities.

But this, too, is only part of the story. As discussed throughout this study, ICT literacy is only one aspect of what is required in order to learn online; another is Information Literacy including (but not limited to) the ability to make informed judgments about the quality and utility of information encountered. One of the great virtues of the non-linearity of the digital world—in particular the World Wide Web—is that information from very different contexts, environments or even paradigms can be encountered by learners, with the result that they 'almost inevitably read multiple pages on the same topic written by different authors' (Britt and Gabrys, 2001, p. 75). On the one hand, this provides them with a range of alternative perspectives; but on the other hand, 'one problem this causes for [learners] is the need to take information garnered from one page and integrate it with what one has learned from other pages…' (Britt and Gabrys, 2001, p. 75).

In terms of assimilating information and knowledge claims derived from different, possibly even incommensurable perspectives, the challenge for the self-directed learners is clear: how to evaluate the information and how to classify it. These exact skills are, as Britt and Gabrys go on to point out, 'quite similar to those we have found essential for high school students learning to use primary documents in history classes' (p. 75). A similar point is made by Wiley and Voss who comment that their own research 'suggest[s] that students were developing a better understanding *when they had multiple sources* and a task that required them to integrate the sources' (Wiley & Schooler, 2001, p. 252, emphasis added). This of course is precisely the situation faced by the self-directed learner.

In short, then, all learning involves assimilating information and insights, but in the digital environment the speed, complexity, diversity and volatility of this process are amplified. Fortunately, however, the same technologies that give access to expanded resources can also be recruited to aid the process of managing them. However, these various applications all depend to a significant extent on the existence of the learner's conceptual framework, which both precedes and follows from the assimilation of new information and insights. Accordingly, it is to this central issue that I turn next.

12.4 Assimilating information into personal frameworks

It is a striking fact that in learning, as in other domains of human endeavour, no two people will necessarily see or experience the world identically. Generally because of their education, upbringing and cumulative previous experience, individuals are inclined to see the world in particular ways, to categorise events people and ideas differently, and to assign varying levels of importance salience or sovereignty to different knowledge claims.

The recognition that people construe the world in distinctive and individualistic ways has confronted educators and information specialists alike. For educators, it lies at the heart of many issues in instruction and evaluation, especially in open-ended domains where a number of interpretations are possible, because it acknowledges the fact that not all learners will understand any single instructional event in the same way and, accordingly, that this must be recognised in the assessment of that learning. In the case of those placing information into the public domain, especially if the information is organised or arranged according to a particular conceptual model or framework, it is possible that the would-be user may not be able to locate the information because his or her understandings are not arranged under similar

headings. A minor but compelling example is when one seeks information from the Yellow Pages telephone directory; it is a common experience to find that a particular service or product has been categorised under some unexpected heading, and while the logic might be obvious in retrospect, the information remains well hidden unless the searcher comes to grips with the classificatory system. In short, it is an enduring challenge to those who would seek to help others who wish to learn something.

These personal frameworks have a number of names. They may be called personal constructs, concept maps, cognitive frameworks, schemata, worldviews, meaning structures, personal models or a number of other synonyms. By whatever name, they are highly personal and individualistic systems through which, and categories by which, learners classify, sort and store information. However, they are not simply a passive set of categories or constructs, pigeonholes into which new insights and information are placed. As a sort of representation of the world through which each person makes sense of reality they also shape and condition what he or she expects to see and to experience; it is a fundamental tenet of constructivism that conception determines perception. This helps to explain why certain information may be effectively 'invisible' to some learners; they do not see it because it lies outside the limits or boundaries of their customary frame of reference.

There is another sense in which these frameworks are not just passive or fixed; they actually change in response to new learning. The great developmental psychologist Piaget claimed that learning proceeds through two major processes: assimilation, 'where the learner makes sense of new experiences by adapting them to fit into pre-existing schemas, and accommodation, where schemas are [themselves] modified to take account of new experiences' (Scriven, 1995, p. 5). There is an analogy here with Kuhn's often-quoted concept of a paradigm shift. According to Kuhn (1970), 'normal science' proceeds within an agreed framework that is commonly shared within a community of interest. Sometimes, however, there is an accumulation of anomalies, which can only be explained through a different explanatory model or paradigm. A viable alternative paradigm needs to be able to explain and take account of all existing phenomena as well as explaining the anomalies and, as is well known, there will not be paradigm shift until a sizeable majority of the relevant community of interest comes to embrace it.

The similarity to individual learning subsists in the fact that individuals will continue to assimilate new items of information into their existing framework of understandings unless and until a compelling new alternative is able to replace it. In 1982, I proposed a three-tiered model of learning along these lines (Candy, 1982), of which the three elements were elaboration, modification and transformation. Based on the conceptual framework

proposed by Kelly as early as 1955, I argued that new information can elaborate some relatively small and confined aspect of a person's construct system, lead to a modification of some part of the system or, in extreme cases, challenge and completely transform someone's view of the world or of their place in it.

Clearly these latter conceptions of learning—akin to a personal paradigm shift—are much more subtle and sophisticated than the simple gathering (or transmission) of isolated fragments of information; learning is primarily an act of construction, in which the learner comes to attribute different meanings to the object of his or her inquiry. As mentioned in the Prologue and discussed in greater detail in Chapter Fifteen, such learning is commonly attributable to some kind of 'conversation' involving the learner (Thomas & Harri-Augstein, 1985).

As new information is incorporated into a learner's personal framework, it subtly alters that framework, in turn changing the context within which such further learning takes place. This whole theme is dealt with at length in the following chapter; however, in terms of assimilating new ideas or new experiences, it is important to acknowledge that learners are not tabula rasa, even in relation to areas that are ostensibly quite new to them. Moreover, if new experiences or information are to be assimilated into existing frames of reference, then those frames of reference must be structured in such a way that relevance is perceived between what the learner already 'knows' and the new information. As discussed earlier in this chapter, the pre-existing conceptualisation provides a way of bringing order to the otherwise chaotic confusing and undifferentiated nature of the world, in which either everything, or nothing, may be seen as being relevant to a particular learning project.

12.5 Assimilating digital information into personal frameworks: dynamic versus static environments

From the foregoing, it is apparent that there is a reciprocal relationship between the processes of assimilation and the frameworks into which new information and insights are integrated. On the one hand, the learner's conceptual models influence the learning approaches taken and create the structures into which new information is assimilated, but, on the other hand, the assimilation of new information subtly changes those categories in an iterative cycle. The question is whether the digital environment has affected these relationships: in other words, does the process of searching for and interacting with resources online differ from its offline counterpart?

In Chapter Ten I discussed the dynamics of the search process, concluding that 'the learner's search strategy is influenced by a number of variables, including [among others] the learner's existing level of familiarity with the field…' Based on the issues raised in the present chapter, it is clear that how a learner understands or frames a particular domain is in fact vitally important to the conduct of his or her search. In that chapter, I also alluded to the phenomenon of 'smart' search engines including personal web watchers and portals, which progressively 'learn' what users are searching for. At the outset, such devices simply accept whichever search terms are inserted into them; however, as an inquiry proceeds, they adapt to the perspective of the user, being programmed or 'shaped' by the search terms used and the sites visited or downloaded, and hence by the user's conceptualisation of the field. Eventually, they are able to undertake autonomous searches on behalf of the user, seeking relevant sites that may have escaped the user's attention or which have only recently been created. However, such 'smart' devices are not limited to the search terms that are entered into them; like librarians, they also make use of inferential logic, as well as a range of thesauruses, so that alternative search terms are automatically invoked whenever a user requests some information. As a consequence, unusual or unexpected findings may be thrown up, which prompts the user to revise his or her original perspective.

While the responsive and ultimately intuitive nature of 'intelligent' search engines represents one distinctive feature of online self-directed learning (although in some ways it begins to approximate the assistance provided by a librarian or information specialist offline), another is the increasingly widespread use of hypertext documents that are non-linear in their construction. Prior to the emergence of the Internet, and more specifically of the World Wide Web, the most common way in which learners encountered new ideas was in a narrative format, in which a creator or presenter, such as a lecturer, broadcaster, author, artist, or film director sought to guide the reader, viewer or listener to encounter certain ideas in a particular and fixed order. Of course this was no guarantee that people would develop a shared understanding of the topic—the diversity of interpretations of any piece of writing, film-making, art work or other storytelling is clear evidence of that—but at least there is the likelihood that the creator could develop a narrative trajectory through which he or she could take the readers or observers on a voyage of discovery.

Hypertext documents, however, as previously discussed, are less deterministic, providing a range of possible pathways and a set of links and connections that may be explored in whatever order makes sense to the 'reader,' who accordingly places each idea into a context—what Bush might have called an 'associative trail'—that seems personally appropriate and relevant. With the limitless possibilities afforded by the World Wide Web, users are able to

pursue whichever links and connections seem interesting and pertinent to them, thus giving free rein to their own personal interests and perspectives.

It is interesting to note, in passing, that hypertext documents are not strictly a creature of the digital age. For instance, for hundreds of years there have been analytical concordances to the Christian Scriptures that provide readers with alternative pathways into and through the Bible and the Apocrypha by providing a complex pattern of footnotes, cross references and comparisons between different parts of the text. In the literary world, too, there are precedents for books that lack a strict narrative structure. One of the first authors to break away from the normal story telling paradigm, and to write in a recursive and non-linear way was James Joyce, whose work such as *Finnegan's Wake* has been recognised—both in form and in content—as a precursor to the digital world. As Theall says in his widely quoted paper, 'James Joyce and the Pre-history of Cyberspace':

> *It has not been widely recognised just how important James Joyce's major writings were to McLuhan, or to other major figures (such as Jorge Luis Borges, John Cage, Jacques Derrida, Umberto Eco, and Jacques Lacan) who have written about aspects of communication involving technological mediation, speech, writing, and electronics. While all of these connections should be explored, the most enthusiastic Joycean of them all, McLuhan, provides the most specific bridge linking the work of Joyce and his modernist contemporaries to the development of electric communication and to the prehistory of Cyberspace and virtual reality* (Theall, 1992).

While Joyce and other authors may have laid the groundwork for the discontinuous, episodic and disjointed nature of narrative in Cyberspace, for the most part authors seek to create a context and a 'logic' to their arguments, and readers are able to access this structuring. However, when users in Cyberspace follow a series of links, whether within a document or between sites, many of these cues are not present, and the learner is left to create his or her own sense without this sort of familiar scaffolding. Britt and Gabrys put it this way:

> *Integration involves making connections between prior and new knowledge. Nonlinear reading (ie following links on hypertext pages) places high demands on the reader's ability to build links between new and prior knowledge in several ways. First, nonlinear texts tend to strip out text devices that create coherence because the author cannot make assumptions about what the reader may have already read. Integration requires that one activate one's existing representation in order to modify it based on new information. Authors of a single text carefully add text devices that invoke this representation before giving new information* (2001, pp. 75–76).

The lack of signposting is only one of the challenges that confront a learner in the online world. A second difficulty created by nonlinear reading is, as pointed out by Britt and Gabrys, that 'it increases the number of documents that require integration.' They go on to observe, 'Nonlinear presentation tends to favour short documents, meaning that more documents must be read to gain the same amount of information as in a more traditional linear document' (2000, p.75–76). In the digital world, this need not be a problem, since the number of documents that may be identified, accessed and retained can be quite large, especially if relevant documents and resources are left to be accessed again via the Internet itself.

Linked to the issue of the number of short documents is a point already alluded to in earlier chapters, namely inconsistencies between various authorities. While at one level this is a distinct advantage, since it allows—even requires—the learner to make up his or her own mind, the negative aspect is that, especially in the early stages of an inquiry, when the learner's conceptual frameworks are still relatively fluid and inchoate, he or she may not have internalised or developed the criteria that allow for informed judgments about various aspects or points of view. While the experienced searcher may well be able to categorise some part or all of a document as flawed, the beginner lacks this facility and might therefore incorporate into his or her worldview information that is erroneous, or incompatible with or contradictory to other knowledge claims.

As a learner develops and refines his or her constructs about the topic of inquiry, so this evolving framework guides the next and subsequent stages of the learning effort. If the learner takes a wrong turning, and embraces a perspective that is fundamentally at variance with other evidence, this can lead to a form of inquiry that is biased or in some way incomplete. As expressed by Britt and Gabrys:

> *A final difficulty with nonlinear reading is that readers are expected to guide their own learning process. Authors of linear texts tend to order their presentations very carefully, giving background information, for instance, before delving into complicated arguments. When [learners] guide their own reading, there is nothing to stop them from jumping right into a complicated argument without understanding much about its context—leading to a potentially impoverished representation of the situation* (Britt & Gabrys, 2001, pp. 75–76).

Of course, many learners might find themselves tangling with complicated arguments not so much because of the nonlinear nature of hypertext, but because of the provisional and contested nature of knowledge in the particular domain. In many fields such as genetically modified foodstuffs, how best to deal with the threat of terrorism, the effects of ozone depletion, the

proper role of the university, and so on, attitudes are sharply divided and, in the digital domain, one may encounter every conceivable hue in the spectrum of opinions. Thus, while it is always challenging to integrate insights derived from a diversity of sources in various forms with a range of different levels of credibility, in the online environment this task is further complicated by the lability of the information encountered. And of course, hypertext documents and websites are perfectly suited to presenting information and opinion (often indiscriminately mixed together) about complex, contested or rapidly changing fields.

Another way in which online learning differs from its conventional counterpart is the potential offered by technologies to link and display information dynamically, indeed almost organically, in a manner reminiscent of the operation of the human brain, with its many nodes and neural pathways. Elsewhere in this study, although particularly in the next chapter, I have drawn attention to the capability afforded by digital technologies to manipulate and portray information in new and startling ways such that the likelihood of the learner assimilating new information is enhanced. Many packages are now flexible enough to adapt to the needs, interests, perspectives and preferences of the individual user and in a way to become an extension of his or her personal style as a learner.

It may be seen, therefore, that in the digital era, self-directed learning can be greatly facilitated by the use of technologies that allow for the assimilation of different inputs into more complex and comprehensive pictures, and at the same time for the assimilation of new information into existing patterns of understanding. At one level, these technologies simply relieve some of the burden of collecting and collating the raw material of a learning effort. As Lieberman and Linn put it:

> *Technological tools usually relieve the learner of tedious tasks, such as those required for information retrieval and management, and thus permit more time to be spent on complex problem-solving. In addition to retrieving or transforming information, the software should provide adequate memory support so that learners can easily find the information they have already gathered, and can review their progress, as needed* (Lieberman & Linn, 1991, p. 388).

However, as I have argued, the utility of these tools is not limited to their role as passive under-labourers in the learning process. There is a whole suite of so-called 'graphic organisers,' that allow learners to 'pour' their ideas into a managed space, and to move them around, changing their relationships in very intuitive and simple ways, often through clicking and dragging on the screen (see, for example, http://www.graphic.org/goindex.html). Of course this is no substitute for the hard work of engaging with the substance of a

learning project, and in both the educational literature and some advertisements for software packages, there is much misplaced confidence in the ability of technologies to make learning easier. But technologies can substantially facilitate the process of reflection. This phenomenon is referred to as volatile hypertext, which Bernstein et al. explain as follows:

> *Volatile hypertexts—on paper or on computer—are created and used by thoughtful, deeply involved readers who need to wrestle with complex and incompletely understood ideas. For example, as scholars explore and describe the internal structure and interrelationship of texts—historical ephemera, inscriptions, manuscripts, novels, poems and plays—new connections constantly appear; the shape of the discourse changes as new ideas, interpretations, and structures augment earlier understanding. Journalists, intelligence analysts, planners and legislators [and self-directed learners] constantly filter and organise texts to convey new understanding, formulating coherent stories from incoherent information or reformulating existing structure to convey new perspective. Early drafts of well-crafted documents are volatile; because thoughtful authors revise and experiment* (Bernstein, Bolter, Joyce & Mylonas, 1991, p. 244).

Increasingly 'smart' technologies like these can suggest possible links between and among data and, through allowing for transformations that would previously have been unthinkable—or at least massively time-consuming—can facilitate the whole process of assimilating new insights into old frameworks. Moreover, as I will discuss in the next chapter, by allowing users to portray their data in new and startling ways and to move ideas around, such software can greatly extend and amplify the learner's own capabilities and lead to transformations in understanding.

12.6 Assimilating as a collective or shared phenomenon

To this point, I have focused on individual self-directed learners, many of whom may be operating in relative isolation and relying on their own skills, aided by the available technology, to help them with the processes of assimilation. However, both online and offline, a great deal of learning occurs in group settings of one kind or another, where the knowledge itself is socially, collaboratively constructed. It is therefore important to recognise that the assimilation of new information can be, and often is, facilitated by social relationships and by the exchange of information and insights between fellow learners.

The phenomenon of learning in groups is as old as humankind, and may be traced back to the very earliest hominids who began to communicate with other members of their family groups or tribes. Even deliberately undertaking managed, distributed learning projects has a surprising long history. For instance, in 1818, 'Joseph Lovell, the Surgeon General of the United States Army, ordered each Army surgeon to "...keep a diary of the weather..." and to note "...everything of importance relating to the medical topography of his station, the climate, diseases prevalent in the vicinity..." ' (Smart, 1893, p. 209). All over the United States, including the most remote frontier territories, Army medical personnel were engaged in a huge, distributed learning project to obtain information about local weather conditions, and to pool this information in order, as a latter-day commentator has said, 'to learn about climate effects on disease' (Conner, 1995).

Interestingly, even today, many meteorological authorities around the world supplement their own monitoring stations by using hundreds of volunteer observers throughout the country who use standardised instruments to collect information in a common format. Another example is the compilation of atlases showing the distribution of bird species. These are commonly based on thousands of individual sightings by enthusiastic amateurs and professional ornithologists alike, separate and often isolated observations can be combined to create an overall picture. In both cases, the readings or observations are transmitted to a central authority where they are combined to create, on the one hand detailed weather maps and climate data, and on the other hand maps of bird populations, for a variety of purposes.

Such modern-day projects differ from the earlier example in a couple of significant ways; one is the use of telecommunications for the instantaneous transmission and consolidation of data from around the state, country or region, and the other is that the data is commonly posted straight onto a website where it is available not only to the collectors and to the coordinating body, but also to other collectors and to members of the public. Thus, the assimilation of the information is a shared—and relatively public—process that benefits everyone.

However, birds and weather are far from the only examples where a number of people collaborate to create new knowledge and where information or insights are pooled in this way. Workgroups, hobbyists, professional associations, researchers, and even creative artists have all found ways of assimilating their findings or their outputs through the use of ICT. For instance, many workgroups share virtual workspaces in which, using group-based software, geographically or organisationally dispersed individuals are able to work together on a single project. Ideas can be exchanged online in real time chat sessions or asynchronously over different time zones, different

individuals or teams can work simultaneously on parts of a project to speed up its completion and build on specialist expertise, and documents can be written, revised and edited through the process of combining ideas from a number of contributors.

In virtually any hobby domain, it is possible to find examples where individuals contribute to each other's learning so that, like creating a jigsaw puzzle, each can assimilate into his or her framework ideas, insights or information provided by others. In universities and research institutes around the world, people who may never have met face-to-face are able to undertake joint research and share the results of their previous inquiries to build up a composite or collective view that none of them could have achieved alone. The Human Genome Project is perhaps one of the most spectacular examples of this sort of collaboration. In the entertainment industry, too, Information and Communication Technologies have permitted musicians to collaborate so that, for instance, sound tracks generated in one country can be matched to video clips created somewhere else.

This kind of assimilation has all been facilitated by the spread of ICT and by rapid advances that allow near instantaneous interactions, by the development of interoperability standards and protocols for the exchange of digital information, and by the creation of shared (or at least mutually intelligible) conceptual frameworks. Overall, the assimilation of information, although it has long been possible, has been greatly facilitated by the evolution of digital technologies, and this in turn has led to the joint construction of more elaborate, complete or insightful outcomes than would have been possible individually. I will return to this issue of the co-creation of knowledge in Chapter Fourteen on Networking.

12.7 Conclusion

E M Forster is credited with the often (mis)quoted quip 'How do I know what I think until I see what I say?' This apparently frivolous comment in fact contains a profound truth about the nature of understanding. It is often not until we 'see what we say,' whether through explaining something to someone else, or actually putting ideas down on screen or paper, or sketching out the shape of a painting or drawing, that we really do understand what we think. Very often, the learner does not know exactly what he or she thinks until it has expressed or been made manifest in some way, and digital technologies have tremendous potential to help learners to explore, visualise and transform an area of interest.

In their three-part model of vicarious learning, Mayes and his colleagues refer to this stage of the learning process as 'Construction,' which in their opinion:

> *[can] be broken down into: selection, linking and classifying. Selection involves picking out of particularly relevant material, linking involves putting the information together in ways which have meaning for the learner, and classifying involves comparisons to relate old and new material into a coherent whole* (Mayes et al., 1996).

According to Mayes et al., 'this is where "secondary courseware" can be very effective,' and they go on to distinguish such courseware from the more expository or 'primary' forms which 'allow learners to gain more familiarity with new material' rather than attempting to integrate it into their individual understandings.

From the foregoing discussion, it can be seen that Assimilation is a vital aspect of learning, and moreover that it is mightily enhanced through the advent and widespread use of various Information and Communication Technologies. Yet it is equally clear that drawing information together is not in itself the central element of learning, which in fact is a qualitative shift in how the learner views some significant aspect of his or her world. Accordingly, in the next chapter I turn my attention to the most complex level of learning; that which entails reconceptualising a field of inquiry or, to use the term introduced earlier in this chapter, transforming the learner's understanding.

13 Reconceptualising:
Learning in the Digital Age

13.1 Introduction

This chapter begins from the fundamental proposition that it is the process of seeing things from a new perspective that constitutes the heart of learning. In light of this starting point, the chapter has two purposes. The first is to explore the potential offered by digital technologies for learners to reconceptualise areas of inquiry, and hence to engage in transformative or deep-level learning. The chapter considers those features of the technologies that militate against, as well as those that facilitate, this process of reconceptualisation in learning. The second purpose is to examine the argument that it is learners, rather than teachers, who have most successfully and comprehensively exploited the educative potential of digital technologies and hence expanded our understanding of that potential. It is argued that learners, in conjunction with software producers, have pushed the learning boundaries of ICT, with education and training providers seeking to capitalise on this phenomenon. And further developments may be expected to occur—in formal education, nonformal training and self-directed learning—as young people reach maturity who have grown up 'bathed in bits.'

A versatile term, the word 'learning' has taken on a range of meanings. At one level there is confusion about whether it is a verb, describing the action of acquiring new information or insights, or a noun, describing the results or outcomes of that action, the information or insights so acquired. Of course it is both these simultaneously; the intended meaning generally being clear from the context. More controversial is the very wide range of activities that are subsumed under the one word, when it is used to refer to everything from learning the name of the neighbour's dog or learning what time the train leaves Platform 4; to learning a new language, discovering that one was adopted or finding out that one's employer is about to go out of business. Manifestly the intellectual and emotional implications of these various kinds of 'learning' are radically different.

Clearly, too, different approaches to learning are implied in each set of circumstances. To refer to the three levels of learning I described in Chapter Twelve, there are major differences between 'elaboration,' 'modification' and 'transformation.' Linked to this is the fact that some kinds of learning are

more amenable to technological assistance than others. In this chapter, and indeed throughout this study, it is my contention that digital technologies are perfectly adequate, indeed in some ways ideally suited, to supporting and facilitating some of the lower-level kinds of learning, especially those that depend only on obtaining information. But in their present state of development, and given the current level of familiarity, there is less evidence of their appropriateness for more profound transformational kinds of learning such as those envisaged in the following:

> *Real learning gets to the heart of what it means to be human. Through learning we re-create ourselves. Through learning we become able to do something we never were able to do. Through learning we re-perceive the world and our relationship to it. Through learning we extend our capacity to create, to be part of the generative process of life. There is within each of us a deep hunger for this type of learning* (Senge, 1990, p. 14).

