1 Introduction

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Background

In September 1998, The Commonwealth of Learning (COL), with funding from the Department for International Development (DFID) of the Government of the United Kingdom, commissioned a Study Team to prepare a report on the status of the development of virtual education from a global perspective. The analysis was comprehensive in that it included all levels from school to higher education. Virtual education was defined in two ways:

- The application of information and communication technologies (ICT) to core institutional functions such as administration, materials development and distribution, course delivery and tuition, and the provision of learner services such as advising, prior learning assessment and programme planning.
- As an organisation that has been created through alliances and partnerships to facilitate teaching and learning to occur without itself being involved as a direct provider of instruction.

The report of the Study Team, *The Development of Virtual Education: A Global Perspective*, was tabled in June 1999 (Farrell, 1999). It provided a snapshot of the state of virtual education development in the major regions of the world along with a general synthesis of the trends, issues and forces shaping its development. The report also recognised that virtual education is an extremely dynamic phenomenon.

Indeed that has proven to be the case. There has been an immense increase in activity since the publication of the report. The international environment has changed remarkably with respect to the application of ICTs at all levels of education. For example, most educational institutions are developing or planning to develop Web-based course delivery capability. As well, a significant number of government, institutional, corporate and private Web sites have emerged to chronicle the burgeoning numbers of virtual education initiatives. Further evidence of this increased activity is presented in some recent studies that have examined the processes of "e-education" (Bjarnason et al., 2000; Cunningham et al., 2000; Erhmann, 2000; Kerry et al., 2000, Johnston et al., 2001).

The explosion of interest in virtual education over the last two years underlines the point made by COL in its initial proposal to DIFD for funding to support a study of the development of virtual education. It stated that "the provision of education will be the biggest challenge for most governments as they attempt to attain the ideal

of peace, freedom and social justice, while striving at the same time to position themselves to generate more wealth and compete in a global market." And that statement is now being borne out by governments and international development and aid organisations that are experiencing a growing sense of urgency to respond to the challenge of providing education in a changing global market. They are recognising that it cannot be done effectively without substantive reform to their education systems.

There are several global forces (CIA, 2000; UNESCO, 1998) that are serving to raise the sense of urgency:

- World population in 2015 will be 7.2 billion, up from the current 6.1 billion. Ninety-five percent of the increase will be in developing countries. People in most countries will live longer, which will add to the demand for access to education as well as for health-care and other services.
- Globalisation, the largely unrestricted flow of information, ideas, cultural values, capital, goods and services, and people, which is driven by the global networked economy, will enhance not only the demand for education, but create need for more diversified content and greater flexibility of access. However, two trends running parallel to the globalisation process will have a significant impact on the development of global systems of virtual education. These are the creation of more small and medium-sized enterprises and an increasing desire to defend cultural, linguistic and religious identities.
- Each of these trends complicates inter-institutional collaboration and mitigates against the flow of globalised content across borders.
- Exponential growth of scientific knowledge continues to be accompanied by a widening gap between developed and developing countries, the latter being unable, single-handedly, to acquire the basic infrastructure necessary to access that knowledge.

Cunningham et al. (2000), in the comprehensive analysis *The Business of Borderless Education*, identified the following forces as driving the growth of what they called the "alternative education market" in those jurisdictions:

- The globalised economy, with a growing demand for standardised products, services and technical infrastructure, and sophisticated communication systems.
- The emergence of a post-industrial information age and the explosive growth and distributed nature of new knowledge.
- The demands for greater access to tertiary education fuelled by rapid changes in the economy, the need to maintain and upgrade skills for employment, and industry's demand for "work-ready" graduates.
- The growing reluctance on the part of governments to fund the increasing demand for higher education.

The Context

The educational strategies that are being deployed in response to these forces may variously be called "virtual education," "distance education," "distributed learning," "online learning," "Web-based learning," "e-education," "e-learning," or any one of a number of other labels. Current strategies typically involve the use of digital networks, either synchronously or asynchronously, for:

- The delivery and tuition of courses.
- Management of administrative services such as registration, records, fee payment, etc.
- The provision of learner support services.

However, whatever the label used to describe these current strategies, they all have their roots in the practice of distance education. A recent report from the American Council on Education (ACE) states:

> The new distance education force transforming higher education may not be controlled by the traditional structures or providers of education or by traditional academic policies. Not only do the new forms of education portend a change for student populations, but also they will force faculty to develop new modalities of teaching and administrators to provide a new infrastructure for support. As a result, the advent of distance education is forcing many institutions to review and amend many of their existing policies and procedures (Parrish and Parrish, 2000).

