

Greville Rumble (Ed.)

DUdYfg'UbX'8 YVUHyg'cb'h Y
Economics and Costs of
Distance and Online Learning



**Studien und Berichte der Arbeitsstelle Fernstudienforschung
der Carl von Ossietzky Universität Oldenburg**

Volume 7

Greville Rumble (Ed.)

**Papers and Debates on the
Economics and Costs of
Distance and Online Learning**



Bibliotheks- und Informationssystem der Universität Oldenburg

2004

**Studien und Berichte der Arbeitsstelle Fernstudienforschung
der Carl von Ossietzky Universität Oldenburg**

Herausgeber:

Dr. Ulrich Bernath
Prof. Dr. Friedrich W. Busch
Prof. Dr. Detlef Garz
Prof. Dr. Anke Hanft
Prof. Dr. Wolf-Dieter Scholz

© Carl von Ossietzky University of Oldenburg, Center for Distance Education

Publisher: Bibliotheks- und Informationssystem der
Carl von Ossietzky Universität Oldenburg
(BIS) – Verlag –
Tel. +049 441 798-2261
Telefax: + 049 441 798-4040
e-mail: verlag@uni-oldenburg.de

ISBN 3-8142-0886-2

Contents

Series Editors' Foreword	5
Author's Preface	5
1. Introduction.....	9
Economics of Mass Distance Education	
2. The Economics of Mass Distance Education (1988)	27
3. Technology, Distance Education, and Cost (1999).....	41
4. The Effect of Employment Practices on the Costs of Flexible and Distance Learning (1994)	53
The 'Competitive Vulnerability of Distance Teaching Universities' Debate	
5. The Competitive Vulnerability of Distance Teaching Universities (1992).....	67
6. Response to Greville Rumble's Article 'The Competitive Vulnerability of Distance Teaching Universities' (1992) <i>Vernon White</i>	89
7. Response to Greville Rumble's Article 'The Competitive Vulnerability of Distance Teaching Universities' (1992) <i>Ian Muiridge</i>	93
8. The Competitive Advantages of Distance Teaching Universities (1994) <i>Desmond Keegan</i>	97
9. The Competitive Vulnerability of Distance Teaching Universities: A Reply (1994).....	103
10. Competitive Vulnerability: An Addendum to the Debate (1998).....	107
The Economics of E-Learning	
11. E-Education - Whose Benefits, Whose Costs? (2001).....	119
12. The Costs and Costing of Networked Learning (2001)	139
13. The Costs of Providing Online Student Support Services (2001).....	163
14. Just how Relevant Is E-Education to Global Educational Needs? (2001)	175
Name Index.....	185
Index of Institutions	188
Subject Index	190

Acknowledgements:

Chapter 2: "The Economics of Mass Distance Education" was commissioned by the editor of *Prospects*, the UNESCO journal, in 1986 as part of a two part edition of the *Journal of Distance Education*. It was published in 1988 in *Prospects*, Volume 18, No. 1, pp. 91-101.

Chapter 3: "Technology, Distance Education, and Cost" was first published in 1999 in the *Journal of Education and Development in the Caribbean*, Vol. 3, No. 2, pp. 91-104. The paper had its origins in an address given to the University of Guyana. First International and Second National Conference on Distance Education, held in Georgetown, Guyana, in September 1999.

Chapter 4: "The Effect of Employment Practices on the Costs of Flexible and Distance Learning" was first published in *SCIENTER* (ed.) (1994) *DELTA* Concerted Action on the economics of flexible and distance learning. First collection of papers for delegates at the Brussels Workshop of 16-17 February, Bologna, *SCIENTER*.

Chapter 5: "The Competitive Vulnerability of Distance Teaching Universities" was first published in *Open Learning*, Vol. 7, No. 28, pp.31-45 (June, 1992).

Chapter 6: "Response to Greville Rumble's Article 'The Competitive Vulnerability of Distance Teaching Universities'" by Vernon White was first published in *Open Learning*, Vol. 7, No. 3, pp. 59-60, (1992).

Chapter 7: "Response to Greville Rumble's Article 'The Competitive Vulnerability of Distance Teaching Universities'" by Ian Mugridge was first published in *Open Learning*, Vol. 7, No. 3, pp. 61-2, (1992).

Chapter 8: "The Competitive Advantages of Distance Teaching Universities" by Desmond Keegan was first published in *Open Learning*, Vol. 9, No. 2, pp. 36-9, (1994).