No doubt there are people whose experience of online learning approximates this ideal, but for many—perhaps most—digital technologies do not immediately commend themselves as a way of radically transforming how we perceive the world and our relationship to it. The great strength of such technologies may lie in their ability to discover and manage information (although even this is far from sure, given the amount and quality of information within the digital domain) or even to communicate with others but the prospect of undergoing a profound and transformational experience online is, for most users, somewhat remote.

If it is to be truly worthwhile and significant, learning must go beyond simply unearthing various decontextualised knowledge claims—ranging from isolated 'facts' and items of data right through to complex and fully formed arguments—and storing them in some form. In its fullest sense, learning must entail some kind of conversation between the learner and his or her own internal world-view (introspection and reflection are of this kind), or the worldview of others. This latter may be a 'live' conversation (face-to-face, at a distance, or online) or a notional conversation with someone else's thoughts as represented by their writing, artwork, music or some other creative output. The point is that some kind of dialogue is implied.

13.2 Learning as reconceptualising understanding

In 1975, a Swedish academic, Säljö (1975), published a groundbreaking study entitled *Qualitative Differences in Learning as a Function of the Learner's Conception of the Task*. Both the research question and methodology (now

referred to as phenomenography) were elegant and deceptively simple; he merely asked a group of students 'What do you mean by learning?' He noted down their responses verbatim, and subsequently analysed them, looking for recurrent patterns or clusters of meaning. Even though the respondents used different words to explain their understandings, Säljö found that all of the responses could be classified under one or other of five categories:

1. Learning as a quantitative increase in knowledge. Learning is acquiring information or 'knowing a lot.'

2. Learning as memorising. Learning is storing information that can be reproduced.

3. Learning as acquiring facts, skills and methods that can be retained and used as necessary.

4. Learning as making sense or abstracting meaning. Learning involves relating parts of the subject matter to each other and to the real world.

5. Learning as interpreting and understanding reality in a different way. Learning involves comprehending the world by reinterpreting knowledge.

Subsequent researchers, especially those interested in learning in formal educational settings, have built on these findings; indeed there is now a large body of literature, much of it from Sweden, Australia and the United Kingdom, which further elucidates these categories of meaning as well as teasing out the elements of different approaches to learning tasks. Although Säljö's original work was completed well before the dawn of the digital era, it has an enduring relevance. Indeed, his five categories might well have been devised with the online world in mind.

Based on this original formulation, other researchers have argued that conceptions 4 and 5 are qualitatively different from the other three, which view knowledge as external to the knower, whereas the last two emphasise the internal aspect of learning and the transformation undergone by the learner in coming to understand the world differently. To describe this difference, the terms 'surface' and 'deep' level learning (which were discussed briefly back in Chapter Two) have been coined. Surface learning is characterised by more or less verbatim reproduction of disconnected elements or atoms of information in which there is:

• a limited understanding of concepts;

• reduced ability to distinguish principles from examples;

• difficulty in developing a logical argument;

• difficulty in recognising which ideas are key ideas; and

• a considerable tendency to forget facts very quickly.

Deep learning, on the other hand, involves an attempt to understand the principles that underlie particular instances or examples and, in the words of Bruner (1957), to go 'beyond the information given.' It is characterised by:

- the development of relational responses to tasks;

- long-term retention of understanding;

- the ability to apply knowledge to novel situations;

- the ability to generate new meanings and new paradigms; and

- enhanced independence in relation to undertaking further self-directed learning.

There is little doubt that, in most instances, deep level learning is preferable to surface level learning and, that, in the majority of cases, this is precisely what most self-directed learners would be striving to achieve. If they are undertaking a learning project for their own interest, they are more likely to want to understand the topic in depth rather than simply to memorise isolated facts and specific examples. This then raises the question: how does a learner attain deep level learning outcomes? The answer, not unexpectedly, is that he or she adopts a deep level approach to learning. Those who think learning is a matter of seeking underlying patterns, changing understandings and comprehending the world differently, approach learning differently from those who think it is essentially a question of memorising or simply accumulating knowledge.[1] In other words, there is a direct relationship between the *approach* that a learner takes and his or her learning *outcomes*. While the concepts of 'surface' and 'deep' are sometimes erroneously applied to the learners themselves, as if they were learning styles, in fact the concepts are not invariant personal characteristics or qualities so much as descriptions of the stance that a learner takes in relation to a particular learning task.

The constructs of 'surface' and 'deep' learning have been developed and most extensively researched in formal educational settings and, within that, predominantly in face-to-face encounters. As a result, there is a considerable body of literature about how best to encourage and to facilitate deep level learning. Since many educational and training providers have moved at least partly towards

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1 There is a third category of approach that has been identified in formal education settings, the so-called 'achieving' approach. For instance, many highly capable students, when confronted with large amounts of material to learn in order to pass an exam (medical students learning anatomy or physiology are a good example) make no particular attempt to learn the material in a deep way, but instead settle for rote memorisation in order to meet the assessment requirements of the course. This has more to do with obtaining good marks and 'playing the system' than it does with learning itself, and since it is largely if not exclusively an artifact of the formal education system with its curricular and assessment requirements, I will not be dealing with it any further here.

open or distance learning mode, there has also been some attention to issues of whether, and in what ways, learners can be supported to undertake deep level learning when there is no teacher, trainer or instructor present.

As an extension of this tradition, with the advent of the online environment researchers have turned their attention to a consideration of whether there are qualities or characteristics of digital technologies that either militate against, or alternatively actively support, deep level learning. Whilst it is my contention that some significant deep level learning can and does occur in the online environment, nevertheless, it is hard to resist the *prima facie* case that digital technologies may have a tendency to lead to more reproductive and superficial learning. In the sections that follow, I will consider some of the arguments and evidence both in favour of and against the proposition that surface level learning is more likely in technologically mediated situations.

13.3 Aspects of digital technology that encourage surface learning

The first and most obvious aspect of the digital environment that is likely to favour a surface or reproductive approach is, as previously discussed, the huge amount of information to which technology gives access. The sheer volume of material that a learner encounters, especially when working on his or her own without guidance, can lead to superficial learning. Instead of testing out complex predicates or seeking supplementary information, the learner might feel completely overwhelmed and opt instead for what seems to be a simple, and preferably also a plausible solution. This phenomenon is particularly noticeable when there are multiple competing explanations; the learner might simply become besieged by alternatives and opt for the first or easiest solution or insight that comes to hand.

Linked to this is the fact that technologies themselves can sometimes present what appears to be the correct choice and can even make this seem as if it is the only, or at least the most logical, alternative. Whether this is a statistic, a word, a date, a formula, a name, a suggested course of action or something else, the inexperienced user may be inclined to accept the 'answer' yielded by a search engine or subject gateway. Intelligent agents sometimes have an aura of inscrutable authority that can lead a learner to the mistaken belief that a particular solution or piece of information is not simply the best, but in fact the only sustainable choice.

The lack of narrative structure within or between hypertext documents can make it difficult for a learner to experience deep level learning. All learning

involves some reappraisal of what was thought before, along with the attribution of new meaning and new salience to insights, values and understandings. In the digital environment, whether in the use of CD-ROMs or in navigating in Cyberspace, the familiar organising principles of narrative—'coherence, significance of all elements, and a fixed sequence: causality and linearity'—are absent. While 'the freedom to explore material and to choose its pace and sequence can be liberating … it can also be confusing, particularly for educational materials' (Plowman, nd, p. 1). Plowman goes on to observe:

> *Reading is not a straightforward linear movement, a merely cumulative affair; our initial speculations generate a frame of reference within which we interpret what comes next, but what comes next may retrospectively transform our original understanding… As we read on, we shed assumptions, revise beliefs, make more and more complex inferences and anticipations; each sentence opens up a horizon which is confirmed, challenged or undermined by the next. We read backwards and forwards simultaneously, predicting and recollecting, perhaps aware of other possible realisations of the text which our reading has negated.*

> *This process of constant adjustment and re-interpretation is more difficult for interactive multimedia because much of the text before and after any given point of engagement is invisible and, compared to books, inaccessible. This is true both at a local level, as only one screenful at a time is visible without scrolling, and at a global level for the entire contents of a CD-ROM* (Plowman, n.d., p. 3).

Finally, deep level learning, by its nature, is usually a challenging and difficult process. It may involve discarding cherished beliefs or personally significant constructs. While such learning can occur through solitary activities such as reading and reflection, it more often results from significant interpersonal contact. Certainly, as discussed in the next chapter, ICT has the potential to mediate connections between people; however, most still find it a somewhat artificial experience, lacking the warmth, and very often the immediacy of direct proximate human connection.

Even in those cases where deep level learning is largely or exclusively an intellectual matter, dependent on considered reflection and careful thought, and even when it is epiphanic, as a result of some transformational experience or flash of insight—the so-called 'Ah-ha!' moment—it is still likely to follow a period of exploration and reflection, of searching, consideration and weighing of evidence. This kind of intensity is seldom associated with superficial and episodic 'surfing' or 'browsing' in a virtual space.

13.4 Aspects of digital technology that encourage deep learning

It would seem, then that there are certain qualities of the technology, or of the virtual experience, that might have a tendency to lead to, or at least to favour, a surface approach to learning. But there are other aspects that pull in precisely the opposite direction, supporting deep level or transformational learning outcomes.

Ironically, one feature that can facilitate deeper learning is exactly the same as one that can lead to surface learning; namely, the availability of large amounts of relatively uncategorised information. For the learner intent on delving deeply into a subject or topic of interest, the ability to access resources from around the world, from every conceivable angle or perspective, is an inestimable advantage. Linked to this is the capacity of technologies to greatly aid human memory, by keeping track of large amounts of data. Much learning draws on large volumes of information, and the ability to retain, or to know where to find, this data is central to such learning.

A second aspect of technology that can support or facilitate a deep approach to learning is its use in games and simulations. Both these forms may involve interaction between the learner or user and the technology, or between the learner and other users, mediated through the technology. In both games and simulations, there is the potential to learn a great deal not only at an intellectual or conceptual level but (depending on how engaging the game or simulation is) at an emotional level as well. Commercially available games can teach people about history, geography, languages, town planning, sociology, air-traffic control, economics and so on. Although many of them are designed first and foremost as entertainment, they can provide a high level of quality learning through intense engagement. In particular, games often embody graphics, sound, interactivity, layered levels of complexity (problems to be solved or terrain to be mapped), and even role-playing which can engage both the imagination and the emotions. The insights gained through games and simulations are assimilated into the learner's existing frames of reference—often sub-consciously and without the learner being aware of it— and often profoundly changing those same perspectives as well.

A further potential for technologies to support self-directed learning is, as discussed in the previous chapter, their capacity to model and manipulate the interactions of large numbers of variables or of complex operations. In learning about statistics, economics, meteorology, anatomy, physics, oceanography, biodioversity, astronomy, and many other topics the self-directed learner may well wish to test his or her emergent understandings

through models that allow for the selective alteration of some variables whilst holding others constant. Through such simulations, technologies can allow learners to test their emergent hypotheses in a safe environment, and to develop complex understandings in a way that would be very difficult, if not impossible, in a real world setting. A related facility offered by some technologies is their ability to transform information, representing it in ways that make sense to the learner and adapt to the individual's learning style, thus providing insights into deep meaning structures or interactions that lie beneath the surface.

These characteristics, combined with the capacity for 'prompting the learner to structure, integrate and to interconnect new ideas with previously acquired ones,' and to provide for 'the easy movement, consolidation and restructuring of information needed by individuals as their knowledge base grows,' mean that digital technologies can, as Rowe (1996) puts it, 'aid thinking, problem-solving and learning.' She states that, 'by supporting processing and compensating for limitations in the processing system, a cognitive tool can amplify cognition and at the same time minimise the amounts of mental effort required' (Rowe, 1996, p. 6).

Allied to this role as 'cultural amplifiers of the intellect' (Bruner, 1966, p. xii), ICT also has the capacity to simulate skills and to allow learners to practice (and even to fail) without causing any real world consequences. Skills such as driving or flying, air traffic control, docking a large ship or performing a complex medical procedure can all be learnt through repeated practice, and each successive attempt by a learner can be compared with his or her previous attempts, or with those of an 'expert' or other learner. I am not referring here to the acquisition of rote-learned skills or simple routines or algorithms through drill and practice, which might be considered the antithesis of deep level learning, but rather the solution of complex problems and the transformation of understandings to create abstract general principles.

Another feature of the electronic environment that could be said to facilitate deep learning is the capacity it provides to network with other learners. In a paper entitled 'Online Pedagogies and the Promotion of Deep Learning,' Rosie writes:

> *The bringing together of tutor-constructed resources and available web links provides a different and richer medium for study. But it is the potential for online discussion that is most fruitful. The study so far has shown that asynchronous discussion has a distinctive role to play. The fact that [learners] can make considered contributions over a period of time has distinct benefits. An analysis of the contributions showed that [learners] often made a couple of contributions in the seminar exchange and then returned some days later to reformulate*

> *their earlier contributions. This reformulation process is an integral part of the promotion of deep learning* (Rosie, 2001).

Of course, Rosie (2001) is referring to the promotion of deep level learning in formal educational settings (in this case, a final year undergraduate course at university), but his point is nevertheless valid. The opportunity to reflect and to contribute in a more leisurely way—and as the participants themselves state, in a more forthright way—than they might face-to-face, represents a real plus for the technology. Indeed, it is not only the act of contributing, but even being in the presence of other learners that can lead to reconceptualisation. As Mayes et al. point out in respect of the concept of 'vicarious learning,' even the ability to see others in the process of learning can be a valued contributor to deep learning, since it often allows the learner to see his or her own worldview in the context of what appears to be perplexing or enlightening to others.

Finally, not all knowledge is individual. Much of it is socially constructed, especially in work and other social settings. Accordingly the capacity of technologies to facilitate sharing of one's own and the clarification of others' understandings—both synchronously and asynchronously—is one of their major strengths in seeking deep level understanding. This phenomenon, which is sometimes referred to as the 'interbrain,' in which 'cognitive activities are increasingly being performed in networked contexts which, to varying degrees, are undeniably virtual' (Wiley & Schooler, 2001, p. 254), relates to the co-creation of knowledge through a learning community. Complex simulations and role-plays, such as that developed by Vincent (1998) in relation to the teaching of Middle-Eastern politics in university, are one example. In addition, various kinds of servers and software are available which facilitate electronic brainstorming, the development of solutions and insights, and the recognition of shared patterns of meaning. I will return to this feature of technologically assisted learning in the next chapter.

13.5 On balance

On the basis of this review, therefore, it seems that technologies themselves are relatively neutral when it comes to either supporting or discouraging deep or transformational learning. They certainly exhibit some facets or features that predispose towards a superficial learning approach, yet to balance this, they offer extraordinary opportunities for the motivated learner to engage deeply with the topic of his or her inquiry.

It would seem that the more important variable is not so much the mode of learning, but rather the mindset of the learner, including the extent to which he or she is genuinely interested in and willing to consider alternative points of view. For instance, it is both intuitively and empirically true that a person who has more-or-less made up his or her mind in advance is likely to be resistant to incompatible or disconfirming evidence. An historian, for example, who is convinced of the identity or actions of a particular historical personage, may well be unwilling to seriously entertain any alternative hypothesis. Thus, irrespective of the evidence or information that may be found by a search engine and presented to the user, he or she will be likely to disregard or discount the information; preferring instead to stick with the original hypothesis. The willingness to change one's mind, to be open to alternative and possibly contradictory solutions, and to engage in deep or transformative learning, is more fundamental than whether one is learning online or in some other context.

The depth of learning attained in any particular case is based on a complex amalgam of the intention of the learner and his or her openness to different points of view, the subject matter being learned including the learner's familiarity with it, and the approach used including the learner's facility or fluency with the technology. Learning thus remains a complex, elusive and multifaceted endeavour, and technology does not mark the end of the human contribution—either intellectual or emotional—to the process.

13.6 How young people's uses of technology are reconceptualising learning

Throughout the world, educators have been quick to recognise and to seize on the potential offered by digital technologies to support their work, with the result that educational providers have been among the most avid and innovative proponents. Yet for many of them, the technologies have been and are embraced not because of their ability to offer a radically different learning experience or to emancipate learners, but rather because they allow for certain existing practices to be carried out more easily.

In his thoughtful and provocative essay entitled 'The virtual library: An idea whose time has passed,' O'Donnell uses the story of a hypothetical farmer to make a telling point about our attitude toward technologies. He writes:

> *A farmer at the turn of the [last] century saw that the horseless carriage could get him to market and back more quickly, but had no inkling that the same vehicle would send an interstate highway*

> *through his pasture and change his way of life forever. It takes a*
> *generation or three to get past the point of depending on the old*
> *medium for a way to think about the new and to the point of*
> *exploiting the new medium artfully in its own right*
> (O'Donnell, 1994, p. 7).

O'Donnell then goes on to make a point specifically about the concept of the virtual library; 'the dream of the virtual library comes forward now, I therefore submit, not because it promises an exciting future, but because it promises a future that will be just like the past only better and faster.'

In many ways, those who advocate the use of digital technologies in education do so 'because they promise a future that will be just like the past, only better and faster.' Of course there is also a considerable literature that draws attention to the possibility of 'an exciting future'; however, a good deal of the literature about teaching and training online seems to accept uncritically the continuation of past practices and underlying ideologies, which tacitly accept the legitimacy of 'transmission,' or simply telling learners something (or, in the online environment, simply making some information available), as the main function of education. There is an enduring and pervasive belief in what Mayes calls 'the heresy of transmission' but this is a flawed and impoverished view of teaching and learning. It also grossly underestimates the power of Information and Communication Technologies to engage learners in deep level learning through meaningful interactions with each other or with resources. To the contrary, it could be argued that the development of online pedagogies represents the first real breakthrough in teaching and learning since the invention of moveable type some five centuries ago. Rowe writes:

> *It seems ironic…that few tools have ever been designed specifically to*
> *facilitate learning. The chalk board is one of the notable exceptions,*
> *particularly in the light of its popularity and longevity. Other tools*
> *such as paper, pencils, rulers and calculators have become important*
> *to education. Many tools and media such as projectors, transmitters*
> *and computers have been retroactively adapted to serve educational*
> *purposes. Few have been developed with learning as the primary goal.*
> *The availability of computers, particularly personal computers, has*
> *changed this drastically. They allow for the adaptation and/or*
> *development of tools with only one purpose in mind: to support*
> *learning* (Rowe, 1996).

It seems to be an inexorable law of technology that, as expressed in Gibson's famous cyberpunk maxim in his classic novel *The Neuromancer,* 'the street will always find its own uses for things.' In other words, users will commonly find for technologies new and innovative applications that were not

anticipated by their inventors or developers. A simple but notable example is the pervasive use of SMS messaging by young people, which has not only taken telecommunications companies and mobile phone manufacturers by surprise, but has also led to the invention of a shorthand language for conveying a lot of meaning very briefly and even to the coining of the term 'thumb people' that refers primarily to SMS messagers and more generally to those hooked on new technologies.

The focus of this study is on self-directed learning, rather than learning that is directed by others, such as schools, colleges, universities and training organisations. It is particularly instructive to look at the uses to which young people are putting information and communication technologies; partly because they are amongst the most innovative exploiters of the medium, and partly because they will become the next generation of adult self-directed learners. And it is not only frivolous or superficial uses of the technology, such as the sending and receiving of hundreds of SMS messages in school, in place of the time-honoured practice of passing notes; there has been a lot of attention, both popular and scholarly, to the impact of ICT on children's and young people's leisure time and, more recently, on the spillover effects of their leisure time on their school-based pursuits.

Popular authors such as Rushkoff (1997), Tapscott (1998) and Turkle (1995) draw attention to the fact that, at least in advanced industrial countries, young people tend to have an easy familiarity with digital technologies, which changes their expectations of what such technologies can do and how they ought to function. Such 'children of chaos,' or as Rushkoff (1997) calls them, 'screenagers' (p. 2) commonly develop—even within the home—a level of digital fluency that eclipses that of most older people with whom they come into contact, including parents, teachers, librarians, youth group leaders and employers.

In his book *Growing up Digital*, Tapscott (1998) makes a similar point about the 'Net Generation,' who, in his view, are 'smart, fluent, social, analytical, self-reliant, curious, contrarian, articulate, media-savvy [and] bored with television' (p. 124). Tapscott argues that those who have been 'bathed in bits' since infancy will probably use technologies not only to access information and to learn, but to play, communicate with each other, do their banking and other business and participate in government, in ways which we have hardly imagined as yet. Likewise, Turkle, in her book *Life on the Screen*, claims that in the age of the Internet, 'it is our children who are leading the way, and adults who are anxiously trailing behind' (1995, p. 10).

It is not only popular authors who have explored the impact of technologies on young people's lives, but scholarly researchers approaching the issue from a variety of perspectives—sociological, psychological, linguistic, educational

and so on. Such researchers tend to be more circumspect about the differential effects of digital technologies depending on variables such as class, gender and cultural background, and they also point to the fact that the number of extremely adept young people with access to the best and most sophisticated technology is not perhaps as great as we have been led to believe. Nevertheless, it is possible to catch glimpses of the self-directed learner of the future.

The widely-cited essay by Tobin (1998), entitled *'An American Otaku* (or, A Boy's Virtual Life on the Net)' chronicles the online world of Isaac Tobin, the author's highly capable 15-year-old son, who, to service his 'obsession' with the fantasy game Warhammer 40K, launched his own website, participated in a game users' list, sent and received a prodigious number of email messages and even worked with other enthusiasts to produce graphics. Tobin writes of the contrast between Isaac's 'scornful' attitude towards school (p. 114), and his 'self-learning' interactions with online peers and with an adult technical adviser, a systems engineer friend of the family, from whom Isaac learnt a great deal in a relationship 'the antithesis of most high-school student-teacher relationships' (p. 116).

While Isaac may be the stereotypical highly computer literate adolescent, his story is far from typical, a message brought home in another chapter in the same book. In their contribution entitled, 'Digital visions: Children's 'creative uses' of Multimedia Technologies,' Sefton-Green and Buckingham demonstrate that, at least when they did the research in 1995, many young people in Britain did not have regular access to the same sort of technology or support as Isaac Tobin, and that, even when they did, their appropriation of the technology was often rather unimaginative.

One study which quite explicitly traces the links between children's activities in 'techno-popular culture' out of school and their effects on school-based learning is the 'Screen Play Project' by Sutherland and her colleagues at the University of Bristol. In this study, they set out to explore what screen-based technologies young people interact with outside school, what significance such technologies have for them, and how they engage with them as 'cognitive tools.' In one of the papers produced during the project they write:

> …*we have explored the ways in which the technology undergoes a process of appropriation within the home, with young people choosing to use the computer to further their participation in an already important activity in their lives, such as writing … or drawing… [We found that] young people are active in constructing their definitions of computer technology and are not simply 'receiving' the construct of the computer generated by familial or marketing discourses… [Although] these home computers are entering an already constituted*

> *social space … such as the existence of sibling rivalry or the exercise of parental authority over children's leisure activities …, we have begun to chart the ways in which this technology is harnessed to resist and challenge some of these existing patterns, as young people develop more expertise and construct computer cultures based around people of their age-group* (Sutherland et al., 2000, p. 211).

Of course, although digital technologies in the home are an extremely important source both of learning about and experimentation with new technologies, not all significant encounters occur informally like this. In fact for many young people their first, and sometimes their only, experience with digital technologies happens in school. With growing awareness of the pervasiveness of online and digital domains, schools and educational systems throughout the world are frantically trying to ensure that both their infrastructure and their curricula are equal to the task of providing an appropriate level of technological literacy. This is a huge challenge for all educational providers, because of the costs—capital and recurrent—and because of the rapidity of change and development in the field. Nevertheless, there is a complex interaction between technology-based practices in the classroom and young people's out of school and post school experiences, and we can confidently predict continuing change in the relationship between self-directed adult learning and increasingly ubiquitous technologies.