Other authors have described the increasing use of ICT as an evolutionary process that has been underway for some time. Tapsall and Ryan (1999), writing from an Australian perspective, describe the evolution of delivery modes in terms of three phases: distance education, open learning and flexible learning. They argue that the first phase, distance education, emerged in response to the needs of learners who were unable to access campus-based institutions because of geographical distance and / or work and personal commitments. The second phase, open learning, while also responding to the problems of distance, is primarily focused on meeting the needs of those who are disadvantaged in terms of entry qualifications and, therefore, need to be served through "second chance" enrolment policies and alternative programmes and delivery models. Finally, they argue that the third phase, flexible learning, in the context of Australian universities, is less about distance or disadvantage than about providing "more" education to "more" students (anywhere, anytime) at "less" cost. Flexible delivery modes, using CD-ROMs and the Internet, are being used as much as a solution to on-campus problems as they are to off-campus access. Tapsall and Ryan claim that, as a result, face-to-face and distance and open learning modes are converging. Students in all types of venues are increasingly learning through the use of the same technologies.

Peter Dirr (1999) offers yet another view of the evolution of ICT applications in higher education. As he sees it, two features have characterised the process. One is that the technology application decisions have been driven primarily by technology, not by consumers. The other is that the applications have been to a traditional academic paradigm. He points to the widespread use of video-conferencing, which has enabled instructors to retain many of the old pedagogical methods, but has done little to accommodate the learner's need for flexibility. Dirr argues that institutions have failed to employ the full potential of newer technologies and have not taken full advantage of the resources available to both learners and instructors.

Jim Taylor (1999) has suggested that this evolutionary process is about to enter a fifth phase. In his schema, the first generation of distance education, the correspondence model, was based solely on print technology; the second, the multimedia model, was based on print, audio and video technologies; the third, the tele-learning model, involved the application of telecommunications technologies to provide opportunities for synchronous communication; and the fourth, the flexible learning model, is based on online delivery via the Internet. Taylor argues that even though this fourth generation of distance education is still gathering momentum, a fifth generation is beginning to emerge. It will use automated response systems that scan the text of incoming e-mail and respond intelligently without human intervention, thereby decreasing the cost of online tuition and increasing access to learning opportunities on a global scale. Taylor calls this the "intelligent flexible learning model" that will enable a quantum leap in economies of scale and cost effectiveness.

Stephen Ehrmann (2000) has another perspective. He says that, "Many institutions are searching for a unifying vision to guide their investments in teaching, learning and technology.

Some of them hear a thundering herd of innovations collectively referred to as *distance education* and *learning anytime anywhere for anyone* and are wondering if their campuses even have a future."

Ehrmann contrasts the concept of the "campus-bound" paradigm with the "campus-based" paradigm. The former assumes that the quality of a programme depends entirely on the books, laboratories, faculty members, students, etc. that are on-site. But the latter, which he calls the new paradigm, assumes that some of the resources and some of the learning are off-site. Networks enable staff and students to use a World Wide Web of academic resources and, as a result, they may only be on campus part of the time.

It was stated earlier that there are many labels used to describe this evolving process of adopting ICT to enhance educational processes. The foregoing review puts that in context. The reality is that some institutions are less advanced than others, yet no one wants to use a label that isn't thought to be the most current — such as virtual education! The review illustrates just how quickly the nature of virtual education is changing.

The Motivation for Further Study

The 1999 report on the global status of virtual education (Farrell, 1999) was well received, and COL was encouraged to continue to monitor virtual education developments, which it has since done routinely as part of the overall information resource-gathering activities of the organisation. Changes in COL's strategic priorities have also heightened this interest in pursuing further study of virtual education activities. The Commonwealth Ministers of Education, at their meetings in Halifax in November 2000, endorsed the Three-Year Plan put forward by the COL Board of Governors. Capacity-building is one of the key roles described in the Plan. It calls for COL to "create programmes and models incorporating different technologies and learning media and demonstrating the ways in which they can be applied to build capacity wherever there is need" (COL, 2000). The Commonwealth Ministers (2000) also called upon COL to "establish a virtual university for small island states using existing structures and capacities."

In July 2000, COL invited the Study Team Leader of the 1999 report to review the available literature on virtual education and issues related to the use of ICT in education and to recommend whether a follow-up study should be undertaken. This exercise determined that current developments in virtual education are comprehensively "chronicled" in new Web sites, recent studies, organisation newsletters and in the education press. Therefore another "snap-shot" study by COL would not add substantially to what already exists. However the review and analysis did result in the following observations:

- The growth of virtual education initiatives is largely occurring in countries with mature economies and established institutional and ICT infrastructure.
- There is widespread recognition that the need for models of mass education is greater in developing countries as they face the challenges of equipping their people with the skills and knowledge needed for economic and social development in a globalised environment. The causes of the "digital divide" must be addressed if virtual education is to be a meaningful part of the educational reform process in these countries (Kenniston and Kumar, 2000).
- A remarkable feature of this surging interest in online virtual learning is that it remains largely focused on ways to use technology that will make the current products of educational institutions (i.e., programmes and courses) more accessible, flexible, cheaper and attractive to learners and, from the institutional

perspective, provide a means of generating revenue to support the traditional on-campus model.