Chapter 9: "The Competitive Vulnerability of Distance Teaching Universities: A Reply" was first published in *Open Learning*, Vol. 9, No. 3, pp. 47-9 (1994).

Chapter 10: "Competitive Vulnerability: An Addendum to the Debate" is extracted from Greville Rumble, "The Costs and Economics of Open and Distance Learning: Methodological and Policy Issues: Vol. 1: Introduction to the Published Work", submitted for the degree of Doctor of Philosophy by Published Work, The Open University, July 1998, pp. 96-108.

Chapter 11: "E-Education - Whose Benefits, Whose Costs?" was originally delivered as an Inaugural Lecture on taking up a Personal Chair in Distance Education Management at the Open University, UK, and was delivered on Wednesday, 28 February 2001.

Chapter 12: "The Costs and Costing of Networked Learning" was originally published in the *Journal of Asynchronous Learning Networks*, Vol. 5, No. 2, September 2001. It is accessible in its original form at www.aln.org/publications/jaln/V5n2/index.asp (new: <http://www.sloanconsortium.org/publications/jaln/index.asp>)

Chapter 13: "The Costs of Providing Online Student Support Services" was originally prepared as one of the papers presented by the Open University UK's Student Services to the 20th World Conference of the International Council for Open and Distance Education, held in Düsseldorf, Germany, 1 - 5 April, 2001.

Chapter 14: "Just how Relevant Is E-education to Global Educational Needs?" was first published in 2001 in *Open Learning*, Vol. 16, No. 3, pp. 223-32.

Series Editors' Foreword

The assembled *Papers and Debates on the Economics and Costs of Distance and Online Learning*, selected for this volume primarily serve as a reader for students in the Master of Distance Education (MDE) in the course *Management of Distance Education 1: Cost-Analysis*. Clearly, the readings are also of interest for the wider audience of distance educators and managers.

Greville Rumble, the author of most of the papers in this volume, worked under the roofs of the distance teaching 'cathedral', the Open University in Milton Keynes in the United Kingdom. He occupied different positions, as a planner in the headquarters, as director of a regional office, as a faculty and research fellow in different academic areas, and as the editor of *Open Learning*. Last but not least he enjoyed being a student at the OU taking courses such as 'Renaissance Art', which signals his interest in life-long learning as well as his confidence in the quality of the teaching and learning opportunities provided by his home institution.

Rumble developed a professional perspective on distance education as being based on an ethical remit to open access to education, which is realized through efficiency advantages of the distance education format and the scale economies that can be harvested.

But, Rumble also named the possible weaknesses of distance education without ambiguity: (i) interactivity, the dialogue between the student and the teacher, which is the Achilles Heel of distance education, where this kind of student support tends to be a cost-driver taking away the efficiency advantages of distance education; (ii) the wide scope of courses and disciplines, which tends to erode scale economies; (iii) and time lags between development and delivery as well as shelf life, which may endanger reasonable scale economies and may lead to content obsolescence. All this is discussed in part one of this volume.

In part two, the centerpiece is the article on *The Competitive Vulnerability of Distance Teaching Universities*. Rumble's intention was to stir the 'deans of the cathedral' out of their self-contented slumber and awaken them to the arising competition from campus-based universities that were finding it cost-efficient to branch into resource-based teaching and would eventually set up distance-teaching wings. Even if this type of operation may not lead to a more cost-efficient new type of institution or improve the quality of distance teaching, the mushrooming of dual-mode institutions has made inroads in a market that was long reserved for specialized distance teaching universities. Their vulnerability lies in the 'piranha effect' - many small-scale alternatives take students away from the previously captive market of dedicated distance teaching universities - thus weakening the scale economies on which traditional distance education is based. This classical debate between Rumble, White, Mugridge, and Keegan, and sets standards.

The emergence of e-education affects distance education in all its three major components of a distance education system - the development of teaching materials, the provision of student support, and the administration of the teaching and learning processes - and requires that the debate should be revisited. New technologies provide new levels of media sophistication and are a cost driver. The same is true for student support. It

facilitates costly student-teacher dialogue, re-introduces teaching in classes and tends to re-establish the link distance education prided itself to have overcome: the relation between volume (number of students) and cost that characterizes the conventional education system. It is mainly in administration where Rumble sees potentials for savings.

E-education may amplify the tendencies identified in the vulnerability debate when introduced on campus. Learning Management Systems make it increasingly easy to transform lectures into online materials and wrap them in computer-mediated communication.