It seems likely, therefore, that as young people—for whom these technologies constitute a natural environment—grow into adulthood they are going to further extend the boundaries of all sorts of digital activities, including learning. As this happens, information and communication technologies will be recruited and modified to support the self-directed learning activities of ever-greater numbers and increasingly diverse cohorts of online users (see, for instance, notschool.net in the UK).

13.7 Conclusion

In their landmark study on literacy in everyday contexts, South African researchers Prinsloo and Breier (1996) argue convincingly that the reasons why nineteenth century black South Africans undertook literacy education were often radically different from the reasons why missionaries and other social reformers offered it. They make a strong point, which is still relevant today, that even in the world of formal education, learners are often self-directed as to their reasons for undertaking a course or program of study. More generally, in the world of information and education, there is commonly a significant gap between the intentions and perspectives of the providers and the users.

In the case of the digital world, for instance, there are probably as many different reasons for providing information as there are information providers. For instance, it seems likely that digital resources have been generated:

- to save money (for example by cutting down on printing and mailing costs);
- to meet statutory obligations (such as Annual Reports of Clubs, Societies, Business Enterprises or Government Agencies);
- to serve the needs of specific interest groups, such as members, shareholders, subscribers or customers;
- to speed up the process of communication with stakeholders;
- to save wear and tear on fragile or rare original documents;
- to attract customers or clients;
- to save staff from having to repeatedly answer the same questions;
- to save storage space by keeping only digital archives; and, indeed
- simply to demonstrate the ingenuity or abilities of the author or creator.

Yet irrespective of the underlying motive of the information provider, once its availability and location have been identified, users can access information for their own purposes. If those purposes happen to include learning then, *ipso facto*, the available information is transformed by the user into a resource for learning. As I have argued elsewhere, such learners are often remarkably single-minded and dedicated, with a level of motivation and perseverance that eclipses that of many students in formal courses. Moreover, they commonly demonstrate an ingenuity and persistence in locating, retrieving and utilising resources that likewise far exceeds all but the most committed graduate students pursuing curiosity-driven research projects. It is hardly a surprise, therefore, to realise that in the digital world—so richly endowed with resources, links and leads—self-directed learners manage to locate and use a remarkable diversity both of resources and of applications, many of which were developed for purposes other than the overtly educational. In other words, learners, and particularly younger learners, are helping us to reconceptualise 'an exciting future,' where independent and self-directed learning is not merely a slogan or an aspiration, but a reality. The educative potential of digital technologies, especially the Internet, is being exploited and advanced by learners and users, arguably to a greater extent than it is by teachers, trainers or information providers.

If, as previously discussed in the Introduction to Part I, the World Wide Web is seen as a largely unconstrained frontier, which has evolved in substantially unplanned and uncoordinated ways, then it is instructive to look at how it has been used by learners. In this way, it is possible to get some sense of what self-directed learners want to be able to do. It is apparent that self-

directed learners have accessed a very wide range of resources, many of them from the so-called 'deep Web' to support their particular learning goals and interests. It is evident that a large proportion of the chatrooms and discussion lists that have been set up on the Internet owe their origins to particular enthusiasts, or groups of enthusiasts, who have discovered the potential of the Internet to support networked learning. Likewise, a large proportion of the billions of emails that are exchanged worldwide every day are concerned with learning. Many of the more technologically sophisticated learners—whether alone or as part of a group—have established their own websites, which are often very informative and sometimes extremely authoritative.

Clearly, there are some features of digital technologies that predispose towards shallow or surface level learning, but equally there are certain features that lean towards more meaningful, deep level or transformational outcomes. Ultimately, it depends more on the learner than on the properties intrinsic to ICT themselves. As we look forward to the future in which self-directed learning is likely to be both more widespread and perhaps more influential than it has been hitherto, it is vital to recognise that the technologies themselves are rather less influential than the intentions of the users.

In this chapter I have argued that at its heart, learning entails attributing new meanings as a result of experiences or insights (stimuli) that originate either inside or outside the learner. As essentially a constructivist process, learning involves some sort of transformation, where new relationships are seen, or new salience is attributed or new significance is perceived. As the present cohort of sophisticated and adaptable young users themselves advance into adulthood, not only will the technologies help them to reconceptualise their understandings, but their understandings and patterns of usage will in turn help to reconceptualise the technologies. Central to this transformation is the use of technologies to network with others, and accordingly it is to this theme that I turn in the following chapter.

14 Networking—Contributing to the Community of Learners

This analysis of my experience as a networked learner and this brief exploration of some relevant theoretical concepts suggests to me that Networked Learning does involve radically new discourse practices. The newness of this discursive environment and the natural uncertainty generated by learning itself and the joining of a new discourse community would in my view compound the weight of the words, clunky and burdensome, and promote a tendency towards the need for a more conservative idea of a stable community
(Mann, 2002, p. 74).

14.1 Introduction

In his book *The Virtual Community: Homesteading on the Electronic Frontier,* Rheingold succinctly argues that 'the potential social leverage' of Information and Communication Technologies arises largely from:

> *the power that ordinary citizens gain when they know how to connect two previously independent, mature, highly decentralised technologies: It took billions of dollars and decades to develop cheap personal computers. It took billions of dollars and more than a century to wire up the worldwide telecommunication network. With the right knowledge, and not too much of it, a ten-year-old kid today can plug these two vast, powerful, expensively developed technologies together for a few hundred dollars and instantly obtain a bully pulpit[7], the Library of Congress, and a world full of potential co-conspirators.* (Rheingold, 1993, Introduction)

While Rheingold's claim about ten-year-old kids might be something of an exaggeration, there is little doubt that educational providers, and learners of all ages, are really the beneficiaries of technologies that have been developed and changes that have been motivated more often by military, commercial and security considerations than by intellectual or social imperatives. Although

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7 The term 'bully pulpit' is attributed to President Theodore Roosevelt who referred to the White House as a 'bully pulpit,' by which he meant a terrific platform from which to persuasively advocate an agenda. Roosevelt often used the word 'bully' as an adjective meaning superb/wonderful.

the Internet originated with the higher education and research community, Governments and communication carriers around the world have driven the rollout of sophisticated connectivity and the increased availability of Information and Communication Technologies because they are seen to be significant engines for domestic security, economic growth and global competitiveness. There are comparatively few educationally inspired websites or resources, and also relatively few explicitly educational applications; many of the most familiar resources being adaptations or variations of technologies that have been primarily developed for other purposes.

However, whether for business, government, health, citizenship, recreation or learning purposes, the increasing ubiquity and power of computers, combined with their capacity to network with one another has marked an unprecedented amplification of at least some human capabilities. Up to this point, my emphasis has been mainly on the potential provided by digital technologies to put people in touch with large numbers of rich, but relatively inanimate resources, and to assist them in managing great quantities of 'data' in a variety of forms. It is beyond argument that one of the most stunning legacies of all this progress has been the increased capacity for individuals throughout the world to access unimaginable amounts of previously inaccessible information.

But this is only part of the story. Even more amazing is its potential for what Harasim et al. call 'knowledge networking,' in which individuals, often isolated and with highly specialised interests, are placed in a position 'to facilitate information acquisition and knowledge building' with like-minded people around the world. As Harasim et al. put it, 'Perhaps the most dramatic example is on the Internet. Thousands of discussions on topics ranging from the aardvark to zen are available to anyone with an Internet account…' (1995, p. 10).

It is this dualistic nature that defines the digital revolution, and marks it out in significant ways from its various antecedents; this blending of access to rich resources, and ability to network with others may signal the beginning of a new era for self-directed learning throughout life. But not everyone has access to the technologies, and even those who do, may not fully appreciate or for various reasons be able to avail themselves of the opportunities that now lie before them. This chapter will examine some of the features—both positive and negative—offered by the new technologies in relation to networked learning.

14.2 Social dimension to networking

The first and most obvious fact about networking online is that it provides a human dimension to the digital environment. Those who use information and communication technologies are sometimes portrayed as antisocial 'nerds,' keeping strange hours and lacking the capacity for normal face-to-face social intercourse. While this stereotype may be true of a tiny minority of users, the majority of online learners and users are well-adjusted, fully functioning members of society, who engage in a comprehensive range of social and intellectual exchanges offline as well.

Because learning occurs inside the privacy of people's minds and hearts, it is sometimes thought to be a solitary activity. This is even more pronounced in the case of self-directed learning, which is often construed to be an independent—even a monastic—pursuit in which interpersonal contact is unimportant. However, on the contrary, learning is about more than just accumulating 'facts' or acquiring information. It is a deeply social activity, which involves transactions with other people (Brown & Duguid, 2002). As I have discussed in the previous chapter, in its deep form it is about coming to see some aspect of the world in new ways. It generally involves some sort of 'learning conversation' and, in order for this to happen, it is usually necessary to be exposed to others' thinking.

In conventional real world teaching or training situations, this exposure occurs through both formal and informal interactions inside and outside the classroom. In a range of non-contiguous learning situations, however, including distance education, even though online resources have become more sophisticated, more interactive and more engaging, the limited human contact is often experienced as something of a drawback. In a review of developments over a number of years, Taylor writes that:

> *Distance education operations have evolved through the following four generations: first, the Correspondence Model based on print technology; second, the Multi-media Model based on print, audio and video technologies; third, the Telelearning Model, based on applications of telecommunications technologies to provide opportunities for synchronous communication; and fourth, the Flexible Learning Model based on online delivery via the Internet* (Taylor, 2001, p. 2).

From this thumbnail sketch, it is apparent that each successive model of distance learning has brought it closer to the richness and spontaneity of face-to-face learning. Now, with the advent of the Internet, learners not only have access to high quality resources, but are also able to appeal for help, offer

suggestions and insights, ask and answer questions, draw attention to useful resources, express a range of emotions, and generally behave much as they do in real life. When the medium is supported by audio and even video links, the range and depth of potential exchanges is proportionately greater. Thus, ironically, far from being antisocial, computer networking can be a vital antidote to the aridity of simply accessing text-based resources, and can add an entirely new dimension to the whole enterprise of learning—especially for those whose mobility may be limited.

However, despite these many strengths and advantages, studies of online learners within formal settings have revealed that very few actually see the technology by itself as offering an adequate way to learn. In her study of online language learning, for instance, Felix posits a four-part typology of online learning contexts, where the Web might be used:

- as an addition to face-to-face teaching, with the material used in the classroom;
- as an addition to face-to-face teaching, with the material used in the learner's own time;
- as a distance learning resource, with access to an online tutor; or
- as a distance learning resource, without access to an online tutor.

According to her study; 'Nearly half of the respondents considered that the best way to use Web materials was in class as an addition to face-to-face teaching, and the least preferred mode was distance learning without access to a tutor' (Felix, 2001, p. 308). She also asked about people's preferences with respect to learning alone, with a partner or in a group. In her study; 'only 21% …chose to work alone, the rest preferring to work with a partner (35%) or in a group (44%)' (Felix, 2001, p. 308).

While this research was undertaken with those enrolled in formal courses of study, who might accordingly be expected to betray a learning preference that distinguishes them from self-directed learners, other studies of people seeking information or otherwise learning independently reveal a similar pattern of preference for human contact. In his work on knowledge management, for instance, Prusak estimates that information users are twelve times as likely to seek information from a human being than from a website CD-ROM or database (Prusak, 2002); it seems to be a natural inclination to seek contact with others especially when attempting to learn, or to consolidate learning.

Indeed, it is not just active interchange with other learners that makes a difference; merely being online with other learners can itself be a learning experience. As Mayes et al. express it:

One of the things which both students in a university sitting in front of a terminal and distance learners in their own homes miss is a potentially vital element of the experience of a classroom or group—the observation of other learners. For instance, often in these situations, students recognise that a question being asked by someone else holds a key to furthering their own understanding. This project [the Vicarious Learner Project] is interested in understanding whether this sort of experience, as well as other forms of dialogue, really does promote learning, and if so, how can the power of technology be brought to bear to deliver these sorts of experiences to dispersed groups? (Mayes et al., 1996)

Many users and learners report the vital importance of belonging to an online community not only to their learning per se, but also to their motivation and commitment. Even highly motivated self-directed learners may lose momentum when their inquiries bog down in a morass of unanswered emails, missing links, recalcitrant technology or fruitless leads, and it is in just such circumstances that learners may be reinvigorated through their online support mechanisms.

While there are undoubtedly advantages and benefits to be gained from the use of interactive networks, whether synchronous or asynchronous, on the purely human level they can have their drawbacks. For a start, quite manifestly the whole environment can prove addictive, with users being more drawn to their online universe than they are to the people in their immediate real-life context. Especially when the learning community comprises people who share their interests, and where they are free to fantasise about how attractive or compatible their online companions might be, ICT can represent a form of escapism. The potential for online romances to blossom is widely recognised and extensively written about; although, as Standage (1998) points out in *The Victorian Internet,* it is nothing new. More than a century ago, telegraph operators occasionally fell in love with their unseen clients in exactly the same way that some people do today.

The literature is also replete with examples of users, including learners, who worry about how they are perceived by others in the online environment. Sometimes such users are excessively sensitive, timid and apprehensive, taking umbrage at relatively innocuous or inadvertent comments (or even silences). Of course, their suspicions are not always exaggerated or misplaced; because people are capable of behaving online much as they do in other aspects of their lives, there is the likelihood of genuinely intimidating or bullying behaviour. There is also the possibility of people engaging with each other asymmetrically, so that they have different levels of trust and different levels of self-disclosure. For every person who agonises about the best way to present him- or herself authentically in the disembodied world of Cyberspace,

there is someone else who calculatedly and deliberately presents a false persona with a view to coaxing someone else to trust them or to respond in some particular way. This is discussed further in a later section of this chapter.

14.3 An accessible environment

While the social dimension of networking is a vital and irreplaceable aspect of learning online, relatively few learners (except perhaps for those classified by Lonsdale [2002] as 'participators') seek online companionship as an end in itself. For most people, it is their pursuit of a particular interest that leads them to connect with other like-minded people. Accordingly, a major attraction of online networking is its remarkable convenience as a way of making contact with fellow-learners and experts in one's field of interest. In the familiar offline and pre-digital world, those wishing to contact other learners and experts were often held back by their location, lack of resources, or unfamiliarity with the domain. Although it may have been possible to locate and make contact with like-minded groups, and subsequently to participate in the full range of shared activities such as attending meetings, exchanging letters, swapping books and other resources, receiving and contributing to newsletters, and so on, all of these processes have been massively facilitated by the advent of the digital world.

Today, so long as she or he has access to the Internet, it is relatively easy for even a neophyte to locate and engage with interest groups which themselves may be distributed globally. Inexperience is no barrier, since it is possible to participate as much or as little as desired, asking questions, offering comments, submitting information, posting resources, or even taking a leadership role within the virtual community. And all of this can happen more or less independently of the learner's circumstances including where he or she happens to live. Moreover, unlike most face-to-face encounters, people's age, gender and physical appearance, and their ability to speak in public, are of little consequence online, and accordingly many people who may otherwise be too shy to join in a face-to-face setting may flourish when the principal criterion for participation is their ability to contribute to online exchanges based on knowledge of and commitment to the topic of shared interest. There is plentiful evidence that the online environment can be liberating for people who might otherwise lack the confidence to contribute in face-to-face situations.

However, notwithstanding these advantages, the online world also has its drawbacks. In Chapter Nine on 'Engaging,' I dealt with some of the impediments to participation, technological, financial and personal. One of

the most prevalent disincentives may be that the would-be learner lacks the necessary technology, including not having regular access to the Internet at convenient times. If his or her access is through work, for instance, the employer may well impose restrictions on non work-related use of the technology and, even when that is not a consideration, access may be available during working hours only. In such cases, the learner may be unable to participate in chat rooms or other synchronous forms of communication that occur out of working hours.

Assuming, however, that the learner is both able and willing to join an online network, its essentially unmoderated nature can be both intimidating and restrictive. It is also possible for people to be apprehensive about contributing, especially where they are uncertain about how their ideas are likely to be received by unseen and unknown 'others.' As mentioned earlier, the disinhibited nature of the online world also has its dark side. It is possible for insensitive or unscrupulous people to wound the feelings of less confident or less robust individuals through 'flaming' or aggressive replies; indeed even moderate responses can inadvertently hurt the feelings of someone unfamiliar with the social protocols of the Net.

14.4 Mastering networking and new communications

In the early days of online communities, the technology was clunky, the protocols arcane, and only dedicated technical experts could effectively participate in virtual learning communities. Little wonder, then, that early use tended to be the province of computer scientists, and the potential of the technology was unavailable to the great majority of the population, even including early adopters of personal computing. However the advent of the Internet, and more recently of the World Wide Web, combined with increasingly inexpensive and intuitive software applications, has exponentially increased the capacity of individuals around the world to pursue their learning interests online. For many self-directed learners, their passion for the subject has been the impetus to their growing technical facility. The knowledge that large amounts of information relating to their hobby are to be found in Cyberspace, and that other fellow enthusiasts can be contacted online, is often sufficient encouragement for them to acquire the needed technology and to develop the requisite skills—commonly a major self-directed learning project in its own right.

Most online learners begin simply by accessing websites, often graduating from this to sending and receiving emails, subscribing to mail lists and

bulletin boards, and then participating in online forums and discussion lists. The more adventurous may try synchronous communications, where they are logged on at the same time as another user or users, and may find that they can engage in online chat with other interested parties. One does not have to look far for such opportunities. It has, for instance, become increasingly commonplace for radio and television stations to supplement particular broadcasts—whether of general interest programs such as cooking, history or music, or more controversial matters such as documentaries and on-air debates—with the opportunity for viewers to participate in live chat sessions with the producer, journalist or presenters involved. However, even these relatively rudimentary and commonplace skills are beyond the reach of many self-directed learners, and when they are not, more advanced applications can stop them in their tracks. For instance, sending and receiving attachments is an intimidating step for many users, and the idea of audio or video conferencing online can be beyond their level of technical fluency. Many self-directed learners are mystified when it comes to downloading documents from the Internet, and scanning images, although child's play to many children, leaves some adult users effectively marginalised, excluded from groups where they have a lot to offer and a lot to learn.

The advent of new technologies has also given rise to new ways of communicating. One of the most obvious of these, as discussed in the previous chapter, is SMS messaging, whereby a sender inputs and transmits a brief message using his or her mobile telephone, the keys of which—having both alphabetic and numerical coding—are capable of spelling out words and numbers that appear on the screen of both the sender and the receiver. This technology allows the rapid and relatively inexpensive transmission of messages. However, the small size of the keyboard, coupled with the costs of transmission and the usual preference to communicate quickly, has led to the development of abbreviations and code words, to some extent reminiscent of the codes used in telegraphs and telegrams decades earlier.

As with all human interactions, some such codes are specific to a particular group (or even pair) of users, whereas others have more extended currency. Common abbreviations include: F2F (face-to-face), IRL (in real life), BRB (be right back), IMHO (in my humble opinion); FYI (for your information), LOL (laughing out loud), and TIA (thanks in advance). These and many other abbreviations can be found on websites that deal with 'Net Lingo.' Such abbreviations are commonly combined with the use of standard punctuation marks in various combinations to convey additional or supplementary information. Referred to as emoticons, with a few deft keystrokes the clever use of punctuation marks such as colons, dashes and brackets can be used to convey emotions such as disappointment (:-<), happiness ( ) or surprise (:-o).

Building on the unsuspected capacity of the technologies to convey emotions, many users have adopted an apparently casual attitude towards written communication; often writing long run-on sentences and otherwise subverting normal rules of spelling, grammar and punctuation in their haste to get their ideas online. New rules are starting to emerge about what is and is not acceptable in writing on the Internet. In his paper 'Self without body: Textual self-representation in an electronic community,' Giese writes:

> *the lack of capitalisation of the personal pronoun…is fairly typical and seems to be a direct result of the immediacy of the computer mediated communications environment. This … is probably due to a sense of urgency that is not usually present in a writing mode coupled with a medium that takes much longer to compose a message in. Capitalisation … takes too much time and destroys the flow of his 'speech'. The same is true of spelling errors and other typographical blunders. The written word on the net is built for speed, not for show. If, in the opinion of the writer, the meaning is more or less clear there is no social need to go back and correct such blunders. This is due, in part, to the clumsy text editing interfaces that dominated the early development of computer-mediated communication which made it difficult to correct such errors easily. They are passed off in the same manner verbal errors in speech are dealt with in a face-to-face conversation. …also the extravagant use of all caps, parentheses, asterisks, ellipses and other infrequently used writing devices … affects the tone of the message. This communication is much more like a hall-way conversation than it is a letter* (Giese, 1998, pp. 8–9).

While a new, more conversational tone is creeping into online writing, not all users necessarily feel comfortable with it. For a start, new users may be baffled by unfamiliar abbreviations or by the use of emoticons in otherwise plain text. Thus, knowledge of the protocols for online communication has to be added to technical proficiency and subject-matter expertise as potential stumbling blocks to participation in various communities. In addition, assuming that the network community of interest is not too intimidating on any of these counts, some learners may form negative opinions about other writers because of what they see as slipshod writing, lacking the conventions of the formal printed word. As a consequence, even high quality information may be discounted or ignored if it is thought to originate from a person or source of dubious provenance.

In fact, this is not much different from the situation that prevails in the 'real world,' where the quality of one's ideas may be judged by, for instance, one's physical appearance or accent. Human nature being what it is, some online users form opinions about those they encounter in Cyberspace, simply trading

in one set of prejudices for a different set. Although the online world may seem in some ways to be more egalitarian and accessible to a wide diversity of users, where the quality of contributions is held to matter more than their precise form, subtle nuances are starting to make themselves felt even in the relatively new and disembodied world of Cyberspace.

But of course the written word, as important as it has been in the development of digital technologies, is becoming less dominant as the technologies evolve. Although the online world is often claimed to be dominated by the written word, in which more literate users are advantaged, this is less and less the case. As new technologies evolve which involve the spoken word, verbal interactions will be increasingly the norm. Voice activated software is improving, and the use of Voice over Internet is already becoming a highly significant aspect of learning in this mode. Also, the multimedia nature of the online environment means that audio and video streaming can form a significant element of the online learning experience. The use of static images, photographs, charts and diagrams is relatively new, but software already exists that allows desktop-to-desktop conferencing with images embedded into text as it appears on the screen. The use of virtual reality is often hailed as the next major breakthrough that will allow networked learning to permit tactile experiences—such as driving a vehicle, piloting a plane or performing a surgical operation. I will return to this theme, the development of competencies in the online world, at the end of the chapter.

14.5 Self-governing communities in Cyberspace

One of the often-mentioned advantages of the online community is that it is blind, not only to where in the world people live and work, but to other extraneous features such as their age, physical appearance, gender or prior education. It is non-hierarchical, and the only thing that matters is people's interest in the topic. In other words, as discussed in Chapter Eight, it is often hailed as a 'level playing field' without the usual pecking order associated with most group situations, or at least a pecking order based on different criteria. This means that all contributions have equal weight and that a newcomer has as much right as an established member to contribute to or to request help from the group. To what extent is this a Utopian ideal? Are people really likely to behave differently in virtual groups than they do the real world? Locatis and Weisberg provide a 'reality check' when they observe:

> *The problems of developing multimedia knowledge representations and learning environments become magnified considerably when learners interact not only with the programs but also with each other. Learning*

communities are difficult to develop in any context, especially at a distance (Locatis et al., 1995). Can interactive environments be created for multiple users predicated on harmony and understanding instead of competition and violence? Can virtual spaces for learning be created that will attract students? Can these spaces be designed and can students be prepared to feel comfortable and thrive in them? Can extended intellectual discourse be sustained in a world where learners expect instant gratification, and where a steady stream of stimuli diverts attention? (Locatis & Weisberg, 1997, p. 103)

One way of avoiding the 'steady stream of stimuli,' of course, is for pairs or small groups of participants to withdraw from the larger group to a private chatroom, or simply to email one another outside the group situation. Another way of designing virtual learning spaces where participants feel comfortable is to devise some kind of mechanism to 'stop everyone talking at once.' In moderated groups, directing the traffic can be the responsibility of a designated leader or tutor; indeed in some groupware programs a small icon, such as raised hand, is often provided to indicate when a group member wishes to make a contribution. However, in unmoderated groups, tempers may flare if some members of the group are perceived to be hogging the discussion. Nevertheless, it is possible to work out a protocol so that no one person dominates the proceedings and no one's contributions are overlooked. Harasim writes about a not-for-credit virtual learning community conducted since 1988 by Peter and Trudy Johnson-Lenz through their organisation, Awakening Technology:

This is a collaborative online community for self-enrichment learning. Some of the programs included have been a Right Livelihood Workshop, a twelve-week workshop for participants looking for more meaning and fulfilment in their work, and a Living on Purpose workshop within which participants spend four weeks exploring their personal life purposes.