- While this focus is not inappropriate, there are several trends emerging that are likely to bring about radical changes to the way we think about the concepts of campus, curriculum, course, teaching/learning processes, credentials/awards, and the way that ICTs can be utilised to enable and support learning. These trends include the following:
    - The development of community-based facilities to enable access to ICT appliances, connectivity and educational resources.
    - New ways to develop and store content as "learning objects."
    - A growing concern about how "quality" can be adequately ensured in a virtual education environment.
    - The development of new organisational models to facilitate virtual education processes.
    - The provision of learner support services using ICT.
    - The continuing evolution of ICT.

The report to the COL President described these trends as "macro developments" and proposed that they be the basis for a in-depth study in order to investigate their likely impact on the development of virtual education. It was suggested that such a study, while of general interest, should be undertaken to see what promise these trends might hold for addressing the barriers to the expanded use of virtual education in developing countries. This was agreed to and, with the continuing support of DFID funding, a study was designed to achieve the following objectives:

- Identify and describe trends related to educational applications of ICT that are modifying the core products and processes of education (e.g., programmes, syllabuses, courses, delivery models and teaching venues).
- Examine the implications of these developments for stakeholders and organisational arrangements, particularly those in the developing countries of the Commonwealth.
- Make recommendations regarding strategic decisions in light of these developments.

Study Methodology

The study evolved in three phases:

- **Phase one** focused on the identification and validation of the selected trends. The Study Team Leader drafted the initial set of macro developments and circulated them electronically, along with a general description of the nature of the study, to a selected focus group of approximately 30 people around the world. These people were all currently involved in some aspect of virtual education as practitioners, academics, policy leaders and administrators. They were asked to consider the macro developments put forward in terms of the following questions:
    - Do you believe these to be significant trends in terms of their current and future impact on the development of virtual education?
    - Is the description of each trend clear and sufficient?
    - Are there other trends that you believe to be more important than any one of those listed?

Twenty-eight responses were received and used as the basis for reconsidering and rewriting the descriptions of the macro

developments. These descriptions are included in Appendix 1.1.

- **Phase two** involved the identification of a lead author to prepare a paper on each of the selected macro developments according to the following guidelines:
  - Describe the nature of the "macro development."
  - Describe how it is developing in terms of its form(s) and context and in terms of the current stage of development in different parts of the world (i.e., North America, Europe, Africa, South America, Australia/New Zealand, India/Asia).
  - Provide case examples that illustrate the nature of the development.
  - Identify the driving and constraining forces influencing the development.
  - Describe the major issues the macro development is creating with respect to the policy and practice decisions facing education leaders, keeping in mind that the focus of the study is across all education levels.

  The papers written by the lead authors provide the core content of this report. Each person was responsible for his or her paper within the above framework; however they all were encouraged and enabled to work as a team to share information, debate ideas and respond to each other's questions. A project listserv was available to facilitate interaction. (See the Acknowledgements for a list of all the authors.)
- **Phase three** began with the Study Team convening at a workshop in Vancouver in March 2001 for the purpose of reviewing the papers and discussing the probable impacts of the macro developments on the evolution of virtual education and the various issues that are likely to arise. The analytic framework used was as follows:
  - The consumers of education (the learners) at all levels.
  - The suppliers of education and training.
  - The delivery learning opportunities.
  - The nature, organisation and structure of content.
  - The "core business" processes of organisations.
  - The policy and strategic leadership issues that arose from the analysis.

  The Study Team Leader acted as the facilitator for the workshop and drafted the summary document based on the findings from the workshop. This summary constitutes the concluding paper in this report (see Chapter 8).

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Change in education systems is always in pursuit of one or more of the following goals:

- Improvement of access to educational opportunities.
- Enhancement of quality in terms of both standards achieved and the learning process.
- Improvement of efficiencies such as increased productivity, greater return on invested capital and cost reduction or containment.

The macro developments discussed in this report will have an impact on each of those goals and, in the process, shape the way virtual education develops in the future. COL hopes this report will be useful to educational leaders and

policy-makers generally as they grapple with the complexity of establishing strategic priorities in a complex and dynamic environment. However, its more fundamental purpose is to provide a comprehensive analysis of the elements and processes that need to be considered in the development of virtual learning models for COL as it undertakes its various efforts to assist developing countries in the Commonwealth to meet their educational challenges.