The challenge is to find ways to exploit the potential and promises of new technologies without losing sight of the original remit of distance education: to open access beyond the audiences of the privileged elite and the rich. The papers presented here do not solve this question (if it can be solved at all). However, the problem is analyzed and the remit of distance education emphasized, making the reader less vulnerable to the ICT hype.

It needs to be pointed out that the papers assembled here were written over a certain period of time and intended for different audiences and for different purposes. There are redundancies in the book. The added value of this edition lies in having a reader that assembles otherwise scattered papers of importance for a specialized field within distance education. For our students these repetitions may be referred to as pedagogical redundancies, which will help to 'carve out' the core arguments to be applied.

The editors of this volume of the ASF Series are grateful to Greville Rumble as author, colleague and co-editor for making this reader with an elaborated index possible. Students in the cost-analysis course of the MDE, which is team-taught by Rumble and Hülsmann, will benefit from this volume as well all those readers interested in the economics and costs of distance and online learning.

Franziska Vondrik deserves our thanks for her editorial assistance. Thomas Hülsmann and Christine Walti also supported the editing of this volume in word and deed.

The Editors
January, 2004

Author's Preface

Distance education is a fast-moving field not least because the technology upon which it depends changes so quickly. When Ulrich Bernath and Thomas Hülsmann first suggested that I should bring together some of the papers I had written over the years on the economics and costs of distance education I was skeptical about the value of the project. In many cases the data and the examples are out-of-date, yet I was encouraged to agree because some of the ideas still seem relevant. In particular, the general cost structure of distance education (as opposed to on-line education) remains the same, and the factors that affect its costs and hence have a bearing on the cost efficiency of distance education relative to face-to-face education remain the same. Among the factors that influence the costs of distance education, and that have not received the recognition they should have, are organizational structure and employment practices, upon which I had written a conference paper. This had never been made a more widely available paper, yet the arguments seemed to me (and still seem) valid – and the preparation of this volume gave me an opportunity to give the paper a wider circulation. Also it seemed to me that the arguments raised in the papers on the theme of the competitive vulnerability of distance teaching universities still had force – a view that has been reinforced by the lively debates that I have on this issue with students taking *The management of distance education 1: Cost analysis course*, which is part of the on-line Masters Degree programme which was launched by the University of Maryland University College (UMUC) and the Carl von Ossietzky University of Oldenburg, on which I am a visiting expert. Finally, the papers that I wrote in the main in 2001 on the costs of on-line learning still have currency. So in the end I agreed on the third time of asking to the project and this is the book that has resulted.

The book would not have been as powerful, however, had it not included the papers written by Desmond Keegan, Ian Mugridge, and the late Vernon White, in response to my paper on the competitive vulnerability of the distance teaching universities. I am delighted that these papers have been included.

I am also grateful to the publishers who have given permission for works that originally appeared elsewhere to be republished in this format. These are *Open Learning*, *Prospects*, *SCIENTER*, *The Journal of Asynchronous Learning Networks*, and *The Journal of Education and Development in the Caribbean*. In preparing the papers for publication a very few changes have made to the originals, mostly to correct spelling mistakes and make uniform the system of referencing other works. In a few cases I have inserted additional footnotes with a late comment. These are always indicated.

Finally I am grateful to Ulrich Bernath and Thomas Hülsmann for proposing the volume, and to Franziska Vondrlík for her work in turning the various original manuscripts into a coherent whole.

Greville Rumble
Nutley, East Sussex, UK

1. Introduction

This volume contains a selection from the articles and papers on the economics and costs of open, flexible and distance education that I wrote over the period 1988 to 2001, together with three short pieces (by Vernon White, Ian Mugridge, and Desmond Keegan) that were published in the journal Open Learning as contributions to a debate around one of my articles. In this introduction I want to do two things: to establish the general background against which my own articles can be read, and then to position those articles specifically within that background.

The Costs and Economics of Distance Education: Origins of the Field

The economics of education did not develop as a subject area until the late 1950s and early 1960s with the publication in the United Kingdom of John Vaizey's *The costs of education* (1958), and the delivery in the United States, on 28 December 1960, of Theodore Schultz's lecture on "Investment in Human Capital" to the American Economic Association (Schultz, 1961). At least initially, interest focused on attempts to quantify the economic benefits of investment in education to the individual and the State, but there were other concerns too - notably the efficiency of public expenditure.