One unique feature of the software is an interaction space called 'the circle.' This involves an exchange of sequentially numbered text items called 'rounds.' In order to encourage an egalitarian, democratic learning atmosphere in the Virtual Circle structure, participants may enter only one response per round and may respond only to certain rounds of exchange at any given time. When entering the learning circle, a set of icons in a circle displays the name of each participant, giving the participants concrete imagery for the process being supported, which is likened to passing the 'talking stick' around a circle in many native cultures [Johnson-Lenz & Johnson-Lenz, 1990, p. 409] (Harasim et al., 1995, p. 121).

Thus, with goodwill and agreed ground rules, it is possible for even loosely organised groups, meeting in real time, to find ways of managing themselves. However, as in real world gatherings, too much freedom can be counter-productive, and when a discussion group or chatroom is not moderated, there is the potential for biased, incomplete or incorrect information to be disseminated. Unless someone has the authority to put it right, everyone may be led astray by an incorrect claim or assertion which people are either too polite or too inexperienced to challenge. Even if someone knowledgeable does strive to correct an incorrect or inappropriate knowledge claim, the neophyte may be unable to distinguish between the authoritative and the misleading information, assuming each to be equally tenable or equally defensible at face value. Thus, the democratic and egalitarian nature of Cyberspace can make it difficult to disentangle good information from poor, or convincing from unconvincing evidence and, while this might be acceptable to, even welcomed by, an experienced and sophisticated information user, the learner (especially one without any external guidance or point of reference) may find it difficult to evaluate competing claims.

Overall, these are still comparatively early days for the whole concept of virtual learning communities, and while such environments are never likely to wholly replace their real world counterparts, new norms and standards of 'netiquette' are gradually being worked out as more and more everyday activities and people move online.

14.6 Accessing collective wisdom

Whilst a great deal of information on the Internet is available in the form of documents and other resources, one of the great strengths of digital technologies is that they provide access to human-based expertise. As Scriven expresses it: 'If our view of knowledge is no longer located in one individual mind, but is acknowledged as being spread and shared between communities of learners, the computer becomes a cultural artifact that has its place in this distributed model of intelligence' (Scriven, 1995, p. 10). Thus networking represents an opportunity to tap into the distributed expertise of a large number of people—
'a socially constructed network of distributed knowledge' (Scriven, 1995, p. 1)
—whether they are bound together by a shared interest in some topic, or by their common commitment to some enterprise such as building a community or resolving a problem. Of these latter cases, some occur in the context of existing groups such as geographical communities, some in workplaces or professional associations, and some in groups (such as taskforces) formed ad hoc for the purpose of achieving a specific goal or objective.

Elsewhere in this study, I have likened the self-directed learning project to a journey in an unfamiliar domain. Perhaps a more useful analogy is to see it not only as a journey where the territory is unfamiliar and the destination is unclear, but where we may not even have a map or compass to guide the trip. In such situations, it is our travelling companions who might from time to time provide the key orienting information. Harasim offers a slightly different image; 'Think of an online course [or other learning experience] as a voyage of discovery through the world of knowledge. As with ocean voyages, one of the main attractions is the opportunity to interact with complete strangers who become one's fellow passengers' (Harasim et al., 1995, p. 193). Whichever metaphor is adopted, rather than attempting to discover everything for ourselves, the information or insight needed to bridge the gaps in our knowledge may be provided by others. Networking is not simply an adjunct to the use of other resources, but rather a principal strategy by which a person may choose to learn or to solve some problem.

In the past, the ability to find the right person to answer one's questions was largely constrained by the breadth of one's circle of acquaintances. Sometimes, of course, an 'expert' could be located through some sort of preliminary inquiry such as reading a book or article, consulting another person, making a phone call, or looking up a register of expertise, but the process was still essentially one wherein the learner or inquirer sought out the needed help or information. In contrast, one of the key attributes of new technologies is the ability of an inquirer to post his or her question or problem onto a bulletin board or forum, and invite others to proffer suggested solutions or resources. In some cases, it will be perfectly obvious as to whom to consult. This is particularly the case where the learner is part of an existing community (such as a workplace or profession) and the question is specific to that context. In other more general inquiries, however, the boundary-less nature of the Internet can extend the potential reach of the learner well beyond his or her immediate circle by providing the opportunity for others, of whose existence he or she may be unaware, to respond to the challenges.

Of course how and where such a request for information is posted will prove a determining factor in whether it is received and responded to by the right people. Moreover, the learner or inquirer still confronts the challenge of deciding which information is worth attending to. However, networked technologies dramatically increase the learner's reach by shifting some of the communicative burden to those willing to help. Where the learner has a genuinely unique question or problem, there may be some escalation procedure so that the question is either passed on to a recognised expert or turned over to a wider group for possible suggestions and input. In such instances, learning depends on collaboration, which may entail various kinds

of synchronous or asynchronous exchanges. For instance a member of the group may post a question or make a statement: this then leads to a form of brainstorming in which various group members offer their insights or other information that has a bearing on the problem at hand.

Commonly, the input from one person will lead someone else to offer an elaboration, contradiction or even reformulation of the question, so that a process of co-construction of knowledge takes place. One of the most intriguing examples of this kind of knowledge sharing is the 'Answer Garden,' a cooperative work tool originally developed by Ackerman and Malone with the intention of creating a repository of answers that develops and grows organically as questions are asked and answered. Their original paper begins with these words:

> *Consider the following common problems in organisations: Customers get incomplete or inconsistent answers to their questions and complaints. Employees get stuck or waste effort when they can't find the specific information they need. Meanwhile, the people who could answer these questions may, in some cases, be unaware of the problems people are having or, in other cases, they may be overwhelmed by the sheer mass of simple questions they have to answer.*

> *The Answer Garden system helps an organisation solve these problems by providing a database of answers to commonly asked questions that grows 'organically' as new questions arise and are answered. It is designed to help in situations where there is a continuing stream of questions, many of which occur over and over but some of which the organisation has never seen before* (Ackerman & Malone, 1990).

The paper then goes on to describe how the Answer Garden system 'helps an organisation improve its memory by capturing answers to questions that would otherwise be lost and then providing tools to retrieve the answers later.' There were three key elements to the system:

1. A branching network of diagnostic questions [that] helps users find the answers they want;
2. New questions from users are automatically routed to appropriate experts and then inserted (along with their answers) into the network;
3. Experts can modify the diagnostic branching network in response to users' problems.

First published in the *Proceedings of the ACM Conference on Office Information Systems* in April 1990, the Answer Garden has since spawned a number of studies in various organisational contexts. It has also led to a revised version, which was discussed at the ACM Conference on Computer-

Supported Cooperative Work six years later. In a subsequent paper co-authored with McDonald, Ackerman points out that there were two major problems with the architecture of the original Answer Garden. The first of these was:

> *Tying the social network into the system in a more natural manner. Answer Garden's dichotomy between experts and users was problematic. While there was nothing in the underlying technology to force this dichotomy, it was a simplifying assumption in the field study to have separate user and expert groups, real collectivities do not function this way. Most people range in their expertise among many different skills and fields of knowledge. [While] broadcasting each question to every person in an organisation will fail...AG2 [Answer Garden Version 2] offers several mechanisms to ameliorate the overload problem while allowing and providing for a range of expertise* (Ackerman & McDonald, 1996).

The second problem was that of:

> *Providing for the contextualisation of the answers, thus providing for the user's understanding of an answer. In the Answer Garden field study, most users either did not need contextualised information or were able to contextualise it themselves. However a significant portion of the participants did need more context. ... Providing the proper context is, unfortunately, difficult* (Ackerman & McDonald, 1996).

These two modifications to the original Answer Garden system are more than simple refinements; they recognise two important verities. The first is the fact that individual learners can frequently offer an insight or a piece of information to help others; it is this, along with recent software advances in the co-creation of knowledge such as WikiWiki, which distinguishes a learning community from a simple user group where people are seeking information from a particular source. The second is the recognition that knowledge does not exist independent of its context. There are severe limitations in attempting to provide decontextualised information when learners, almost by definition, may require additional scaffolding in order to understand the answer given. Such scaffolding is commonly denied to the solitary independent learner.

There are clearly limits to the extent to which a solitary learner can recognise and make use of information, unless he or she already has a well-developed conceptual framework within which to place new information and insights. Recognising this, many education and training providers go beyond the concept of a learning community, to provide structured support to learners—commonly referred to as 'scaffolding'—which is progressively dismantled and

removed as the learners' independence and expertise increases. However, since individual learners will require different kinds of scaffolding, and will be able to progress without it at different times, such support itself needs to be tailored to the needs of particular individuals. I will discuss this further in the next chapter in considering what can be done to support self-directed online learners.

14.7 Conclusion

While the phenomenon of networked online learning itself might be relatively novel, its prototype is in many ways the most ancient form of human learning. Indeed some have argued that what set *homo sapiens* apart from other early primates at the dawn of civilisation was the fact of deliberately setting out to learn and to share insights with other members of an extended family or tribal group. Originally this was focused on matters of survival—hunting and finding food sources—but the cooperative, community-based spirit underlying it is as old as humankind.

The concept of 'community' in the real world has carried over to references to 'online' or 'virtual' communities in Cyberspace. In fact, however, there are severe limitations to the extent to which communities in the full sense of the word can be reproduced in the virtual setting. In arguing that information is quintessentially a social artifact, Brown and Duguid acknowledge an important distinction made by philosophers between propositional knowledge and procedural knowledge, or 'knowing that' and 'knowing how.' They write:

> *Whatever the strengths of communities of practice, people learn on their own, picking up information from numerous sources about numerous topics without ever becoming a 'member.' We can learn something about Tibetan medicine or racing without needing to work with Tibetan doctors or becoming a Formula 1 driver. The critical words here, however, are* about *and* become*. They point to a distinction made by Jerome Bruner, a professor of psychology at New York University, between learning about and learning to be. Certainly, most of anyone's knowledge might best be described as knowledge 'about.' Many people learn* about *a lot of things— astrophysics, Australian Rules football, Madagascan lemurs, or baseball statistics. In the age of the Web, this learning about is easier than ever before.*

> *But picking up information about Madagascan lemurs in the comfort
> of our home doesn't close the gap between us and Madagascan field
> zoologists. Learning to be requires more than just information.
> It requires the ability to engage in the practice in question* (Brown
> & Duguid, 2000, p. 128).

In concluding this brief review of the place of networking and collaboration in online learning, it is vital to acknowledge that, while networking as discussed in this chapter has undoubtedly added extra dimensions to the richness and complexity of learning, there are nevertheless profound limitations as to what can be learnt online. There is little doubt that the convergence of technologies and in particular the blending of access to resources with the capacity to interact with others represents a significant breakthrough in the long history of technologically assisted learning. But in the final analysis it does not diminish the essentially context-dependent or socially constructed nature of knowledge, or the inherent differences between learning about a subject and being enabled and empowered to undertake life tasks. In other words, there is a significant gap between the community of inquiry and community of practice.

And yet there is still a need, perhaps greater than ever before, for people to be able to learn about the complex world in which we live. As Sockman so evocatively put it, 'The larger the island of knowledge the longer the shoreline of wonder.' Accordingly in the next chapter, I will turn my attention to the range of initiatives that can be taken—by governments and corporations, by libraries and information providers, by educational institutions and professional associations, by software manufacturers and fellow learners—to provide access to digital technologies and related information, and to support self-directed online learning.

15 Providing Support to Self-directed Online Learners

Most stakeholders at all levels of education expect that innovative, improved and more highly communicative pedagogies will be realised through the exploitation of new educational media…. [However] we should step back from institutional and practical concerns about virtual learning environments (VLEs), online courses and the like so that we can consider eLearning in terms of the underlying learning processes *and interactions that are stimulated, supported or favoured by new media and the contexts or communities in which it is used….*

Our prognosis is that we need to avoid the narrow pedagogies that are predisposed by available technologies, such as those dictated by currently available VLEs, and instead adopt a more holistic approach that considers the necessary relationships between community, communication and cognition. *Or, putting this another way, if we want to 'put the learning into eLearning' then we have to treat technology as a mediator of what are, essentially, social learning processes within cultural contexts…*(Ravenscroft, 2002, p. 1).

15.1 Introduction

There is a widespread misconception that the prototypical self-directed learner is some sort of cross between Davy Crockett and Robinson Crusoe: independent, self-reliant and most of all solitary; relying on his or her wits and single-handedly dealing with the barriers and obstacles thrown up by the pursuit of knowledge. No doubt there is a grain of truth in this characterisation, especially if the frontier metaphor is relevant and if the learner is pursuing a difficult or protracted inquiry in unfamiliar territory. However, throughout this study, I have emphasised the fact that self-directed learners are not always isolated; very often their learning occurs in the context of group membership, and nearly always with the support and encouragement of other people. As discussed in the previous chapter, the fact that such learning might occur online does not alter this fundamental reality.

In this chapter my focus shifts from the perspective of the learner to that of the people and organisations that might be able to help with the learning process. There is of course a huge and complex literature that deals with the

provision of online education and training, which might illuminate some of the issues involved in supporting self-directed learners. This convergence of perspectives is all the more likely for two reasons; firstly, because the concept of self-direction also features in the lexicon of formal education and training (although as I discussed in Chapter Two it is more properly referred to as 'Learner Control'), and secondly because, in the seamless world of online learning, such providers are increasingly offering support even to learners who are not enrolled in courses of study.

Yet despite these points of similarity, there are several features that distinguish most, if not all, providers of education and training from those organisations and individuals outside the formal education systems that seek to support self-directed learners. The first such difference is the concept of **curriculum**; a cumulative developmental program of learning that is mapped out in advance by a subject-matter expert. When a person embarks on a formal course of study, he or she may reasonably expect that someone will have developed a program which, if appropriately followed, is likely to lead to certain learning outcomes. The truly self-directed learner, on the other hand, is basically blazing his or her own unique trail—at least insofar as the pace, sequence and direction of learning is concerned—and is unlikely to be following a route mapped-out through the learning territory. As I mentioned in Chapter Eleven, 'this is one of the trade-offs that the self-directed learner makes, that of freedom over convenience.'

Linked to the notion of curriculum is the idea of deliberate **scaffolding**; some conceptual apparatus that is erected at the beginning of a learning endeavour, and progressively dismantled as the learner proceeds. For this to happen, someone needs to have a concept of what the learner already knows at the outset, the desired or likely finishing point, and a proposed route from one point to the other. In the case of the self-directed learner, not only is the concept of a 'finishing point' less relevant, but such a trajectory is far from clear, especially to the learner him- or herself and it is therefore difficult to know how and by whom such scaffolding could be erected in advance.

Discussions about scaffolding inevitably lead to consideration of another difference between the formal educational process and that of autodidactic learning; namely, the concept of **assessment**; a process that makes judgments about the learner's progress. Such assessments are of two principal types: formative, which may result in some direct instructional intervention or other corrective action, and summative, which commonly lead to some form of certification. The self-directed learner generally has to judge for him- or herself how a learning project is proceeding, or at least to seek external advice with respect to the criteria he or she has adopted, and as far as summative assessment is concerned, is usually more interested in the learning itself than having it attested to by some external authority.

A final major difference revolves around the degree of integrated **support** available to the learner. For the 'student,' it is reasonable to expect that formal education and training providers will offer an integrated range of support; not only in relation to the substantive area of learning, but in such matters as getting and staying online, locating and using relevant websites portals and search engines, setting up email accounts or personal homepages, developing a level of both technological and information literacy consistent with the demands of their studies, and coping with the likely uncertainties and setbacks involved in learning. The self-directed learner, on the other hand, may have to draw together such support from a diverse range of sources. For example, difficulties relating to communications may be the province of the telecommunications company or the Internet Service Provider, problems pertaining to hardware or software may have to be resolved by the dealer who supplied them, questions relating to the domain being studied might be dealt with by a librarian, a website owner or by other users with a shared interest in the field, and when it comes to the human side of the learning effort—for instance if the learner is experiencing a crisis of confidence or a loss of motivation or if he or she is uncertain about how to participate in an online community—there may be fewer obvious sources of support or guidance to which he or she might turn. As I will discuss later in this chapter, this may well be one of the particular challenges confronted by the self-directed online learner.

In this chapter, I will examine a range of issues concerning support for the self-directed learner, including the diversity of stakeholders that might be engaged, the kind of assistance that might be provided at each stage in a learning endeavour, the kind of support potentially required by different kinds of learners and the personal and professional skills that may be necessary to assist online learners, before finally suggesting the elements of a model of support for online learning.

15.2 Those with an interest in providing support

In view of the diversity of self-directed learning that occurs both online and offline, with its concomitant range of motives and resources, it is not surprising to find that there are many groups and individuals that have an interest in supporting learners' efforts. In Part II of this study, I considered some of the global support that is required, and might be available, from Governments, telecommunications agencies and Internet Service Providers and from software manufacturers to engage in the digital environment in the first place. However, when it comes to self-directed learning, there are many other interest groups that may be able to provide an element of support.

One important set of such groups contains the vocational and professional associations that might wish to see their members engaging in professionally related self-directed learning, especially continuing professional development. Likewise, companies and businesses might wish to support their employees' self-directed learning, either about the company itself or to maintain currency with their products or services, or simply because it is seen to be inherently valuable to have a learning workforce. There are also examples of supporting learning on the part of customers, distributors and suppliers, especially regarding products or services, but sometimes extending to related changes in technology within the industry, in technical specifications, in international trends and developments, or in government legislation or regulations.

Governments (national, provincial and local) may wish to encourage self-directed learners in support of their agenda to have an educated and well-informed citizenry, and cultural agencies including museums, libraries, archives and art galleries almost invariably seek to expand their reach by appealing to new 'markets' for the resources for which they are responsible (Community Research and Development Service [CORDIS], 1998).

Those organisations that have proprietary databases or which sell data-related products (such as bookstores, publishers or consultants) may wish to encourage and to support self-directed learning as it leads to increased demand for their products and services. Information outlets such as the media, which demonstrate a growing convergence between text-based, image-based and sound-based information will also commonly wish to encourage researchers and self-directed learners to use their resources.

Another category of organisations that would have a vested interest in providing useful, accessible and interesting information to their members, or to the population at large, include the clubs, societies and special advocacy and interest groups that exist both to support their members and to promote public awareness of their agenda.

Finally, as already mentioned, there are the providers of formal education and training—schools, colleges and universities—both public and private. Throughout this study, I have been at pains to exclude consideration of those enrolled in formal educational courses and programs. However, many educational providers have a commitment to a wider cohort than those who are already enrolled, including outreach to under-serviced or marginalised groups as part of a community service obligation; support for self-directed learners as a way of attracting new clients who subsequently enroll in formal courses; and engagement with the ongoing learning of graduates who seek to maintain currency in their respective professional fields or to explore new and different areas of interest. For all these reasons, it is to be expected that education and training providers will continue to add to the array of support

mechanisms available to online learners. As this happens, it is likely to provide a general 'upward push' in the quality and sophistication of online support, especially as increasing numbers of learners experience the high quality of service they provide, and accordingly demand similar standards from other providers.

15.3 Potential kinds of support for self-directed learners in the online environment

Over the course of this study, and most particularly throughout Part III, I have developed a six-part model of online learning from the perspective of the learners themselves. In this chapter however, I turn my attention from the 'demand-side' perspective of the learners to a consideration of the 'supply-side' orientation of those who, for whatever reason, offer information or help to learners. Here I focus specifically on the kinds of such support that might be provided and, in order to do so, I will draw on the context afforded by the six-part model already discussed.

Engaging with the technology for learning

In Part One of the study, and especially in Chapter Three, I dealt with some of the ways in which Governments, employers, communities, and educational providers can cooperate to ensure the availability and accessibility of appropriate technology. There is, however, a more specific set of issues that fall under the purview of those that seek to attract and support potential learners and other users.

First and foremost, information providers can ensure that their websites, and the information they contain, are accessible, affordable, reliable and user-friendly. There is a considerable body of literature about the features that make a website accessible to a variety of users (for an overview see Nielsen & Tahir, 2001; or 'Jakob Nielsen's website,' online at: http://www.useit.com). These include its **general appearance and layout**, whether it takes a long time to load (because of excessively complex design features), its **functionality** with various kinds of technology, and its **utility** for a diverse range of users including those with a range of disabilities. With respect to its **acceptability**, information providers (especially those which offer interactive sites created or contributed to by their users) can establish guidelines and policies to ensure consistency in the quality or appearance of their sites, and prevent inappropriate use of their sites such as advertising, flaming or the incorporation of non-compliant or irrelevant content. Finally, there is the **ease and level of customisation** to the needs and preferences of particular users.

A second cluster of issues concerns the extent to which and ways in which information providers orient new users to the applications and content that they have to offer. This is more specific than the introductory skill-building envisaged in Chapter Four on ICT literacy, and also more sharply focused than the issues canvassed in Chapter Eleven on 'Evaluating Sources and Resources,' since it is specific to the domain or to the particular provider. Employers, for instance, would be expected to offer both introductory and advanced education and training to their employees to ensure the appropriate use of technologies germane to that type of work or even that specific enterprise. Professional associations and those offering access to specialised databases or software applications would likewise be expected to provide both initial and ongoing support for those accessing and using their online resources.

Closely linked to instruction in the use of particular websites, databases, applications and software is the provision of help for those users who have specific problems or specialised applications. Such help may be offered in a variety of ways including helpdesks, mentors, step-by-step guides, leaflets or booklets and CD-ROMs.

Lastly, as pointed out in Chapter Three, engagement is not simply a once and for all issue, but a recurrent one that affects the learner's ongoing commitment to the learning project. Indeed, the question of continuing motivation to learn is confronted in all learning contexts and at all levels of learning right through to advanced postgraduate study where the solitary scholar might lose motivation or commitment especially when working alone. Perhaps the nearest offline counterpart to the self-directed online learner is the distance education student, since, in the absence of face-to-face meetings, there is considerable potential for the learner to slip away from his or her original commitment and to lose interest and momentum.

There are many factors that can undermine the sense of engagement, including problems with the technology, problems in coping with the online environment, problems in relation to understanding the content itself, and emotional problems such as loneliness and loss of motivation. In formal education settings, the tutor has a responsibility to monitor and, where appropriate, intervene when the student seems to be experiencing such reversals. In the case of self-directed learners, however, at this stage there may be fewer robust strategies in place to ensure continuing participation. Although self-directed learners engaging with a range of providers may lack a specific point of reference such as that provided by a tutor or mentor in a formal course, nonetheless membership of an online community of inquiry can provide much needed support when commitment wanes.

Locating, retrieving and utilising resources

In Chapter Ten, I dealt in principle with gateways, directories, browsers, search engines and other devices that seek either to organise the content of the Web, or to amplify the capacities of the user. Such strategies may be combined or customised in relation to particular groups of users.