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APPENDIX 1.1
Current Macro Developments in Virtual Education

The Changing Venues of Virtual Education

One of the conclusions of the 1999 COL study was that the lack of access to connectivity and learning technology appliances, particularly in developing countries, is a major constraint to the use of ICT in education. The "learning centre" concept has emerged as an essential strategy to address the problem. It is represented in a variety of forms such as multi-purpose telecentres, regional centres of institutions, community-based learning centres, mobile learning centres, telecommuting centres and, at a global level, by the World Bank's Global Development Learning Centre Network. There is a substantial body of literature regarding this phenomenon as it relates to the development of ICT infrastructure, particularly the use of telecentres to create access to communication appliances and connectivity. However there is very little mention of it in the context of the development of virtual education models, yet it will surely modify the way we think about the concept of a "campus."

Learning Objects: The Emergence of Standardised Instructional Design Processes

Learning objects can be described as the competencies to be achieved, skill and knowledge outcomes, lesson plans, assessment items and learning resources. They can exist in a variety of forms such as books, articles, people, Web sites, images, audio and video pieces. They can be stored in databases and used, reused, aggregated as desired or re-purposed by learners, teachers and course designers for their own particular purposes, thus moving us towards a "learning-on-demand" environment. And they can be accommodated within various delivery models such as print, CD-ROM or Web-based. The use of common standards will make these learning objects databases accessible to any organisation that shares the same standards. A consortium of more than 600 institutions has established a task force to identify the standards for this initiative (Porter, 2000). This development is already starting to change the way we think about the notions of curriculum and courses.

The Provision of Learner Support Services Online

Access to services such as career counselling/advising, assessment of current skills and knowledge, development of learning plans, content quality assurance, credit transfer and the provision of credit banking and personal records of learning are critical to the evolution of online content delivery. However, the literature of virtual education largely ignores them, perhaps because it is assumed that these support services will be provided through the historical processes. However, there are emerging examples of technology-based strategies for providing these support services that promise to make them more accessible, affordable and relevant to the needs of online learners. In this regard, the "customer relationship management systems" that are emerging in the business world are providing some useful insights.

The Development of New Organisational Arrangements

Over the last two years there has been an explosion of new organisational forms in education, particularly at the post-secondary level and in the area of company staff training. These new organisational forms are the result of partnerships between businesses and institutions, joint venture initiatives between and among institutions and organisations, new consortia arrangements and a huge increase in the number of new "for profit" education and training organisations. They are developing for a variety of reasons: to gain market share in a globalised educational world, to take advantage of value-added partnership opportunities, to reduce costs and share risk, and to profit from a burgeoning demand for lifelong learning.

These new organisational arrangements have an impact not only on learners, but also on the management of human resources. Primarily, this concerns the role, rights and working environment of faculty. This issue is not ignored in the literature (Parrish and Parrish, 2000), however there has not been a comprehensive look at what strategies are being implemented to deal with such issues as copyright, tutoring loads, tenure issues, job security, etc. The assumption appears to have been that the extant human resource policies can be transposed to the online education environment. The number of virtual education initiatives that seem to have failed because of an inability to deal with these issues would suggest otherwise.

Quality Assurance

One of the consequences of the growth in popularity of distance education has been increased concern about an erosion of academic quality. In the face-to face teaching environment of the institutional classroom, quality is supposedly assured by managing the qualifications of the teacher who, in turn, has total control of the pedagogical process. As the application of learning technologies has served to decrease the teacher's ability to directly monitor and control the learning environment, these traditional quality assurance strategies have broken down. This has led to a growing concern within institutions about the quality of learning that is provided at a "distance." While some argue that this concern is really a mask for the perception that distance learning will threaten jobs in the academy, others admit that, in the brave new world of e-learning, there is a need to have valid and reliable measures of content and pedagogical quality that are appropriate — both to assist learners in their choice of provider as well as to ensure the validity of competencies implied in the granting of credentials. New models for addressing this need for quality monitoring and assurance are emerging and, in the process, are changing both the concept of educational quality as well as the processes by which it is adjudicated.

The Continuing Evolution of ICT Capacity

Some of the forces that were identified in the 1999 study as constraining the development of virtual education were the lack of access to technology appliances, Internet connectivity and a lack of bandwidth to permit full multimedia use of the Internet. Developments on the horizon such as wireless networks, fibre optics, voice recognition and infrastructure development will lessen these constraints. These will allow the use of online education in ways that will beg the imagination of instructional designers — and the caution of policy-makers! Educational leaders must be able to justify the cost of ICT investments in terms of the benefits to be gained and weigh those costs against other needs such as building more schools, hiring more teachers, etc.