As total expenditure on education rose sharply, however, governments and international agencies became more interested in whether or not technology could cut educational costs. By the 1970s it was clear that few countries could afford to meet the growing costs of providing education for burgeoning populations of young people, let alone the emerging demand from adults for lifelong learning. It was hoped that the application of technology to education would bring the unit costs of education down (Jamison, Suppes & Wells, 1974: 57), thus helping politicians to meet the growing demand for access. Eicher, Hawkrige, McAnany, Mariet and Orivel (1982: 40) captured the general mood well:

"... educational needs, especially in developing countries, will continue to be enormous. ... Therefore, as we foresee a growing gap between available resources and needs to be satisfied, we feel it is urgent to ask whether educational technologies that are more productive are available, and if so, in what context and how they should be used. Traditional schooling with a teacher in front of pupils in a classroom is a labour-intensive technology. ... Are there alternatives? Perhaps we should look in the direction of more capital-intensive technologies than traditional schooling since it is generally in this way that increased productivity is realised in other areas of activity."

The educational field within which technology has most consistently been applied is, of course, distance education. Although distance education had existed (as correspondence education) for many years (at least since 1840), until the 1970s there was little interest in its costs, possibly because most correspondence education was either carried out by private commercial correspondence colleges, or because within the public sphere, it was seen as a marginal and relatively cheap activity, too difficult to cost as a separate activity. MacKenzie, Postgate and Scupham (1975: 80) identified this issue in the early 1970s without seeing it as problematic:

“Some systems preclude separate costing. Institutions like the Chicago Junior College and the distance-teaching centres of Eastern France aim primarily at the extension to an extramural audience in a largely unmodified form of courses already prepared for their internal students. In such instances it is not customary, and would be largely arbitrary, to apportion part of the cost of course development and maintenance to the external operation.

Institutions like the Australian universities, which exist primarily to serve their internal students but which offer external degrees and devote some of the energies of their staffs to the preparation of correspondence courses, also find it impracticable to arrive at a realistic division of costs between the two overlapping activities.”

In the 1970s, however, the use of expensive means of mass communications, particularly educational television, and the development of multi-media systems such as the Open University, not only raised the financial stakes considerably (given the level of investment needed), but also raised questions about the relative cost of distance and traditional forms of education.

Early research into the costs of distance education including educational broadcasting (one of its forms) was sponsored by bodies such as UNESCO, the World Bank, USAID, the US Academy for Educational Development, the International Council for Educational Media, the Stanford University Institute for Communications Research, the UK National Council for Educational Technology, and the Institut de Recherche sur l'Économie de l'Éducation at Dijon. Two main strands of research developed: the first into the costs of large scale educational broadcasting systems set up in such countries as Nicaragua, El Salvador, Mexico, American Samoa, and the Ivory Coast, the second into the costs and economics of correspondence and multi-media-based distance teaching institutions and projects – most notably those of the distance teaching universities and various teacher education projects. A number of studies of the costs of technology-based training, and of so-called dual-mode systems (institutions that taught both by traditional and by distance means) also appeared. The second strand looked at the costs of particular media.

Institutional and Project Studies

Table 1 lists the major institutional studies undertaken between the mid-1970s and early 1990s.

Table 1: Key Institutional Cost Studies of Educational Technology Systems

(based on Rumble, 1999a: 127-8)

(* Contributors' names: the references given are to the edited volume in which the contribution appears and not to individual contributions.)

Remote classroom systems (educational radio, educational television, and video-tape systems)

- Nicaraguan Radio Mathematics Project (Jamison, Klees & Wells, 1978)
- Mexican Radioprimary (Jamison, Klees & Wells, 1978)
- Brazil: Maranhão Schools Instructional Television Project (FMTVE), (Oliveira & Orivel*, in Perraton, 1982b)
- Brazil: IRDEB Madureza Project in Bahia (Oliveira & Orivel*, in Perraton, 1982b)
- Dominican Republic: CENAPEC (Muñiz Aquino*, in Oliveira & Rumble, 1992)
- El Salvador ITV Project (Jamison, Klees & Wells, 1978)
- Hagerstown ITV Project (Jamison, Klees & Wells, 1978)
- Ivory Coast primary education project (Eicher & Orivel*, in UNESCO, 1980)
- Korean Elementary/Middle School project (Jamison, Klees & Wells, 1978)
- Mexican Telesecundaria (Jamison, Klees & Wells, 1978; Arena*, in Oliveira & Rumble, 1992)
- USA: Stanford ITV Project (Jamison, Klees & Wells, 1978)
- USA: National Technological University (Fwu, Jamison, Livingston, Oliveira, Skewes-Cox, & VanderKelen*, in Rumble & Oliveira, 1992)
- SURGE (State University Resources for Graduate Education), Colorado State University (Wagner, 1975, 1982: 108-13)