One strategy is the provision of courses or programs, sometimes face-to-face, and sometimes through online or other distance education modes, to enhance users' ability to locate for themselves information of interest. Moreover, such programs commonly include a component of 'information literacy,' so that users can make informed judgments about the quality and utility of information they unearth for themselves.

Another approach is the publication of printed guides or reading lists that orient users to the domain of interest. Linked to this can be the development of gateways or portals to recommended sites or resources, or dedicated, subject-specific search engines. In many fields of inquiry and practice, such as medicine, law, archaeology and genealogy, specialist sites have been developed which act as a first point of call for those seeking information in that particular domain. However, such sites are open to manipulation, if not abuse, for instance by those seeking to offer paid services or databases. What at first sight may appear to be an objective listing of resources may in fact turn out to be an insidious, commercially motivated inducement to use particular products, sources or services.

Strategies to assist with locating resources fall along a continuum, from those that rely on artificial intelligence applications to discover and to categorise potentially relevant resources through to those that make extensive use of human intervention to assist in the identification of useful material. For instance most search engines, portals and directories use programmed algorithms and various kinds of inferential logic to locate and to categorise useful resources, but as many users will attest, they do not invariably find exactly the right information or desired answer. A variation is the portal or directory which, while offering access to extensive digital resources, in fact makes use of human inputs. An example is the website 'whichbook.net' which makes use of readers to catalogue the content of various novels against a set of criteria; the information then being entered into a database that allows users to select books for future reading. A further extension of this idea is the Virtual Reference Desk offered by many libraries—academic, specialist and public—through which patrons can lodge a request by email or 'Ask a Librarian' and the inquiry receives personalised attention. One of the most ambitious such programs is that of the Library of Congress, which not only undertakes to respond to every question within five working days, but also uses software called 'QuestionPoint' which, to quote the website itself,

is 'a global, collaborative reference service' whereby questions may be forwarded to other libraries if necessary. The software also allows for the archiving of both questions and answers so that the patron can review the progress of his or her inquiry. It differs from the Answer Garden software, however, in the sense that it presumes an expert-client relationship rather than that of a virtual community built around shared expertise.

A further elaboration of this idea is the live online chat version of 'Ask a Librarian' in which an inquirer engages in real time with an information specialist. This phenomenon, which Dempsey (1999) has dubbed the 'mortal in the portal,' represents an innovative adaptation of the technology, although it is of course labour-intensive and hence costly. The challenge of maintaining coverage 24x7 has led some libraries and other information providers to form global consortia so that, even after hours locally, questions may be answered or advice given by a distant adviser. In a paper given in November 2002 at the Annual Conference of the Library and Information Association of New Zealand Aotearoa (LIANZA), presenters Jane and McMillan pointed out that questions requiring detailed local knowledge (e.g., 'Where is the key to the photocopying room on Level 3?') are often more difficult to answer than those of a more general or domain specific nature.

A further variation of the blending of human agents with technologies is provided by those interest groups which offer the services of volunteers (or sometimes paid searchers) who will assist an inquirer by seeking out needed information on his or her behalf. In the field of family history, for instance, because of geography, workloads, physical disability or financial disadvantage, it may be impossible for researchers to visit repositories and locations for themselves. However, locally based volunteers who have offered their services without fee under the rubric of 'Random Acts of Genealogical Kindness' (or RAOGK) may take such inquiries and undertake to track down and copy particular documents or resources, or to photograph something (a church, street address, or tombstone, for instance) on behalf of a distant or otherwise dependent researcher.

While the use of human agents to supplement digital resource discovery is one strategy, its obverse is the use of intelligent 'bots' or programmable search engines to amplify human capacities, as mentioned in previous chapters. In particular domains, such as medicine, where there is an overwhelming proliferation of online information available, dedicated devices (some of them hand-held) have been developed where, instead of entering a search request or scrolling through a number of possible sites, individual buttons link to pre-assigned functions such as patient information records, pharmacological information or Medline databases.

Even without such highly specific electronic devices, websites can be adapted to the specific needs and interests of individual users. A familiar example is the commercial bookseller, 'Amazon.com' where the website recognises and 'greets' a user each time he or she logs on, and provides a range of functions that allow for virtual browsing of an unseen bookstock. As already discussed, such 'push' technologies have considerable potential for locating resources and for identifying others sharing similar interests in the world of information and learning.

While the examples already noted focus on mechanisms that overtly support the locating of resources, information providers can also do a great deal 'behind the scenes' to make their resources visible to search engines and web crawlers. I have already discussed the use of embedded metadata tags, which may be invisibly inserted to describe the principal focus of resources as they are generated. A familiar analogy is the practice of including a few keywords on the title page of a conference paper or scholarly article to make it easy to locate. However, a significant problem in the online world is that, of all the billions of pages of information that exist in Cyberspace, only a vanishingly small proportion has been created by education and training providers; by far the lion's share has been generated and disseminated by others—government departments and agencies, businesses and commercial operations, professional associations, and cultural institutions such as museums art galleries libraries and archives—without any specifically educational focus or intent. Accordingly, there is a challenge for information providers to locate and perhaps to 'repurpose' for educational ends materials that were generated with a different intention. To describe this phenomenon, Ip and his colleagues have coined the term 'Non-Educationally-Focused Resources' or NEFs. They write:

> …educators [and learners] select and use many items that are not originally designed as educational resources. A feature film such as 'Twelve Angry Men,' initially intended as general entertainment, might have great educational benefit when included as part of a multimedia unit on group dynamics. The item has gained an extra dimension. It follows, then, that there is a difference between 'educational resources' and 'educational potential of a resource.'

> We use the term 'non-educationally-focused' (NEF) resource to refer to a resource which was originally created for purposes other than educational consumption. However, this name should not imply the appropriateness or otherwise of the use of such material in educational or training [or other learning] situations (Ip et al., 2000, p. 4).

To illustrate the point, they offer a couple of typical examples of NEF resources that might have significant educational value:

- *'real-time' information (unlikely to be created for sole educational use). They can be linked by including static URLs of the most current pages of dynamic web resource sites, e.g., in the resource page of 'World Politics in Transition' Role Play Simulation, there are links to News sites such as BBC and CNN.*

- *Aggregation, customisation and/or other value-added services such as result pages from appropriate subject gateways, search engines and data sources (for example, the First Fleet Online database hosted at the University of Wollongong has been a useful resource for many schools in teaching of the early white settlers in Australia)* (Ip et al., 2000, p. 5).

The authors go on to argue that the accessibility and utility of such resources would be considerably enhanced if they were to be 'educationally enabled,' by some suitably qualified third party. This would be achieved through the incorporation of, or links to, appropriate 'educational metadata' that would allow them to be recognised by subject gateways or search engines, and hence to be made more readily available as educational resources.

While it lies beyond the scope of this study to consider the technical aspects of such 'enabling' or, for that matter, the logical impossibility of enabling every resource that a learner could conceivably find to be of value, it is hard to disagree with the general point that although 'the majority of online resources…are not created as educational tools or classroom materials… these NEF resources can have great educational value in the right context' (Ip et al., 2000, p. 1). However, it must be acknowledged that it is often not the providers of information, but rather the consumers or users of it who, through their single-minded devotion to an inquiry, manage to reconceptualise materials as learning resources that were not originally designed or offered in that context.

Evaluating sources and resources

Central to the evaluation of information is the development of information literacy skills, which have been dealt with in Chapters Four and Eleven. As elaborated there, information literacy has both generic and discipline-specific aspects to it. It may be reasonable to expect Governments to endorse and to provide for the attainment of general information skills for the population, and for this to be supported by libraries as well as schools, colleges and universities. However, the responsibility for developing evaluative and information seeking competencies within particular domains must be shared between information users and those with specialist knowledge to share.

I have previously referred to the existence of checklists and other guides that have been prepared, mainly by librarians and other information specialists, to

assist users in judging the currency, credibility, comprehensiveness and quality of websites and other electronic resources. Clearly such generic checklists can be of only limited value in helping to assess a resource within a given field, and accordingly interested groups can, and commonly do, provide specific guidance in relation to their particular domain.

One of the most obvious aspects of this must be in the case of business enterprises which have a vested interest in ensuring that their employees, distributors and clients or customers are capable of independent learning about their products or services. A similar imperative to provide information literacy education might be attributed to professional associations, clubs and societies, not-for-profit groups, and even libraries or archives offices which, as part of their training and development programs, may include instruction about the evolving criteria for evaluating sources that their members or users may encounter online.

Moving beyond such pre-emptive or anticipatory user education or support, all sorts of stakeholders, including paid and free sites, and portals and subject-gateways can also help learners to internalise the criteria used for evaluating sources and resources. For instance, search engines that attribute a score or 'star rating' to information can add value by providing a link to the criteria that were used in arriving at the judgment. Websites can offer drop-down menus, help icons and other online facilities that assist a user to make an informed judgment about sources.

Websites in specific domains can help learners to make their own judgments through the provision of Frequently Asked Questions documents (FAQs) to cut down on repetitive inquiries posed by new users. Relevant questions that have no precedent may be referred to a subject expert, who can provide his or her insight through a contribution to the Questions and Answers part of the site. All of these facilities, however, require a level of programming sophistication which may exceed that available to all but the best resourced organisations.

Assimilating new information and insights

As discussed in Chapter Twelve, one of the crucial tasks for any learner is that of drawing together into an overarching scheme all the various data, resources, insights and other knowledge claims encountered or developed in the course of the learning endeavour. This is perhaps one of the greatest strengths of digital technologies, because they can actually amplify the capacity of the human beings both to assimilate and to remember large amounts of information from diverse and sometimes non-obvious sources.

In the case of individual learners, software has been developed that allows for harvesting, structuring, storing and displaying relevant material. While this in

no way detracts from the possibility, indeed the responsibility, of the individual learner imposing his or her individual framework of understanding on the material so found, nevertheless the provision of headings or fields, and assisting with the classification and clustering of information resources, can act as a valuable aid to the self-directed inquirer.

Well-known and widely available software such as spreadsheets and databases facilitate the assimilation of information, as do concept maps and other graphic organisers—programs that allow for mapping concepts and visually portraying complex relationships across sources of data (see, for instance, Hyerle, 2000). In addition to such general programs, dedicated software has been developed for specialist applications. Amateur genealogists, for example, can select from a range of programs that facilitate the collection, organisation and presentation of data that may be built up over a period of years. Other fields, such as geology and mineralogy, meteorology and climatology, astronomy and ornithology also offer specialised software that is tailored to the particular needs of hobbyists and professionals alike.

In the case of groups, learners can adopt shared software or shared data formats that allow them to freely exchange and integrate information. They can also collaboratively build websites to which they all have access. Interest groups (including professional associations, clubs and societies, and specialist information providers) can offer online discussion groups and chatrooms that allow users, members or subscribers to exchange information with each other.

But assimilation involves more than simply managing information sources, however numerous or multifaceted they may be. It is also a complex intellectual process in which the learner or other user draws together various knowledge claims, evaluates them and places them into some kind of framework or schema. This is perhaps one of the pivotal differences between those engaged in a formal program of study and self-directed learners. In the case of the 'student,' it is the instructor, tutor, mentor or facilitator who seeks to provide a conceptual system into which new learning is incorporated. He or she may engage with the learner in various evaluative processes including discussions and tests, with a view to guiding the learner's acquisition of new material. Likewise, he or she might provide some framework or scaffolding which sets a structure, but which is progressively dismantled as the learner gains in knowledge and confidence.

In the case of the self-directed learner, however, working without institutional support, such external structuring may not be readily available, with the result that his or her understandings and conceptions may be deficient, incomplete or biased. It is certainly possible that some stakeholders may provide such scaffolding and support, especially for neophytes, but the problems are formidable. Essentially two alterative approaches are possible—'hard' and

'soft' scaffolding—and each has its drawbacks.

'Hard' scaffolding is built into the technologies themselves, and can take a number of forms, including drop-down menus and buttons that can be clicked to receive help and advice at a particular point. Paradoxically, since at least some of the difficulties encountered by users are likely to be because of their aversion to or unfamiliarity with the technology, such solutions may not be generally appropriate. Moreover, from the point of view of the individual or organisation seeking to offer help and advice, such approaches require a reasonably high level of technical skill on the part of the programmers, competence that is not widely distributed throughout the general community.

'Soft' scaffolding means that human beings stand behind the technology providing direct support to the learners. Examples of 'soft' scaffolding include live courses or sessions, telephone hotlines, online helpdesks, and either synchronous or asynchronous forums to deal with users' questions or to negotiate relationships between users. Although this is more user-friendly, especially for those lacking confidence and experience, it is also more labour-intensive and therefore more costly. Consequently it tends to be offered sparingly.

In both cases, hard and soft, the dividing line between self-directed learning and its more formal counterpart may become quite blurred. However, in both cases, the intention is not simply to support the assimilation of information, but to facilitate the actual processes of learning or reconceptualisation.

Reconceptualising—transforming understandings

As I posited in Chapter Thirteen, a common, albeit tacit, view held by many people is that learning is little more than an accumulative process, in which items of information, devoid of original context, are simply acquired by a learner or user. In this view, teaching involves the transmission of such items of information from a source (such as a lecture, website, reading or experience) to the learner. Since digital technologies lend themselves to this transmissive paradigm, it is common to find applications that are predicated on such an understanding of learning.

Undoubtedly some learning is of this sort, and Lonsdale's category of 'task specific searchers' encapsulates one kind of information-seeking in the digital domain. However, it is useful to recognise that all learning—even this relatively straightforward gathering of data—involves the incorporation of new information or insights into some existing frame of reference or, as it is sometimes called, personal construct system. As mentioned in the Prologue, It is also desirable to conceive the actual process of learning as involving some kind of 'conversation,' whether this be an interior conversation with one's

own understandings, an interchange with the ideas of another person, or a conventional discussion—either real time or asynchronously—direct with other people themselves. This idea was strongly promoted in the 1980s and even earlier by Thomas and Harri-Augstein of Brunel University, notably in their book *Self-organised learning: Foundations of a conversational science for psychology* (Thomas & Harri-Augstein, 1985). In the digital domain, a similar theme has been echoed by Laurillard who, in her book *Rethinking University Teaching: A Framework for the Effective use of Learning Technologies* (1993; 2002), has advanced a widely cited 'conversational model of learning.'

If the learning conversation is taken as the fundamental building block of reconceptualisation, the question is what forms or uses of technology can facilitate such conversations? The answer depends on what kind of learning conversation is envisaged: whether one conducted entirely privately within the learner's personal universe, or through interactions with others' ideas, or directly with other individuals. In the case of learning that occurs privately through reflection, digital technologies can assist by offering conceptual frameworks or scaffolding, and by facilitating **internal or interior learning conversations**. By allowing learners to portray and manipulate the elements of their understanding, and by dynamically varying some aspect of their mental model of the phenomenon and seeing how that affects the whole system, learners can engage in a conversation with themselves. For instance, by compiling a single searchable database, as discussed in Chapter Twelve a learner can have at his or her fingertips information from a diverse range of sources, which can be reorganised and restructured to bring to light previously hidden relationships or to juxtapose material from alternative sources. In many domains such as engineering, medicine or physics, technology can not only make invisible phenomena manifest (such as what happens inside an atom or in the circulatory system of a human body), but it can also allow a learner to experiment with different variables to test and extend his or her understandings. In another case, this time in the field of palaeography, various colour filters can be applied to an image of a digitised manuscript, thus effectively separating the top layer of inscription from what lies beneath and allowing the learner to determine what changes have taken place between successive versions. In many cases, these readily available applications have brought to learners' own machines a capacity for sophisticated manipulation and transformation previously limited to advanced research laboratories.

Where learning relies on lists, data sets, or time series, software packages are now available that can undertake quite elaborate analysis and transformation of data or allow the learner to search for patterns or recurring themes. Increasingly 'smart' software can independently search for and recognise

underlying structures and patterns—whether in text, numerical data or digitised images. Such technologies perform statistical analyses and transformations, and represent relationships in novel and arresting ways. This capacity to act intelligently, and to portray underlying structures, makes digital technologies a particularly powerful adjunct to all learning, including self-directed learning. A wide range of fields is amenable to this kind of dynamic interaction, including physics; geology and geomorphology; population dynamics; climatology; economics and ecology. Accordingly, a range of software applications, models and programs has been developed to support the self-directed learner who, in this regard, has much in common with the independent researcher, since the inquirer is often blazing a new trail without any guidance.

In those situations where the learning conversation occurs with respect to an **external stimulus** such as a written document, a photograph, a piece of artwork or an analysis of some statistical material, the first and most obvious use of technologies is that they actually make all the relevant information readily available to the learner. This may mean through catalogues or directories, through websites or homepages, or through digital publications such as CD-ROMs. Once the information is available, tools can be used to search for character strings or recurring patterns (this applies to sounds and images as well as to text) and to identify identical or closely-matching instances. The use of a split screen allows a user to compare and contrast different source documents, or different versions of the same document. For example, a digitised image of a document could be set down alongside a transcription of, translation of, or commentary on the same document.

Tools that permit the searching of source documents, including those that provide different or successive versions of a document or data set can be provided, as can commentaries on or analyses of the data so assembled and viewed. In this latter case, for instance, many museums, archives offices and art galleries are now placing scanned images of their holdings online, along with expert commentaries that explain what the user is looking at, and with digital links to other parts of the same or other collections, essays or commentaries on the subject, and even reflections by the author, artist or creator. Another interesting example is the practice of releasing movies or documentaries on DVD, with the addition of an overlaid commentary by the Director, which may be turned on or off by the viewer, explaining and drawing attention to certain features of or background information about the images as they appear on the screen. This kind of learning conversation would not have been possible prior to the development of this particular technology.

In the case of learning that occurs through **interaction with other people**, both synchronous and asynchronous forums can be provided so that new insights and ideas may be shared, discussed, and made explicit. Such forums may be

moderated or not; indeed, one of the differences between the experience of the student in the formal education system and that of the autodidact is that the former commonly has access to more structured forums in which to discuss his or her ideas and hence to reconceptualise understandings. While some people have argued that online discussions, whether one-to-one or as part of a group, are stilted and artificial, lacking both the spontaneity and paralinguistic cues that are the hallmark of real life discussions, there is a corresponding advantage in that forums or discussions can be reviewed at leisure. In the real world, utterances or contributions are fleeting and it is usually impossible to capture more than a snippet or impression of a point that was made, whereas emails, forums, chatrooms or threaded discussions may be captured digitally and reviewed in more depth and detail by a learner. This issue leads to a consideration of the dynamics of online networking, which is dealt with next.

Networking—contributing to the community of learners

By far the most common use of digital technologies for networking is the mobile telephone, which is used for voice conversations, and for sending and receiving SMS messages. Recent technological advances have added to this the capability for transmitting photographic and other graphic data—a phenomenon referred to as MMS or Multimedia Messaging Services. The portability of this technology is a great advantage, as is its widespread familiarity, and with recent advances, small personal digital assistants or hand held devices are now available which combine the functionality of a personal organiser, a mobile phone and an Internet interface. However, this technology is not yet ubiquitous and even if it were, its utility as a tool for more extensive kinds of learning, as opposed to searching for specific facts or items of information, is strictly limited for the time being.

In the case of computers, those organisations and agencies that seek to support self-directed learners may be able to make greater use of asynchronous formats (Discussion Groups, Newsgroups and Forums), as well as synchronous approaches (Multi-User Domains [MUDs] and chatrooms), that allow for exchanges among learners, or between learners and more advanced users including experts. Such environments may or may not be moderated, and might include a beginners' room, or a graded hierarchy so that learners can access appropriate levels of complexity as their confidence and expertise increase. In both cases, however, many users are not familiar with these various applications and may require additional help and perhaps specialised software in order to be able to participate fully. Accordingly, the first kind of support that will be required is that which applies to the particular conventions prevailing in the online community of which the learner is, or wishes to become, a part.

In Chapter Eight on 'Collaboration' I discussed the development of Groupware applications that provide a number of features including group scheduling, email facilities, document management, news services, project support, central storage facilities, virtual team rooms, and chat features. At present, their use is commonly limited to intact teams and workgroups within organisational settings, which allow for members of the group to share many activities including the joint preparation of documents and participation in virtual meetings.

Such arrangements are also increasingly common for those enrolled in formal education and training programs, using either off-the-shelf software or applications that have been developed in-house to the specifications of the particular organisation and to the kind of learning being undertaken. In higher education institutions, for example, a number of software applications have been developed to make it easier for learners to access and store required information, keep track of course requirements, submit assignments, and participate in online forums of various kinds. For instance, based on Laurillard's (1993 and 2002) conception of a 'conversational model of learning,' Liber and his colleagues have developed a groupware tool called 'Colloquia' which, although it is particularly suited to learning, 'does not depend on the traditional classroom metaphor, rather providing a system that puts conversation at the heart of the learning process. Conversations are supported and amplified by learning resources, and are always engaged in within the context of a specific learning activity' (Liber, 2000, p. 62).

A number of commercially available packages are also available, offering different kinds of functionality for learners. No doubt as more people experience the convenience of these applications as part of their education, they will come to expect such functionality as a matter of course and, in the fullness of time, it may be expected that many more software packages will contain some groupware functions operating across different platforms, so as to allow interest groups and loose coalitions of self-directed learners to undertake shared learning. In fact, it may not even be necessary for each user to install such software on his or her individual machine, since multi-user software is now available which can reside instead on a website and be accessed and used by group members.

Linked to the concept of groupware and shared workspaces is the related possibility of groups of learners jointly creating a bank of information about their topic of interest. For example, a specialist medical society might set out to provide members with the opportunity to pool insights and understandings about a particular topic of interest to that group. They may choose to employ some kind of software such as 'Answer Garden' (see Chapter 14) that allows members of that particular community to post and respond to each other's

questions, thus enabling them to contribute to each other's understandings and to the creation of an online learning community. It is, however, easier to envisage such an approach in an existing community or network—and in particular one with considerable financial technological and human resources—than in a loose consortium of enthusiasts from around the world held together solely by their shared interest in some esoteric hobby.

Finally, there are a couple of promising applications in regard to networked learning, which allow an individual to place his or her interests into the wider marketplace where they can be encountered by others using various search strategies. The first is the personal homepage, on which an individual can post a variety of personal information including his or her interests and areas of expert knowledge. Some Internet Service Providers furnish their subscribers with the opportunity to maintain a personal homepage, as do many education and training organisations, employers and some special interest groups, especially those that have a base of paid subscribers. With the march of digital technologies, it may confidently be expected that it will become standard practice for all citizens to have not only an email address, but also an individual homepage; indeed, some Governments such as that of Singapore are already working towards the realisation of this goal.

A second approach is that of weblogging or, as it has come to be known, 'blogging.' A weblog is a sort of online journal, in which the weblogger, or 'blogger' records ideas, insights, experiences or websites that he or she finds meaningful, uplifting, humourous or personally significant in some way. Customarily they appear in reverse chronological order, with the most recent entries at the top and earlier entries pushed further down the page. Thus, to follow the blogger's train of thought it is usual to go to the end and work one's way backwards up towards the present. Blogs cover a wide spectrum ranging from the zany, self-indulgent and patently idiosyncratic, to the orderly, methodical and well-informed. Since most blogs are based around links to other online sites, they can represent an invaluable guide to the development of a particular field or area of thought and, since they are assembled by a human intelligence, they have the unique and individual stamp of the blogger.

The weblog may be a relatively new phenomenon, although the concept of a knowledgeable or enthusiastic individual sharing his or her interests and insights is at least as old as journalism. It is commonly accepted that the first blog was also the first website—http://info.cern.ch—where the inventor of the Web, Berners-Lee, listed each new site as it came online. From such humble beginnings in 1994, the number of blogs now runs to hundreds of thousands (http://newhome.weblogs.com/historyOfWeblogs [accessed 4 September 2002]). They represent perhaps the most democratic and egalitarian aspect of the Web

as a place for individuals to distribute their ideas, and while many of them may seem trivial or even offensive, and attract a readership of perhaps as few as a dozen people, they have established themselves as a viable mechanism for the free and unencumbered dissemination of information on the Web.

In short, then, while there may be room for reservations about the extent to which true communities can be formed online, there is little doubt that the ability to contact other people, to engage in exchanges with others, to seek input, and to post one's interests and insights, has created a learning tool of unprecedented power and reach. It is also clear that the provision of such facilities is an enormous boon to the self-directed learner whatever the nature or focus of his or her interests.

15.4 Convergence across various facets of online learning

Throughout this chapter, and more generally throughout this study, I have treated these six aspects of online learning as self-contained and relatively independent domains, but this is an arbitrary and artificial device. In fact, the online experience is a fluid and deeply interconnected one. From the moment a person sits down and turns on a computer, he or she is engaging in an absorbing interaction with the machine and, more generally, with the complex world to which it gives access.

A consequence of this is that the six parts of my model—engaging, locating, evaluating, assimilating, reconceptualising and networking—are neither as clearly delineated nor as autonomous as I may imply. There is a degree of convergence between and among the various elements of learning online. For example, the process of locating a resource, or another user, depends crucially on the user's mastery of the technology, as well as the terms he or she uses to undertake the search. These terms in turn, reflect the user's existing understanding of the field, and of how it is organised. If he or she is seeking a particular item of information, because of the way in which data is organised and described in a field, ironically this can require a more targeted and precise search strategy than a general exploratory inquiry.

As items of information are found, they in turn help to recalibrate the user's understanding, and to focus the next stage of the search. Each piece of information—even a negative return—helps to build a picture and is somehow subsumed into the learner's conception of the domain. And all the while he or she is learning at another level, about such generic literacy issues as how the technology operates, what it responds to, and how to frame an inquiry.

Then again, if the particular application entails communication with other people, not only is there the substantive or overt content of the interaction, but all the complex elements of tone and presentation of self that form part of human interactions are also invoked. The dynamics of a single email exchange with another user are different from the experience of posting a request or a comment to an entire group of unseen, and commonly unknown, others. And the reaction or response that one receives may help to modify one's understanding of the domain as well as altering one's next intervention or contribution in Cyberspace. In extreme cases, it can impact—for better or worse—on one's willingness to engage with the digital environment with confidence and assurance. And so on.

In short, the six elements—engaging, locating, evaluating, assimilating, reconceptualising and networking—are cyclically and recursively interlinked, in much the same way as a learning endeavour itself. The way in which one link in the learning process connects to another and another and so on can be enormously rewarding, since it can lead in unexpected directions and turn up unsuspected treasures. However, it can also be frustrating and time-consuming; the trail may lead away from, rather than towards the ultimate objective, and fractured links and tenuous connections can erode patience and cause the user to get lost. As such, the online domain is a powerful metaphor for the processes of learning, and there is a stunning symmetry between the individual processes of sense-making in learning and the electronic processes of making connections in Cyberspace.

From the foregoing, it is evident that learning online is a great deal more complex and demanding than simply accessing a computer and using a search engine to uncover a limited number of resources. Not only are there many kinds of self-directed learners, with a variety of motives and learning approaches, but the online world is more cyclical than linear, and more recursive than unidirectional. If a constructivist view is adopted, online learning can be seen to involve a conversational interaction between a learner, in particular his or her existing frames of understanding, and certain information or knowledge claims, the context or justification for which may or may not be adequately understood or shared by the learner. In short, it is probably best to consider it as a complexly linked ecology. This recognition must be taken to heart by any individual, group or organisation, including any educational institution or training provider that seeks to assist others in learning in this context.

15.5 Support required by different kinds of learners

Earlier in this study I identified different categories of self-directed learners. The model that I have found most useful for this discussion is that provided by Lonsdale (2002), who identifies four different categories of learners:

- the task-specific searcher

- the general searcher

- the self-improver

- the participator

Each type of learner requires different levels and amounts of support. The **task-specific searcher**, for example, is aiming to locate a specific item of information and will require those forms of assistance that enable him or her to rapidly and accurately locate the needed information. Increasingly this is achieved through the technology itself, which utilises more intuitive software and greater amounts of artificial intelligence to resolve the inquiry.

The **general searcher** may wish to gain an overview of a field of knowledge or practice. Sometimes this is facilitated by a portal or subject gateway, sometimes by a directory, sometimes by a browsing facility, and sometimes by a human agent who helps to identify the major parameters of a field and assist the learner to conceptualise how the field is constructed, its major tenets and its principal elements.

Participators in the online context are those who enjoy the social contact afforded by technology. Their support is likely to derive from the group itself, although depending on the size and nature of the group, and the technology used, it can be difficult for other members to detect whether they are experiencing difficulties. In the case of formal educational settings, when there is a nominated tutor or group facilitator, this can be a problem; certainly it is an issue that has confronted distance education providers since long before the advent of online learning. It might be possible to build in a protocol whereby learners have to 'check in' periodically, but most general interest groups are very loosely organised and, in any case, participants might find such a requirement onerous. Indeed, one reason why some learners choose not to participate in formally structured courses is precisely because they find such restrictions unacceptable or inconvenient.

Lastly there is the **self-improver** who, as defined by Lonsdale, is a classic self-directed learner; someone with an interest in (and frequently a wide knowledge about) his or her subject area. Novice learners are likely to require considerable direction and support, whereas more with more experience may

be more independent, although both can suffer from the difficulties of navigating in hyperspace and from the loss of motivation and direction that commonly afflicts the independent learner. At such times, membership of a group, whether formally structured or not, can be decisive in determining ongoing commitment. Those groups that seek to support self-directed inquiry may need to consider how best to identify and to reach out to learners who are experiencing such moments of uncertainty.

Not only is it possible for an individual to be more than one of these kinds of learners simultaneously, depending on the particular learning effort or topic, but perhaps more importantly, a learner might shift his or her orientation in relation to a particular learning effort. Thus a task-specific inquiry might mutate into a more general exploration of a topic, and even into a full-blown learning project. This in turn could lead to an engagement with other learners, where a chance mention of some intriguing sidelight might trigger yet another cycle of inquiry.

When these four categories of learners are combined with the six different aspects or domains of online learning dealt with in this chapter, it is apparent that the provision of support—using either hard or soft technologies—is far from a simple matter. This leads to a consideration of who, exactly, is doing the supporting.

15.6 Skills required to assist self-directed learners

Because learners have very diverse learning needs and interests and varying levels both of subject-matter expertise and of technological fluency, their individual requirements for help can differ quite markedly. As a basis, however, it may be assumed that at different times and varying measure learners may require help with:

- the substantive basis of their inquiry; or
- handling technology; or
- participating in online groups and forums.

When stated like this, it appears that the needs of the 'learner' are not too different from those of the 'student,' and accordingly that the skills involved in offering assistance to such people look remarkably like those required of professional online educators or 'e-moderators.' In 1998, the Australian National Training Authority and the Victorian Office of Training and Further Education jointly published a study entitled *TAFE Teachers Online: Professional Development for Online Delivery*, which contained a detailed checklist of 'Competency Units', each with subsidiary Skill Elements, found

to be required for those operating in the online environment. The eight main Competency Units were how to:

1. use the Internet;

2. use the Internet for research;

3. use the Internet to communicate;

4. plan a course of delivery online;

5. design an online course;

6. create an online course;

7. teach online; and

8. assess online (Australian National Training Authority, 1998, pp. 31–37).

In June 2000 an international conference was convened in the United Kingdom with a view to identifying the competencies required for online teaching. In a paper prepared following that conference, Goodyear and his colleagues put forward an eight-part model according to which, the online teacher has to be;

- a process facilitator;

- an adviser-counsellor;

- an assessor;

- a researcher;

- a content facilitator;

- a technologist;

- a designer; and

- a manager administrator.

Each of these domains subdivides into a number of more detailed competencies; for instance the 'process facilitator' role has 23 competencies nested within it. There is no suggestion that any one person would have to evince all of these competencies, or that they would be equally good at all eight of the roles; indeed as Goodyear et al. acknowledge, 'These roles are unlikely to have equal importance in any specific instance of online teaching. In some circumstances, some roles may be of negligible importance' (Goodyear et al, 2001, p. 68).

The person seeking to help an independent self-directed learner would of course be unlikely to perform those roles that are specific to the formal education and training context, such as the assessor role or that of the manager facilitator, and the extent to which he or she might be involved as a designer or a technologist may well depend on the range of resources or the complexity of the applications involved. Nevertheless, both lists noted above

are salutary for the simple reason that all these functions, certainly those that relate specifically to learning per se (facilitating processes, advising and counselling, contributing to the information base through research and helping the learner to master specific content), are equally applicable at least to some extent in business, community or other settings where self-directed learning might occur.

Looking at the role of the online learning facilitator or 'e-moderator' is one approach to understanding the skill set required of the would-be online helper. Another is to look at the changing role of a particular professional group that has for some time been central to supporting the self-directed learner: librarians. Historically, those librarians who work in specialised fields, and particularly in specialist libraries such as medicine, law or local history, develop an intimate knowledge of their holdings and of the requirements of their clients, and may accordingly be expected to offer domain specific assistance. With the advent of digital technologies, most such specialists have seamlessly incorporated relevant new technologies—CD-ROMs, websites, portals and search engines—into their repertoires. But the majority of librarians, especially those working on general inquiry counters in public, school, and large undergraduate libraries, who characteristically come into contact with a very wide cross-section of users, are unlikely to have a detailed knowledge of the substantive issues confronting particular inquirers or of the particular search engines, web portals or subject specific websites, and must therefore limit themselves to general advice and support. And yet, as traditionally the first port of call for many self-directed learners, they are increasingly viewed as a principal way in which members of the general public are likely both to pursue their learning interests and to develop the skills necessary to participate in the so-called information society or the knowledge economy.

A major report prepared for the UK Open Libraries Network (UKOLN) (Evans 1997) includes an entire chapter devoted to the 'Skills for the new librarian,' new or additional skills that librarians will need, in addition to their existing base of expertise in customer service, knowledge management and cataloguing of information in various forms and formats. According to the report:

> *Public library staff already have many of the communication and customer-care skills which underpin high-quality public service delivery. These skills, and librarians' status as 'honest brokers', clearly make a strong base from which to build the skills for working with a growing diversity of material—including both print and electronic formats, from both global and local sources—that the information society will bring* (Section 3.3).

Elsewhere the report—referring to a similar report prepared for the European Commission (Thorhauge et al., 1997)—identifies the following clusters of skills:

- net navigator
- IT gatekeeper
- information consultant
- information manager
- educator (Section 3.5)

In common with the roles identified and discussed by Goodyear and his colleagues, each of these five also contains a nested hierarchy of other competencies, but it is evident that those library professionals seeking to help self-directed learners need a range of additional skills and attributes specific to the digital environment. Accordingly libraries and library training schools around the world are rapidly increasing the professional development available both to practising librarians and to those in training to be expert users of digital technologies and to be able to teach their clients too.

Of course it is very well to look at the skills required of and being developed by those employed to work with these technologies, but what of the vast army of volunteers whose interest in their subject, commitment to their community and often self-taught level of technical expertise underpins most of the entire edifice of self-directed learning? At a minimum, and setting aside whatever special subject-matter knowledge they may have or claim to have, such people need at least the same minimum skill level as that throughout the general population (see, for instance, the discussion in Chapter Four). But it is probably expected that they would have a more fully developed understanding of the technologies, how they operate and their limitations, so that they can create homepages, websites, discussion groups, help pages and the like, and also because they are often expected by users to offer technical support and advice, especially regarding problems encountered in accessing sites, downloading information or interacting with various applications. Perhaps even more importantly, if they form part of an online learning community, they would require skills of group facilitation which, in the case of online learning, entails different and additional skills to those called on in face-to-face learning situations. This resonates with a longstanding issue in adult education, namely its primarily voluntary and amateur nature.

15.7 Conclusion: Towards a model of support for online self-directed learners

Self-directed learning is often portrayed somewhat unfairly as a dilettante activity, an adornment to the real business of learning that occurs in schools, colleges, universities and training centres. While this was probably never a fair

characterisation, it is even less true today, when the sheer volume of information combined with the rapidity of change has catapulted us into an era of continuous learning, most of which is self-directed. Far from being a marginal activity, self-directed learning is now a major way in which people cope with the turbulent and unpredictable worlds in which they find themselves both personally and professionally.

If the move of self-directed learning from the periphery to the core is notable, so too is the move of technology within self-directed learning from the periphery to the core.

Technologies are no longer the province of the 'geek,' but are increasingly a key part of most people's experience. Today, many people are more likely to log onto the Internet to answer a question, find a service, consult an expert or check the specifications of a product than they are to visit the local library or even to pick up the phone. As I stated in Chapter Two, 'On the one hand, new technologies have created a potent incentive for a great deal of learning, since they are so ubiquitous and versatile.... On the other hand, the growing demand for learning, and the increasing sophistication of learners, has stimulated the development, expansion and refinement of technologies to satisfy the hunger for information and knowledge.'

It is probably fair to say, then, that technologically assisted self-directed learning has assumed a priority never before seen, but with this newfound prominence has come the need for all sorts of help. This help starts with the six domains I identified in the first half of the study: **connectivity**, one of the essential preconditions for online engagement; the **capability** and **confidence** to engage with the digital technologies and to the online environment; the availability and affordability of appropriate digital **content**; ensuring **credibility** and trustworthiness both of the information and of the environment; techniques for **capturing** and harvesting needed information; and, finally, help with realising the transformative potential of technologies through **collaboration** with others.

Many of these issues lie beyond the reach of any one organisation or sector; their realisation will entail an unprecedented level of collaboration between a diverse range of players: Governments, telecommunication providers, hardware and software manufacturers, educational institutions, business corporations, the media and community groups. And the need for help does not stop with these threshold issues, either, since people's decision to participate in online learning—both individually and collectively—invokes another suite of concerns that likewise call for a conspiracy of cooperation.

From this study, it seems established that attempts to learn in this context are a great deal more sophisticated than the direct and unproblematic acquisition

or transmission of neatly packaged and pre-digested elements of knowledge. It is equally clear that there is a lot more to providing support than simply placing digital information onto websites. These support strategies may be clustered into four major groups as follows:

- those that pertain to the content, organisation or accessibility of websites;
- those that pertain to the orientation and assistance provided (either online or offline) to users and potential users;
- those that pertain to discovery, capture, organisation and display of information; and
- those that pertain to the sharing of information and insights and to the creation and support of virtual learning communities.

When a student enrolls to undertake online learning through a formal course of study, whether provided by a school, college, university or training institution, he or she reasonably expects the provider to take care of these various facets. This is one of the value-added services that a learner expects when he or she becomes a student. For the self-directed learner, on the other hand, pursuing his or her interests independently and without institutional affiliation, different kinds of support (when available) may be provided by different stakeholders.

Earlier in this chapter I outlined a number of groups that might contribute in various ways to supporting the self-directed learner. Depending on their resources and the nature of the relationship with their users, there is a range of ways in which interested groups and individuals can support the self-directed learning endeavours of members, employees, subscribers, customers, contributors or others. For obvious reasons, it is in discussing support for learners that the experiences and insights of education and training providers are most directly relevant to those individuals, groups and organisations that, for a variety of reasons, might seek to help self-directed learners. In part this is because the concept of self-direction, as discussed back in Chapter Two, has its counterpart in formal educational settings. In part it is also because at least some of those self-directed learners either already are, or might one day become, students themselves. But principally it is because there are many commonalties in the sort of facilitation that people require whether or not they are enrolled in a formal course or program of study.

Of particular note is the convergence of many activities, programs, concepts, technologies, users and outcomes that were previously separate from one another. In the final chapter, I will consider whether, taken together, these changes presage a new world in which learning occupies a central unifying role. Are we, as so often claimed, about to enter the Age of Learning or the Learning Society? This is the focus of the final chapter.

Part IV Bookmarks, Viruses and Dungeons: Mixing Metaphors on the Electronic Frontier

A map of the world that does not include Utopia is not worth even glancing at, for it leaves out the one country at which Humanity is always landing. And when Humanity lands there, it looks out, and, seeing a better country, sets sail. Progress is the realisation of Utopias (Wilde, 1891).

All languages constantly evolve through use. Old words are given new meanings, new words are invented or imported from other languages, terms are appropriated from various occupations or technical fields, and metaphors gradually come to replace the ideas or processes from which they originally derived. It is therefore interesting to consider how metaphors derived from other domains are commonly invoked to help in understanding and explaining something novel. Perhaps surprisingly, English has benefited particularly from the argot of those who, in past centuries, manned sailing ships.

If we stopped to think about it, most people would realise that phrases such as 'to take the wind out of someone's sails,' 'to be dead in the water,' 'to make heavy weather,' 'to be ship-shape,' 'to like the cut of someone's jib,' 'to follow the leading lights,' 'to know the ropes' and that, to make any 'headway' it is sometimes necessary to 'sail close to the wind,' were all originally nautical terms.

But how many of us would recognise that 'over reaching' originally referred to sailing too long on a cross wind tack before turning; that 'sounding out' once referred to the practice of 'casting around' by 'swinging the lead' to determine a safe passage in shallow waters; that 'as the crow flies' derived from the practice of coastal ships releasing crows (and observing them from the 'crow's nest') to determine the shortest way to land; that 'letting the cat out of the bag' referred to removing a cat-o'-nine-tails prior to flogging a hapless sailor or marine (or indeed that 'not having enough room to swing a cat' also referred to the cramped conditions aboard ship); that 'chock-a-block' referred originally to hauling the sails so tight that the wooden pulleys were 'hard up' against each other; that 'above board' referred originally to what happened out in full view of everyone on the decks of a ship; that a ship

needing to make a quick getaway from a hostile situation would 'cut and run' (meaning to cut the ropes holding the furled sails and run before the wind); or that to be 'taken aback' referred to the situation of being carried away from an objective with the wind blowing into the wrong side of the sails? In fact, faced with a lot of everyday terms such as these, most of us would be like a sail that has become detached from the yard arm; we would not have a 'clew.'

There can be little doubt that figurative language of this kind adds greatly to the richness of our expression; through evocative imagery it provides poetic and non-linear links between ideas, as well as conveying a good deal of meaning in a very elegant and succinct way. But metaphors are more than mere linguistic devices that enhance our vocabularies. Since they commonly start out in one familiar domain (in this case the experience of sailors) and migrate into entirely different contexts and domains, they provide a way of 'framing' and hence of understanding other experiences and ideas, especially those that are novel, abstract or complex. They are, as Ungerer and Schmid (1996) put it, 'powerful cognitive tools for our conceptualisation of abstract categories' (p. 114).

Moreover, since they allow us to conceptualise aspects of the world, they also provide a guide as to how we should act in it. In the memorable words of Lakoff and Johnson (1980), they are what we live by. For example, a teacher who thinks about teaching as being like sculpting clay would regard his or her students quite differently from one who thought of it as like conducting an orchestra; and a teacher who framed his or her work as if nurturing plants (the word 'kindergarten' captures this metaphor) would probably behave differently from one who viewed teaching as similar to coaching a sporting team or training a squad of unruly military recruits.

Accordingly, to understand why people behave as they do in certain circumstances, it is often helpful (and sometime necessary) to understand the metaphors or mental models that guide their actions. Since Cyberspace and the online world generally are new phenomena, a great deal of attention has been bestowed on attempting to identify and to 'unpack' the various alternative metaphors that might help to explain its evolution and, perhaps even more importantly, to shape its likely future development.

As this study has proceeded, it has become increasingly apparent that various authors and theorists, not to mention actual users around the globe, have in mind very different visions of the Internet and how it functions. For instance, as mentioned back in the Introduction to Part I, one of the most explicit and fully evolved metaphors is that of the Internet as frontier (which itself represents one manifestation of a master metaphor of exploration and adventure). In this view, the Internet is seen as a wild and lawless place,

largely the province of entrepreneurial risk-takers and other 'pioneers.' Eventually, however, governments and other regulatory regimes impose some semblance of law and order, and the pioneers are replaced by more staid and conservative 'settlers,' who are concerned with mutuality and reciprocal obligation and with building a sense of community.

This, however, is only one of many ways in which people have conceptualised the online environment. For instance, many commentators either explicitly or implicitly view Cyberspace (itself a metaphor) as a 'place'; which is particularly interesting, in view of its intangibility. In addition to the image of the frontier and, of course McLuhan's seminal concept of the 'global village,' it is common to hear or to read of 'windows' and 'gateways,' of multi-user 'dungeons' and 'chatrooms,' of 'homepages' and 'site maps,' of information 'commons' and digital 'domains,' of associative 'trails' and learning 'journeys,' of 'superhighways' and system 'crashes,' and of information 'landscapes' and 'navigational aids.'

As one commentator has pointed out, 'by adding a prefix such as cyber-, digital-, electronic-, e-, or online- to any noun, we can indicate that these entities exist in Cyberspace' (Lokander, 2000, p. 20). Thus there are 'cyber-libraries' (or 'cybraries'), 'online shopping malls,' 'electronic banks,' 'e-health clinics,' and 'digital information services.' It has also become common for businesses which have a 'presence' online to invite customers to 'visit us at...' or 'go to our homepage,' and for electronic 'addresses' to be described as 'just a click away.'

Of course, the fact that '...the Internet collapses space into one "hyperpotential point" which implodes all concepts of distance, spacing and separation' (Nunes, 1997, p. 166) means, as Adams (1997) points out, that Cyberspace violates what he terms the 'first law of geography,' namely the principle that near things are more closely related than are distant things. The fact that ideas and information can simultaneously be 'present' at more than one 'place' at a time is well explained by Johnson and Post who write:

> Location is ... irrelevant *in Cyberspace in the sense that network servers and online addressees are equally accessible from everywhere. Any Web site in any odd corner of the network can be accessed with essentially equivalent transmission speed and message quality from any other corner of the network, which means that the effects of whatever information is available at a given site are felt simultaneously and equally in all jurisdictions, independent of their 'distance' from one another* (Johnson & Post, 1998).

Yet, despite the many shortcomings of these spatial metaphors, they are nevertheless amongst the most evocative and pervasive used in describing (and experiencing) Cyberspace.

A second common metaphor is to view Cyberspace as library, or even as a huge book, with billions of 'pages' which may be 'browsed' or even 'bookmarked.' It is now increasingly commonplace to speak of 'publishing' information electronically, although much of it is self-published and may accordingly lack the quality control of most books, journals and magazines in print. A consequence of adopting this view is that issues of accessibility, usability and credibility are major preoccupations. Content has to be catalogued and searchable, and users must be educated to locate, evaluate and use needed information. Not surprisingly, this view is prevalent amongst researchers and scholars, librarians and other information specialists.

A third major metaphor, other than the geographical and literary ones just described, is that of Cyberspace as a living organism which, like the human body, is made up of other living organisms. In this view, it is not a monolithic entity beyond the reach of its users and participants, but a complexly interlinked ecosystem, developing and evolving through the sum of the actions and interactions of its many users. The organic nature of this view, reinforced by the use of terms such as 'growth' and 'maturity' of the Internet, 'bugs' and 'viruses,' is exemplified in the complex, almost anarchic way in which users and providers have interactively developed, shaped and repurposed it to meet their own interdependent and constantly evolving needs.

A fourth class or category of metaphor is that which views and portrays Cyberspace as a community. There is a rich vein of literature, much of it from the formal education system but much also derived from online clubs and interest groups, professional associations, and business enterprises that addresses the dynamics of how online or virtual communities can form, develop and be facilitated, and what it is like to be a member of such groups. One of the drawbacks of this metaphor, apart from the absence of physical proximity and coherence that usually characterises a 'community,' is that users, even when they are logged on simultaneously, are not actually in a shared 'space.' Instead, each person is at the centre of a 'cybersphere' or a personal bubble in which all electronic addresses (and hence the information to which they give access) are equally available at any given time. This 'digital individualism' is contrasted with a form of interdependent communitarianism in the real world, in which we all share a dependence on the environment and on each other. However, despite these and other misgivings that have been expressed about the idea that it is possible to have a true community without a physical dimension to it:

in these virtual communities, the sense of community and communication is real enough. What is virtual is that the people do not necessarily live or work near each other in space. Rather, they are neighbours in Cyberspace (Stefik, 1996, p. 117).

As with the other metaphors, if someone holds this view, he or she would no doubt relate both to the technology and to the people and ideas encountered through that technology differently. Presenting oneself in the incorporeal world of Cyberspace, creating and pursuing relationships, and negotiating knowledge claims would all be very different for the individual who sees the online world in terms of a community. While there are certainly shortcomings or 'silences' in this metaphor, as indeed there are in all of them, it nevertheless provides some provocative insights, including that of whether or not the online community is fundamentally different from its real world counterpart.

The four clusters of metaphors that I have examined here are just a sample of the many that have been applied to the Internet. Because the digital domain is novel, complex, influential and invisible, it has spawned a rich diversity of comparisons, allusions and analogies. None on its own is sufficient to illuminate all aspects of the online world; indeed as Lakoff and Johnson (1980) argue, each metaphor highlights certain aspects of the target domain, downplays others and hides still others. The more complex the field—and the Internet is indeed complex—the greater the number of metaphors required to understand it, despite the inconsistencies and even contradictions between them. Metaphors are used because we don't have the linguistic and cognitive tools to come to grips with a novel phenomenon in its own right or, literally, on its own terms, just yet. As expressed so elegantly by O'Donnell already quoted in Chapter 13; 'It takes a generation or three to get past the point of depending on the old medium for a way to think about the new and to the point of exploiting the new medium artfully in its own right' (O'Donnell, 1994, p. 7).

The Internet is simultaneously a library and a kind of living entity, a marketplace and a highway, a communication network and a world to be explored. What matters most is how it is viewed by its users, and in this study I have been examining what kind of library, what sort of organism, what nature of place and what type of community it is, from the perspective of self-directed adult learners who are pursuing learning opportunities for their own purposes, without any institutional support and affiliation.

A learning Utopia?

It is evident that the Internet is in fact much more than just a complex tangle of computers and servers, keyboards and peripherals, copper wires and fibre-

optic cables that allow for the rapid transmission and receipt of electronic impulses representing information. From this brief review it is clear that, for businesses and governments, educational institutions and libraries, interest groups and individuals it is a remarkably rich, diverse and versatile way of doing both what they have done before and, to some extent, what they never previously dreamed of or imagined.

For learners too, both practically and symbolically, the digital world makes possible exciting new visions and opportunities. It is now perhaps time to turn to the question; what kind of society for learners are we creating with new digital technologies? Drawing on the frontier metaphor in particular, are the learners pioneers, blazing new trails and glimpsing new horizons, or are they settlers, availing themselves of the relative comfort and convenience provided by those who have gone before them? Has the digital world moved beyond its individualistic pioneer beginnings to become a Learning Society or a learning community? This is the focus of the next (and final) chapter.

16 Towards the Vision of a Learning Society

…the information-technology revolution is creating a new form of electronic, interactive education that should blossom into a lifelong learning system that allows almost anyone to learn almost anything from anywhere at anytime (Halal & Liebowitz, 1994, p. 21).

16.1 Introduction

In 1986, Gooler—then Dean of Education at Northern Illinois University—wrote a book entitled *The Education Utility: The Power to Revitalize Education and Society*, in which he envisaged a time when information would be provided across the community in the same way as other services such as electricity, gas, water and the telephone. To describe this remarkable confluence of information and communication technologies he coined the term 'The Education Utility,' whose potential 'as the cornerstone of a lifelong Learning Society' was, he wrote, nothing short of 'awesome.' He went on:

> *The Utility could prove to be the focal point around which a new coalition might form to enhance the quality of education available to all citizens. That is, the utility might bring together in common purpose a host of associations, agencies and individuals whose combined talents, carefully orchestrated, could change the countenance of education. Suppose this new coalition began by bringing corporations, teachers, associations, administrative associations, state boards of education, local boards of education and colleges of education personnel together to discuss how best to implement the concept of the Utility. And, further, suppose you added other groups to the coalition, such as educational researchers, continuing and adult educators, vocational/technical educators, philosophers and liberal arts professors. Suppose creative people and groups* outside *the education system, but with ideas for education, joined the coalition. And suppose each of these groups and individuals focused on how to make high quality individualised education a reality? Why couldn't this coalition bring about a renaissance in learning?* (Gooler, 1986, pp. 179–180).

Gooler envisaged dramatic new possibilities for teaching and learning in schools colleges and universities; he also foresaw its application in workplaces and communities, in continuing professional education and in international education and exchanges. Unconsciously echoing the enthusiasm of those who, 140 years earlier, had predicted that through the telegraph 'all the inhabitants of the earth would be brought into one intellectual neighbourhood' (Jackman, 1846), he suggested that 'the Education Utility, used correctly in international settings, could very well play a critical role in promoting international peace and understanding. To the extent that individual citizens have a better understanding of their fellow world citizens, world peace is made more possible' (Gooler, 1986, p. 176).

Today, we know the Education Utility as the World Wide Web, and it is clear that global peace is no closer—indeed it may be further away—than it was in 1846. What about other aspects of Gooler's vision? Are we closer to realising the vision of the Education Utility as 'as the cornerstone of a lifelong Learning Society'?

16.2 The Learning Society

In common with other related concepts such as 'lifelong learning' and 'self-directed learning,' the term 'Learning Society' is extraordinarily flexible, having taken on a range of meanings with radically different origins. Today, the notion of 'Learning Society' is substantially influenced by discourses to do with economic rationalism, and when authors refer to the need for a Learning Society they commonly do so for the pragmatic reason that it will ostensibly produce workers who are intellectually agile and technically proficient, and hence more economically competitive. The term is often employed in the same breath as 'learning organisations,' with a similar practical or instrumental justification. However, it was not always so.

Although the concept of a society which is inherently educative can be traced back at least to ancient Athens (Garforth, 1980), the first recognised mention of the term (if not the concept) in an educational context is probably Hutchins's book, *The Learning Society*, originally published in 1968. In that publication, Hutchins argued that conventional education systems were increasingly unable to respond to the demands made on them for relevant learning, but more than this that learning was at the heart of adaptive change. He noted, 'The two essential facts are… the increasing proportion of free time and the rapidity of change. The latter requires continuous education; the former makes it possible' (1970, p. 130).

A few years later, and quite independently, the landmark UNESCO study on the future of education was published under the title Learning to Be (Faure, 1972). That source was not only seminal in terms of establishing the concept of lifelong learning, but also included the following observation:

> *If learning involves all of one's life, in the sense of both time-span and diversity, and all of society, including its social and economic as well as its educational resources, then we must go even further than the necessary overhaul of 'educational systems' until we reach the stage of a learning society* (Faure, 1972, p. xxxiii).

The following year, Schön published his famous treatise *Beyond the Stable State,* which laid the groundwork for his later work with Argyris on reflective practice, and also spelt out a rationale for why organisations and even societies needed to have learning at their heart:

> *The loss of the stable state means that our society and all of its institutions are in a* continuous *process of transformation. We cannot expect new stable states that will endure for our own lifetimes. We must learn to understand, guide, influence and manage these transformations. We must make the capacity for undertaking them integral to ourselves and to our institutions. We must, in other words, become adept at learning. We must become able not only to transform our institutions, in response to changing situations and requirements; we must invent and develop institutions which are 'learning systems', that is to say, systems capable of bringing about their own continuing transformation* (Schön, 1973, p. 28).

Another year on, and Husén published a book which, although it shared the same title as Hutchins's earlier work, was more explicitly futuristic and technologically oriented. Husén argued that it would be necessary for states to become 'learning societies'—where knowledge and information lay at the heart of their activities. In a piece of writing with a remarkably contemporary feel to it, Husén observed that:

> *Among all the 'explosions' that have come into use as labels to describe rapidly changing Western society, the term 'knowledge explosion' is one of the most appropriate. Reference is often made to the 'knowledge industry', meaning both the producers of knowledge, such as research institutes, and its distributors, e.g. schools, mass media, book publishers, libraries and so on. What we have been witnessing since the mid-1960s in the field of distribution technology may well have begun to revolutionise the communication of knowledge within another ten years or so* (Husén, 1974, p. 239).

He echoed many of the points made in UNESCO's Faure Report a couple of years earlier, including that education was destined to become a continuous lifelong process seamlessly interwoven with other life events and circumstances, without any formal entry or exit points. He envisaged the establishment of 'learning centers,' which would be available in the home and the workplace, probably supported by computer terminals. He also presciently noted that:

> *To an ever-increasing extent, the education system will become dependent on large supporting organisations or supporting systems ... to produce teaching aids, systems of information processing and multi-media instructional materials* (Husén, 1974, pp. 198–99).

By the end of the decade of the 1970s, the term 'Learning Society' was reasonably well established in the educational lexicon. In 1980, Boshier edited a book entitled *Toward the Learning Society: New Zealand Adult Education in Transition*, and in 1986 Husén revisited his earlier thesis in a book called, appropriately enough, *The Learning Society Revisited*. The year 1992 saw the appearance of an article by Ranson entitled 'Towards the Learning Society,' which appeared in the journal *Educational Management and Administration* and which laid the groundwork for his two later books, *Towards the Learning Society* (1994) and *Inside the Learning Society* (1998). Ranson, however, was not alone, and from the mid 1990s until the present day there has been a veritable avalanche of articles, conference papers, government reports and books—some of it praising the concept and some critiquing it—but all dealing with various aspects of the topic (Edwards, 1997; Griffin & Brownhill, 2001; Hughes & Tight, 1995; Jarvis, 2001; Raggett, Edwards & Small, 1995; Strain & Field, 1997; Young, 1998).

Although united by a common term, these various publications exhibit very different ideological perspectives and accordingly divergent views of what such a society might be like. In his book *Changing Places?* Edwards identifies three key strands in discourses around the notion of a Learning Society. In the first of these strands, the Learning Society is an educated society, committed to active citizenship, liberal democracy and equal opportunities. In the second paradigm, the Learning Society is viewed as a learning market, enabling institutions to provide services for individuals as part of supporting the competitiveness both of individual enterprises and of the economy more generally. In the third model, which is strongly influenced by the tenets of post-modernity, the Learning Society is conceptualised as one in which people adopt a learning approach to life, but since their life stories are so varied their learning is likewise quite heterogeneous. Thus some learning will be for citizenship, some for professional advancement and some for personal fulfilment or to create a sense of belonging and social inclusion.

Not unexpectedly, with so many different concepts of the Learning Society, opinions are divided as to whether or not it exists (or for that matter ever could), and likewise whether or not technologically assisted learning is contributing to or detracting from the vision. According to Edwards, the second strand with its emphasis on markets, economic imperatives and individual achievement, has dominated much of the current public policy debate. A good example might be the UK Government's policy paper *The Learning Age: A renaissance for a new Britain* (DfEE, 1998).

However, in this present study, I have been influenced more by the third of the models, which is perhaps best summed up in a recent extensive study of Learning Communities in Europe entitled Towards Europe as a Learning Society (TELS) (European Lifelong Learning Initiative, (2000). The following list of characteristics, a composite provided by the European Lifelong Learning Initiative (ELLI) and the European Round Table of Industrialists (ERT), defines a Learning Society as one in which:

1. Learning is accepted as a continuing activity throughout life

2. Learners take responsibility for their own progress

3. Assessment confirms progress rather than brands failure

4. Capability, personal and shared values and team-working are recognised equally with the pursuit of knowledge

5. Learning is a partnership between students, parents, teachers, employers and the community, who all work together to improve performance

6. Everyone accepts some responsibility for the learning of others

7. Men, women, the disabled and minority groups have equal access to learning opportunities

8. Learning is seen as creative, rewarding and enjoyable

9. Learning is outward-looking, mind-opening and promotes tolerance, respect and understanding of other cultures, creeds, races and traditions

10. Learning is frequently celebrated individually, in families, in the community and in the wider world.

While I do not intend to work my way through all ten of these criteria in any formulaic way, in the sections that follow, I will take some of these criteria either alone or in combination, and examine the contribution digital technologies have made towards the emergence of a Learning Society.

16.3 Interconnection of learning with other significant life activities

For many people, the concept of learning is inseparable from that of schooling, and whenever they are asked about their learning activities and outcomes, they refer only to their (often unsatisfactory) experiences with and memories of the formal education system. In his pioneering research work into self-directed adult learning back in the late 1960s and early 1970s, this was a recurrent finding reported by Tough (1966; 1971). However, one of the defining characteristics of the Learning Society must be the fact that learning is inextricably interwoven—intellectually and socially—with other aspects of life. It is not simply that it is widely or even universally available, although this is also vital, but rather that it occurs naturally and unselfconsciously in the context of many everyday activities.

In recent decades, there has been increased (or rather renewed) attention to the diverse kinds of learning that occurs in settings such as workplaces, homes and communities. It has become recognised that learning is an everyday occurrence, and indeed that there is much to be gained through the study of learning in its natural habitat, as opposed to that which occurs in the more rarefied and contrived environment of classrooms or for accreditation by formal education providers (see, for instance, Lave & Wenger (1991); Resnick (1987)). In fact, this blurring of boundaries has led Edwards to posit that learning is akin to a 'moorland'—an open and unfenced expanse of territory—rather than a series of 'fields' (Edwards, 1997, p. 95). As Miller and West explain it:

> *Richard Edwards argues … [that] lifelong learning renders problematic the idea of a clearly differentiated educational 'field' and site of practice, since so much of people's learning takes place outside educational institutions altogether. In contrast to the 'fields' of adult or higher education, lifelong learning may be more of a 'moorland' of diverse activity, which can take place in the workplace, in the home, in informal community-based settings or in Cyberspace. Such dedifferentiation brings with it new possibilities for learners and learning as well as for celebrating what has been marginal and neglected in older and more rigidly drawn maps* (Miller & West, 2001, p. 14–15).

While this development has been occurring at a theoretical level, the widespread uptake of digital technologies has actually amplified and accelerated the convergence of learning with other life activities at a practical level. This has occurred in two different ways. On the one hand, since so

many aspects of life are now dependent on digital technologies, it has become necessary for people to learn about them in order to participate fully and actively in a range of day-to-day tasks. On the other hand, technologies provide a common platform for the conduct of many everyday tasks of which learning is one. In fact it is not only the common platform, but rather the endless universe of interconnected hypertext documents that makes it so easy for one activity to seamlessly shade off into another.

To take a simple example, a person may wish to book a holiday to an unfamiliar destination. Not only can he or she identify appropriate airfares, hotels, rental cars and sightseeing tours online, but it is possible to see photographs of the venue, to learn about its history, even to read what previous travellers have to say about the place. Likewise, a decision to purchase some shares online can lead to learning about corporate structures, financial reports, product profiles, and even the history of the industry or the firm itself. A simple inquiry to locate a recipe can lead to learning about the history of the dish, how the ingredients are grown or processed, methods of cooking, nutritional information, or even what wines should accompany the meal itself. A decision to buy a replacement part for an appliance can result in learning about the features of the device, its history and development, its various applications, and how it compares with its competitors.

The converse is also true. If someone is learning about geography or history or languages online, he or she may suddenly be confronted with the opportunity to buy a book, attend a film festival, join a club or even make an overseas trip. And that option, in turn, might link to an online membership or order form, a review or testimonial, or a video clip. Thus a whole range of everyday activities including work, communicating with others, engaging in banking or commercial transactions, even checking a telephone number or an address can provide an opportunity to learn in an effortless and simple way, and *vice versa*. As technologies become more ubiquitous, and applications more user friendly and intuitive, it is to be expected that there will be even greater convergence between learning and a range of other activities including entertainment, work, e-commerce and social communication.

An extension of this general principle is the convergence between self-directed and other-directed learning. While for some people there has always been a link between their own self-directed learning activities and participation in formal study towards a qualification, for many others, perhaps a majority, this link is more potential than real; the differences between the two worlds have represented an unbridgeable gap. However, as discussed in Chapter Fifteen, the advent and rapid diffusion of digital technologies has gone some way towards abolishing the distinction between self-directed learning and that which occurs in other, more formal instructional settings.

One obvious and widespread example is the fact that the acquisition of ICT literacy for many people of all ages, even those who are enrolled in formal courses of study, often represents a significant self-directed learning effort in itself. There is ample evidence to show that young people, especially those who have 'thick access' to technology, are inveterate learners. Research by Facer and others, for instance, reveals that, whether in the home or in the school, young people tend constantly to push the boundaries of technology and to learn a great deal about its capabilities through their own self-directed efforts.

They are not the only ones. Research into ICT literacy of students in vocational colleges and universities likewise bears out the assertion that, to a significant extent, they are self-taught. And for adults, whether their use of ICT is predominantly work-based or not, again their skill as users is commonly acquired through reading manuals, through trial and error, or through the well established practice of seeking out a more experienced person and asking for help and advice.

All this independent learning is occurring against a backdrop of increasing availability of courses and programs for learners of all ages. Whether in schools, colleges or universities, in workplaces or continuing professional development courses, or in community-based settings, learners from the very young to the very old are clamouring to participate in courses and programs in order to learn ICT skills. Indeed, in a survey of learning needs and interests among Australian adults virtually the only field that held near-universal appeal—even for those who were otherwise resistant to learning—was the ability to use computers for a variety of purposes, including to access a range of learning opportunities and possibilities (Hazzlewood, (n.d.).

There is evidence to suggest that familiarity with ICT has a beneficial impact not only on people's ability, but also on their willingness to engage in online learning; the spillover seems to be facilitated simply because of familiarity. Those who experience high quality technologically mediated learning as part of their education may be more likely to carry over their interest and enthusiasm for learning into a continuing quest for learning beyond graduation. Conversely, those who are at ease with technology in their everyday lives, including their own self-directed inquiries, are more likely to learn fluently in this way within more formal contexts as well.

The interpenetration of self-directed online learning and formal instruction using technology is not, of course, limited to the domain of technology. Not unexpectedly, the path is smoothed where the learner has, or develops, an interest in the subject matter itself. For instance, those enrolled in formal programs of study are liable to be drawn away from the strict limits of their curriculum into specific areas of interest that appeal to them and which are

accessible via the Internet. Conversely, learners of all ages who are using technologies to pursue their own interests in an unlimited range of domains may well happen upon readings, illustrations, bibliographies and other resources that have been developed and are provided by educational institutions for the benefit of their enrolled students.

Whether or not such resources should be made available to the general public is a matter for institutions to consider. Certainly some institutions deliberately seek to attract self-directed learners, either because of an ideological conviction about the value of learning, or because they see it as an opportunity to showcase the quality of their materials.

It has been an enduring aim of educators throughout the ages to engender in their students a love of learning and a level of enthusiasm that will carry over from the classroom to the 'real world' (Candy, Crebert & O'Leary, 1994). Perhaps for the first time, therefore, there is a potentially seamless connection between self-directed and other-directed learning, mediated by information and communication technologies. Certainly, as this study has shown, much can be learnt from the experiences, interests and priorities of self-directed learners that can be applied to supporting the learning efforts of those engaged in more formal studies.

There are, however, a couple of downside risks to this development. The first is that learners who experience very high quality resources and materials through their own self-directed inquiries, or who come to relish the freedom of pursuing their own interests online, may be less than enchanted with the often amateurish resource materials and the lock-step restrictions to which they are subjected by their lecturers, teachers or trainers. Allied to this, the ease with which learners can 'click' their way out of the classroom means that it is difficult and perhaps impossible to constrain learners to the strictures imposed by a formal curriculum. On the other hand, as young people who are highly accomplished users of technologies pass from school to college or university, and on to the workplace and the wider community, they are likely to expect high standards of connectivity and sophistication in the design of sites they encounter in the outside world. Thus in both cases, the longed-for articulation between learning in formal settings and beyond them may prove to be a double-edged sword, if not for the learners, then at least for those offering courses and programs of instruction.

16.4 Equitable access to learning opportunities

One of the most common and compelling claims made about the online environment is the extent to which it provides access to unprecedented

amounts of information. Certainly there are, as previously discussed, billions of pages available on the World Wide Web and this, linked with the communicative power of the Internet through email, forums, bulletin boards and chatrooms, has made it possible for virtually anyone, anywhere, to learn about any topic of interest at a time and in a form that is convenient to them. Blind to factors such as age, gender, physical appearance, previous educational attainments, socioeconomic status, geographic location or many of the other impediments to learning in the real world, the online context has brought a new democracy to learning.

While the reach of digital technologies is indeed impressive, it is important not to accept such claims uncritically. The assertion that we either are already, or are approaching, the Learning Society because of Information and Communication Technologies is at best premature, and at worst quite misleading. For a start, as discussed in Part II of this study, there are many impediments to access—technological, educational, psychological and sociological—and until these are dealt with, we can hardly claim to have arrived at the Nirvana of the Learning Society. As Kirkup and Jones put it; '…yes, the technology has the potential to provide support networks for lifelong learning. However the applications of this new technology have not yet been proved effective enough to replace many well-established teaching and learning activities, and may never be so. Nor have the technical resources become socially ubiquitous' (Kirkup & Jones, 1996, p. 289).

Even when the technical facilities are available, access to all needed information is still not guaranteed. In Chapter Five, I discussed what I called 'affordable access to quality digital resources.' Not only is there a large amount of high quality information which is not yet in digital form (and some of which may never be), but that which is already digital is subject to heated battles both ideological and economic. I have already alluded to the so-called 'Free Science' movement, but this itself is but part of a larger battle for control of information on the Internet, also exemplified, for instance, by Barlow's Declaration of the Independence of Cyberspare' (Barlow, 1996).

At present, the United States is the largest single contributor to and user of the digital domain, and its free market philosophy has accordingly led to a user pays approach to the provision of a great deal of information, including some that is created, stored, managed or disseminated by the Government. Not unexpectedly many large corporate players have been angling to dominate the Internet, and to charge for information services, including those that are currently available without charge. There is, however, a powerful and widespread movement pulling in the opposite direction with the intention of ensuring that more rather than less information is freely available via the Internet. The movement is sometimes referred to as the 'information commons':

For at least the past 20 years, it has been a mantra in our national political life that the so-called free market is our best hope for a brighter, more beautiful tomorrow. From Ronald Reagan's sermons on the 'magic of the marketplace' to the giddy euphoria of the Internet revolution, politicians and business leaders have locked arms in praise of strong property rights, deregulation, globalisation and the marketisation of everything.

But even before the dot-com bust and the astonishing financial and ethical meltdown of some leading American corporations, there has been a growing counter-movement afoot. This insurgency not only insists that markets have distinct limits, but that there are serious alternative ways of creating and managing wealth in socially benign ways. Call it a rediscovery of the commons[8].

It is a quiet trend with diverse manifestations. But at heart its goal is to prevent the private plunder of resources that belong to everyone and to erect new mechanisms for assuring their popular control...

Paradoxically, much of the economic growth of the 1990s stemmed from the Internet, the biggest and most robust commons in history. The idea that a commons can be a valuable resource for wealth-creation in the market calls into question some core assumptions of economic theory.

Economists, for example, routinely claim that people will have no incentives to create valuable information or creative works unless they have strict copyright protection and the ability to participate in markets. But this simply is not true on the Internet. The biggest effusion of creativity and knowledge in history has occurred precisely because there were weak copyright protections and a general absence of markets. Yes, e-commerce has flourished in some sectors and many kinds of information will not be created without copyright protection.

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8   From the Middle Ages until the start of the nineteenth century, the term Commons applied to resources (including land and water) that were owned by the manor or by the village, and which were available to all members of the community. While small strips of land were used by individual farmers to produce crops, the Commons was used for grazing as well as for fulfiling other purposes such as providing coal, peat or brushwood for their hearths, turf for their roofs, or fish for their tables. This phenomenon gave to the peasants or serfs the title of 'commoners.' After about 1800, much common land was inclosed and placed into private hands, accordingly becoming unavailable to the peasant farmers who, for many generations, had previously depended on it (see Durham County Council, Common Land and Village Greens. Available online at:
http://www.durham.gov.uk/DurhamCC/usp.nsf/pws/Common+Land+-+History+of+Common+Land [accessed 2 December 2002]).

But the Internet has demonstrated that a commons of digital content and infrastructure is critical to competitive, well-functioning markets, not to mention a healthy democracy.

It should be remembered that the Internet was not the brainchild of Larry Ellison or Bill Gates, but of public servants and academics operating in an environment far removed from the market. As a result, the open, end-to-end architecture of the Internet has facilitated the free and easy sharing of information. It has unleashed a creative explosion of Web sites, listservs, open source software development, peer-to-peer file sharing communities—a robust ecosystem of innovation that no market could or did create on its own. (Thought experiment: Compare diversity of expression on television or radio with that of the Internet.)

The commons movement is about re-conceptualising what should be public and shared and what limits should constrain the expansion of markets. Contrary to the Milton Friedman acolytes, not all aspects of life should be controlled by markets. That's why the commons movement insists upon pioneering new models of community control of resources. It also challenges the presumption that virtually everything should be for sale in the market (Bollier, 2002).

While some activists, such as those belonging to the Information Commons movement, are concentrating on arguing that as much information as possible must be free, others are instead focusing on bandwidth and the speed of access to needed information. However, as important as bandwidth is, both to speed of service and to the range of applications that may be accessed, it likewise is not enough. The point is well made by Kellogg and Richards:

We want to be very clear… Bandwidth is good. Higher quality infrastructure is good. However none (or very few) of the human factors outlined here can be addressed with these kinds of 'bigger and better' technical solutions. Getting the wrong information, or not enough information, faster is not a solution, only (at best) less of a problem. The most challenging issues of Internet useability and usefulness are pragmatic and social in nature: For example how do users capitalise on the Internet as an information resource within their own constraints of space and time? How will information ownership or value added to information, be determined and accounted for on the Internet? How can information providers make their information most useful and attractive to others? (Kellogg & Richards, 1995, p. 33).

McDowell and Pickard also stress that access to information—however fast and plentiful—should not be confused with access to learning opportunities:

> *Access to information is seen as one of underpinning infrastructures and essential features of lifelong learning and is supported by government initiatives (for example DfEE, 1997). The availability of vast information resources in the electronic information world is often viewed as a positive and, indeed, liberating feature of networked learning. Claims are made that the use of electronic information enables more learner-centred approaches. If learners can undertake independent discovery and explore alternatives rather than being reliant on their teachers to provide the information they require, this provides a foundation for lifelong learning.*
>
> *… [W]e aim to challenge the assumptions that access to a wealth of information will necessarily lead to the extension of learning opportunities and better learning…* (McDowell & Pickard, 2000, p. 1).

A similar point is made, perhaps even more forcefully, by Shenk in his book Data Smog, where he writes:

> *Much political hay has been made of late about the danger of the widening gap between the 'information haves and have-nots.' 'If we allow the information superhighway to bypass the less fortunate sectors of our society, even for an interim period,' Al Gore has warned, 'we will find that the information rich will get richer while the information poor get poorer with no guarantee that everyone will be on the network at some future date.'*
>
> *Gore and other politicians are sadly missing the point. The disenfranchised citizens of our country are not in need of faster access to bottomless wells of information. They are in need of education. There is an important difference…*
>
> *In fact the information superhighway is not only not a priority for the educational underclass—but in a variety of ways… access to such an abundance will create new problems for it. Indeed, as the educated elite learns to respond intelligently to the new challenges of data smog, it is the have-nots who will be additionally disadvantaged…. The sad irony of the information age is that the have-nots are going to end up with the data dumped on them. The best way to prevent such a data smog gap from settling in is to shift the attention and resources toward basic educational infrastructure for all Americans* (Shenk, 1997, pp. 210–211).

Implicit in all three of the comments quoted above are two related issues, both of which I have discussed throughout this study. The first is the need for **skills of information management**, as recognised by Harasim et al. when they write; 'Infoglut—or information overload—is common to all computer networking activities. We are only beginning to learn how to manage communication effectively and efficiently in the online environment. With networking, access to communication, education, and information is no longer the major problem; *the key challenge becomes learning how to manage the increased information flows*' (Harasim et al., 1995, p. 222, emphasis added). The second is the need for **Information Literacy** as a vital aspect of the ability to capitalise on the digital revolution, and this necessarily entails an educational intervention, not only in formal settings such as schools and universities, but also in communities and workplaces—in fact anywhere that people may be accessing and using information.

In short, we should be wary of inadvertently confusing access to information with access to learning opportunities, and we need to acknowledge the point made by Kirkup and Jones; 'To capitalise on the potential for ICTs for Open Learning, and for a Learning Society rather than an educated élite, implementation programs must attempt to address inequalities caused or reinforced by ICT's.' (Kirkup & Jones, 1996, p. 289). This is a task that calls for shared commitment by a diverse range of agencies and individuals, another characteristic or quality of the Learning Society.

16.5 Partnerships and public recognition of learning attainments

One of the features that distinguishes a 'Learning Society' from a 'society of learners' is the extent of public commitment to and public acknowledgement of the learning that is undertaken. In a strongly individualistic society, learning is a private and highly personal activity, in which people succeed or fail by their own efforts. Much of our formal education system, and a good deal of our work-based learning, depends on this as the basic defining characteristic, which tends to be supported by the individualistic nature of many digital technologies.

Yet intriguingly, it is becoming increasingly fashionable to acknowledge the contextualised and socially embedded nature both of learning and of the workplace. As Bollier puts it, 'The new conversation about the [information] commons is burgeoning for cultural reasons as well. Now that communism is dead, it has become more permissible to talk in respectable company about cooperation and collaboration' (Bollier, 2002). With respect to the issue of

partnerships in the creation of a Learning Society, there are two different manifestations; one pertaining to the imperative to get everyone online, and the other to the shared nature of much online learning.

Throughout this study, I have emphasised that, if we are to avoid the worst excesses of the digital divide, and instead to reap the benefits of the digital dividend, there has to be a shared concern amongst governments, businesses, education providers, telecommunications carriers, community groups, libraries and cultural institutions to collaborate in order to get as many people online as possible. If the digital world simply replicates, or worse still exacerbates, the traditional inequalities of the offline world, then there is little hope for a Learning Society. However, if it is recognised that these technologies provide an unprecedented opportunity to create a new and more egalitarian dispensation, with learning at its heart, then there is a requirement for unprecedented levels of partnership. Manifestly, Governments must take the lead, but there are many other stakeholders who need to be enlisted in the program to provide access for all.

There is a second, and perhaps more localised sense in which the online world is an arena for novel partnerships. This is the potential they offer for genuine networking and for interdependent learning. So long as computers and other devices were freestanding, indeed even when they were simply linked to databases and virtual libraries, all they could offer was an enhanced version of independent learning. But as I argued in Chapters Eight and Fourteen, their truly radical and transformative potential arises from the opportunity they offer to network with others—both experts and co-learners—in the creation of collaborative communities of inquiry. However, even here, as Brown and Duguid (2000) point out, the online world excels at 'learning about' rather than 'learning to be.' Thus, to the extent that a Learning Society transcends propositional knowledge to embrace procedural knowledge as well, there must inevitably be learning partnerships both on- and offline.

But partnerships per se are not enough: whatever collaboration and partnership may be possible with respect to the challenge of creating a network society and learning within it, there can be no true Learning Society without a mechanism for the public recognition or celebration of at least some learning, including that which is undertaken for extrinsic rather than purely personal reasons. In many ways, this seems more difficult in the digital domain. In real world learning situations and communities, including schools, colleges, universities, workplaces and the like, people's attainments are often publicly recognised and their achievements celebrated, through a variety of means; everything from quick handwritten notes, informal social get-togethers and notices in newsletters, through to public presentations and award ceremonies.

It is probably true to say that, in its present state of development at least, there are fewer opportunities for public recognition and celebration of people's learning attainments in the online than the offline world. On the whole, because of the relatively private nature of online learning events and outcomes, it is difficult to identify and hence to publicly acknowledge user's learning experiences and outcomes. Thus, one of the essential characteristics of the Learning Society, namely the public recognition and celebration of learning, may be somewhat difficult until the technologies permit some kind of sharing of individual success and progress.

16.6 Values underlying learning—tolerance, openness, respect for cultural and other differences

In recent years, the concept of globalisation has become associated, indeed for many people synonymous, with many negative values and impacts, economically, culturally and intellectually. Violent demonstrations against world leaders, economic forums, multinational corporations and trade organisations have emphasised that there is a dark side to global development. Included in this are the views that significant historical, cultural and linguistic differences are ignored, working people are pitted against one another by global capitalism, and the power of the sovereign state is diminished in relation to huge corporations or regional confederations. Such angst is fuelled by a lack of understanding about other cultures, and by often deeply held fears concerning loss of social cultural or linguistic identity amid universalising influences including the Internet.

There are two notable ironies in this situation. The first is that many of those who object to what they see as unwelcome aspects of globalisation (captured by the term 'Coca Colonisation') commonly use the very technologies they criticise to launch sophisticated attacks on the organisations and practices they decry. Perhaps even more ironically, however, all this mistrust and mutual misunderstanding is occurring in an era where global trade, communication and travel have never been easier, and where the rapid and pervasive spread of digital technologies has afforded unique opportunities for learners and other users—whether through their work, their local community, or even from the comfort and convenience of their own homes—to log on to distant websites, to read newspapers and journals, to view broadcasts, and to exchange ideas and insights, for instance via emails or through participation in online communities, directly with others from different social, cultural, religious, linguistic and other backgrounds. In other words, there is an

unprecedented opportunity for the development of a global consciousness, respect and tolerance based on enhanced understanding.

Some have argued that the development of the Internet, and in particular the World Wide Web, is itself an example of this insidious process of globalisation; that it is culturally, linguistically and technologically biased towards a western capitalist worldview, and that its mere existence represents an unwelcome intrusion of jarring and dissonant values into many traditional communities. While there may be an element of truth to this, the rapid uptake of digital technologies worldwide indicates their potential to be harnessed to very different ideological ends. An exceptional example, albeit in the context of formal education, is provided by Vincent (1998), who uses technologies to allow undergraduate university students from various universities in Australia and abroad (including in the Middle East) to learn about Middle East politics. According to a description of the process:

> *International and Australian students commence the simulation by forming small groups... Each group is assigned a unique character or identity of a person or organisation who might be involved in a Middle Eastern situation, such as an oil embargo or a border intrusion. The group then studies the person or organisation in order to understand the character's culture, political agenda and connections, what decisions he or she is likely to make or to support, as well as who his or her enemies and supporters are likely to be...*

> *Approximately two weeks is dedicated to students researching the role profile and placing it on the World Wide Web (WWW) for other students' perusal. Dr Vincent then releases a scenario detailing a hypothetical situation which may occur in the Middle east. The groups then meet in character by email or synchronously online to identify and to discuss the various issues involved in each scenario. They participate in debates trying to promote the status of the character they are playing and carrying out any necessary actions...*

> *The final activity is a live international teleconference at which the various characters meet to discuss the issues that have developed through their negotiations around the given scenario...*
> (Vincent, 1998, p. 68).

In the light of this particular case study, there can be little doubt that digital technologies are really just neutral transmitters of information, and it lies primarily with users themselves to decide the ends to which they will be put. Users co-opt digital technologies for such divergent purposes as spreading hate mail and engaging in racial vilification, through to creating communities of religious inquiry and spiritual harmony, and everything in between. There

is no automatic guarantee that users will engage in learning that leads to tolerance, openness or respect for difference any more than that they will engage in pornography, subversion or terrorism. If we value a tolerant, open, well-informed and globally aware outlook, the Internet has provided a unique opportunity for learners to see, hear and read for themselves directly and without intermediation about countries, religions, languages and cultures other than their own. However, the seeds of willingness to do so must be sown in the home, the school, the workplace and the community. The potential of digital technologies to contribute to the realisation of a Learning Society is considerable, but it can only be seen in the context of a broader societal commitment to such learning and social values.

16.7 Lifelong pursuit of learning, both independent and interdependent

Of the various essential characteristics of the Learning Society, none is more central—yet more difficult to define—than that of lifelong learning. No true Learning Society could conceivably exist without widespread opportunities for and participation in learning by all its members throughout their lives. Consequently, in the context of this study, it must be asked what contribution digital technologies have made to the realisation of lifelong learning.

I began this chapter with a brief discussion of the various meanings attributed to the term 'Learning Society,' and alluded to the fact that a similar diversity is to be found around related terms, including lifelong learning (Smith, 2001) which indeed may be an even more contentious concept, perhaps because it has been in common usage for longer and has thus had the opportunity to gather more connotations:

> *Lifelong learning means different things to different people, and its meanings are often confused and contradictory (Griffin 2000; Armstrong 2000). Lifelong learning is sometimes promoted, for instance, not only as a policy for the expansion of education and training, but also as a key element in a strategy for reforming the welfare state and for redrawing the boundaries of responsibility for learning between the state, the market, society and the individual (Griffin 2000). It is also frequently defined as a set of cultural practices and as a key site for the new politics of identity and representation. Lifelong learning, in this context, is implicated in patterns of production (as in discussions of 'the learning organisation'), and of consumption and lifestyle*
> (Miller & West, 2001, pp. 14–15).

The diverse range of meanings attached to lifelong learning is due largely to the fact that it has become a perennial topic of educational theorising, with countless books, articles, conference papers, government reports and scholarly theses being produced on the topic throughout the world over the past century or more. Like the 'Learning Society,' discourses about lifelong learning are based on a wide spectrum of ideological positions and consequently the territory, both in theory and in practice, remains contested. However, the central thesis underpinning all such work; namely that education is a journey rather than a destination, that no one can hope to get through life on a single tank of educational petrol, and that schooling should create the foundational skills for later learning that takes place largely outside the confines of formal education and training, is now well established and agreed.

Although there is an extensive historical literature on the question of learning throughout life, its importance as an area of policy can be traced back at least as far as 1919, when the British Ministry of Reconstruction published a landmark report on the need for learning as a vital part of post-war reconstruction (Ministry of Reconstruction, 1919). The '1919 Report' described learning throughout life as a 'permanent national necessity,' and argued that the fragmented and uncoordinated nature of education as provided in Britain at that time was an impediment both to personal fulfilment and to societal advancement.

Since that time, theorists have adopted the view that learning is a lifelong pursuit, and an indispensable part of civilised society. Moreover, the so-called 'front-end' model of education, in which most learning is held to occur in the early years from say, 6 to 18, came to be seen as seriously flawed, and the alternative view, which holds that equally valuable learning takes place in the workplace, the home, or the community throughout one's lifetime, took its place. Yet if this was true in the early decades of the twentieth century, how much more vital is it today, in an era marked by continuous change, for everyone to develop an orientation towards and capacity for learning throughout life?

Despite the compelling argument that learning opportunities should be available throughout life, based principally on people's interests, abilities and life tasks rather than merely their chronological age or past educational attainments, most countries are still a long way from realising the vision of enabling true lifelong learning for their citizens. Moreover, it appears that digital technologies and the immeasurable riches to which they give access, have quickly been subsumed (at least by providers of formal education and training) under the existing and familiar labels and categories. Such a tendency is inevitably accompanied by serious constraints upon the potential applications of technology in this area. But there are encouraging signs that

this changing, including much more widespread and serious attention on the part of governments, business and industry, and international organisations to the vital need for enhanced learning opportunities throughout life for everyone (see, for instance, Delors, 1996; DOTForce, 2001). With these changes, new technologies may be developed and explored, and as yet unknown avenues for self-directed learning opened up, to the benefit of learners everywhere.

Although these technologies are, relatively speaking, still in their infancy, the evidence suggests that they are rapidly impacting on learning opportunities and activities for people of all ages. For instance, there is a lively literature that focuses on the in-home learning by so-called 'techno-tots'; very young children who, in many cases, have already mastered the rudiments of the personal computer, and in some cases the Web, well before they venture seriously outside the home.

Building on this kind of precocious technological fluency, throughout the world educational systems and providers have recognised the enormous potential of digital technologies to provide learners with access to incredibly rich repositories of information, to support the learning of concepts that hitherto have been difficult or impossible to import into the classroom, to offer drill and repletion for those skills that are best learnt that way, to engage learners in a range of enjoyable learning experiences, and to create online communities of learners extending well beyond the confines of a particular classroom or institution. As Harasim et al. put it:

> *The paradigm for education in the twenty-first century that is emerging is network learning. Based on global interactivity, collaborative learning, and lifelong access to educational activities and resources, it provides an approach that emphasises international connectivities, and engenders new ways of working, studying, and problem solving. Network learning provides a model and approach to meet the challenges of the twenty-first century, enriching educational processes and resources* (Harasim et al., 1995, p. 278).

Meanwhile, at the other end of the spectrum, the fastest growing use of the Internet for personal purposes is amongst older adults, who are discovering its enormous potential to communicate, to pursue passions and interests, to create a meaningful and stimulating retirement, and to break out of what might otherwise be a cocoon of loneliness and isolation. These are the foundations for a technological approach to lifelong learning, in which opportunities are being provided for everyone (techno tots; keyboard kids; digital dads; modem mums; cyber grannies and silver surfers) at times and in ways that are tailored to their individual needs, interests and expectations.

These foundations appear to point to a new, or at least renewed, potential for people to take control of their own learning whatever their interest area, age or background.

Indeed, it is not just the range of learners who can access these opportunities, but their ability to do so across generational boundaries, that is notable. Unlike conventional educational offerings which tend to address the needs of cohorts of learners who are approximately the same age, the online world has created the opportunity for intergenerational learning whereby people with shared interests are able to communicate with, learn from and contribute to learning by others who are not only geographically dispersed, but also different in a variety of other ways that might previously have prevented them from collaborating.

While the above describes the independent aspect of technology-enabled self-directed lifelong learning, it is vital to acknowledge, as I have done throughout this study, that independent learning by individuals is enabled by a highly interdependent model of interaction—the network. As proponents of lifelong learning have advocated opportunities for people to learn from one another, and indeed to create new knowledge through their interactions, digital technologies may offer new potentials for collaboration.

Through the use of common platforms and interoperable systems and applications, digital technologies are providing unprecedented opportunities for people to learn across institutional borders and boundaries, across different sectors and levels of education and training. It is intriguing to note how these developments make the divisions once felt to be sensible and necessary, seem arbitrary and artificial. Earlier in this chapter, I alluded to the 'moorland of learning.' One of the distinctive contributions that these technologies have made is the opportunity for information generated in one context to be utilised in another. For instance, schools, colleges and universities are able to draw on resources developed by other jurisdictions, or even by entirely different providers—local government, the business sector, special interest groups, cultural institutions and so on. This phenomenon, referred to in the offline world as Resource Based Learning takes on a specific meaning in the context of the digital environment and creates a greater interdependence and reciprocity than is possible in 'pre-digital' conditions.

However, while some aspects of lifelong learning have undoubtedly been facilitated by the advent of digital technologies, others have not. For a start, if lifelong learning (and the Learning Society more generally) are predicated on an enhanced sense of community, there is some evidence to show that the more people get connected electronically, the more they become disengaged from their 'real world' communities. In 1988, the *American Psychologist* carried an article by Kraut et al., entitled 'Internet Paradox: A Social

Technology That Reduces Social Involvement and Psychological Well-Being?' In that article, the authors argue that 'greater use of the Internet was associated with declines in participants' communication with family members in the household, declines in the size of their social circle, and increases in their depression and loneliness.' While this assertion has itself attracted a good deal of spirited debate and argument, there are certainly reasons to be cautious about uncritical advocacy of online learning and its contribution to the creation of a broader Learning Society.

A second, and in some ways even more telling caution, concerns the reservations that are offered about the kind of learning possible online. In his book, *Beyond the American Dream: Lifelong Learning and the Search for Meaning in a Post-modern World*, Hayes (1998) emphasises not only the inadequacy of a culture which puts 'having' ahead of 'being', but perhaps even more importantly the impoverishment of the spirit that comes from settling for dreams that have been defined by others. True enrichment, he argues, comes from expanding our repertoire of ideas, and from undertaking real learning about who we are, what we value and what is important and noble. While there are doubtless extraordinary opportunities awaiting on the other side of the screen, even for deep-level learning as discussed in Chapters 2 and 13, the kind of profound, meaningful and truly transformative learning that Hayes writes about are more likely to be encountered in the real company of other people than in Cyberspace.

16.8 Conclusion

The concept of a Learning Society is a complex and elusive one. It is aspirational and ideological and, as I have shown, may be interpreted in a variety of ways and supported for a diversity of reasons. There is no country on earth which could plausibly claim to have achieved the goal of creating a true 'Learning Society', nor is there any simple template to be followed by those seeking such a realisation.

In years to come, looking back with what has been called 'the insolence of hindsight,' today's technologies are bound to seem crude and undeveloped. As time passes, the technology and the users will adapt to each other; the intuitive 'user friendliness' of information technologies steadily advancing more or less in direct proportion to the rising generation for whom they are becoming literally 'second nature.' As Young points out:

> As we shift from a culture of need to know to want to learn, on-line brings new options for learners. But here we speak of the technology, as we understand it and ourselves today. All the limitations of technology

are being worked on. Think of the coming generations of young people who have grown up with technology, and see it as second nature. We have to see computers not as something people escape into, but as a way to reach people. It's about seeing the possible in what seems impossible. That's what will make on-line learning work. And we have often been wrong about the impact of new technologies. In 1939 the New York Times said of TV 'the trouble with TV is that the average family will never find time for it' (Young, 2002, p. 4).

On every front, digital devices are insinuating themselves into our lives. They are becoming smaller and more intuitive, more ubiquitous and invisible, cheaper and more powerful. It is therefore to be expected that, especially as younger users who are comfortable with the technologies reach adulthood and beyond, their use for learning (along with everything else) will increase correspondingly. In their research, Holford and Black pose the following question: 'is the use of new ICT essential to creating a Learning Society, or is it just another technological fad?' (p. 158). They conclude:

The use of ICT in the delivery of learning, particularly with the aim of facilitating the expansion of the Learning Society, offers many advantages, but it also has its limitations. Like many of the past innovations in teaching and learning, the new technologies can neither solve all the problems nor be used blindly. If anything, new technologies place a greater decision-making burden on the teacher-developer. The choices are numerous, the options can be expensive, and the need to be cost-effective is ever present (p. 169).

In many quarters, there is a degree of euphoria—sometimes referred to as cyperbole—surrounding the impact of digital technologies on many aspects of our world, including the world of learning. Starry-eyed technophiles speak of possible futures as if they were already here, neglecting the sometimes-enormous challenges to the realisation of those dreams. The Internet and associated technologies are undoubtedly powerful, but they are not miraculous, and it seems unlikely that a vision that has eluded mankind for millennia—that of a truly empowering and democratic 'Learning Society'—is necessarily going to be delivered by some advances in technology. In isolation, without other parallel changes, digital technologies are certainly not a sufficient condition for the creation of a Learning Society. While the digital world is in some ways a different space and place from the real world, it is populated by flesh and blood people, with all the usual strengths and weaknesses, the same hopes and ambitions that people carry into the online world from their corporeal existence.

Yet, this in no way means that the technologies referred to in this study cannot, with human ingenuity and commitment, be placed into service

towards the building of a kind of Learning Society which we are only now beginning to imagine and describe: 'the necessary Utopia' which 'enables each of us, without exception, to develop all our talents to the full and to realise our creative potential, including responsibility for our own lives and achievement of our personal aims' (Delors, 1996). Depending on how we respond to and use the opportunities before us, Information and Communication Technologies may help to bring us closer than ever before to that ideal.

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