Correspondence and multi-media distance education systems

- Correspondence Course Unit, Kenya (Hawkridge, Kinyanjui, Nkinyangi & Orivel*, in Perraton, 1982a)
- Everyman's University, Israel (Melmed, Ellenbogen, Jamison & Turniansky*, in Perraton, 1982a)
- India: Indira Gandhi National Open University (Pillai & Naidu, 1991, 1997)
- Korea Air Correspondence High School (Lee, Futagami & Braithwaite*, in Perraton, 1982a)
- Malawi Correspondence College (Wolff & Futagami*, in Perraton, 1982a)
- Mauritius College of the Air (Dodds*, in Perraton, 1982a)
- Open University, United Kingdom (Wagner, 1972, 1977; Laidlaw & Layard, 1974; Lumsden & Ritchie, 1975; Mace, 1978)
- Universidad Estatal a Distancia, Costa Rica (Rumble, 1981; Guadamuz Sandoval*, in Oliveira & Rumble, 1992)
- Universidad Nacional Abierta, Venezuela (Rumble, 1982)
- Athabasca University, Canada (Snowden & Daniel, 1980)
- University of the Air of Japan (Muta, 1985; Muta & Sakamoto, 1989; Muta & Saito, 1993, 1994)
- Brazil: LOGOS II (Oliveira & Orivel*, in Perraton, 1993)
- Nepal: Radio education system (Holmes, Karmacharya & Mayo*, in Perraton, 1993)
- Nigeria: University of Lagos Correspondence and Open Studies Unit (Cumming & Olaloku*, in Perraton, 1993)

- Nigeria: National Teachers' Institute (Bako & Rumble*, in Perraton, 1993)
- Sri Lanka and Indonesia: teacher upgrading projects (Nielsen & Tatto*, in Perraton, 1993)
- Tanzania (Chale, in Perraton, 1993)
- Kenya: University of Nairobi External Degree Programme (Makau*, in Perraton, 1993)
- Zimbabwe: Integrated Teacher Education Course (Chivore*, in Perraton, 1993)

Training systems

- Australia: Queensland Fire Service; offshore petroleum service industry (Kemp, 1995)
- Brazil: Project Acesso (Oliveira*, in Oliveira & Rumble, 1992)
- UK various systems (Coopers & Lybrand, 1990)
- UK: Technician Training Scheme, National Extension College (Morpeth & Rumble*, in Rumble & Oliveira, 1992)
- USA: Air Force Institute of Technology (Christopher, 1982)
- USA: AT&T Teletraining (Chute, Hulik & Palmer, 1987)
- Global: Telecom/Telematique (Nettleton*, in Rumble & Oliveira, 1992)

Distance teaching projects within universities

- India: System-wide study across Correspondence Directorates (Ansari, 1992, 1993)
- Australia: University College of Southern Queensland (Taylor & White, 1991)
- Canada: University of Victoria (Muzio*, in Rumble & Oliveira, 1992)

Some of the early institutional studies focused exclusively on the costs of the system under investigation, without trying to draw comparisons between the costs of distance and traditional face-to-face forms of teaching; others did try to make this comparison. For a number of reasons (Rumble, 1997: 130-32) such comparisons are never easy. Among the problems raised is the need to ensure that:

- The comparison is fair. Educational institutions can differ greatly in their aims and objectives. It would be misleading to compare directly an institution with a heavy research commitment or teaching expensive subjects such as medicine with one that does not.
- The way in which student loads and graduate outputs are treated is comparable. Modules may vary in terms of what is required of a student, courses may be of differing lengths (even for the same apparent qualification), students may study at different tempos (full- or part-time): Compare for example, three to five year first degree courses leading to a Bachelor's degree, four year first degree Master's courses, taught postgraduate Master's courses, and research Master's degrees. There needs to be some way of establishing a common basis for measuring student loads (full-time equivalent students, student learning hours) and graduate outputs, not just within a jurisdiction but potentially across jurisdictions.
- Where comparisons take place across several years, or involve a comparison of costs in one institution in a given year with those in another institution in another year, allowance is made for inflationary and deflationary distortions of prices through the use of suitable price indices.

- Account is taken of the distorting effects of translating local (national) prices and costs into a standard world currency (usually the US\$), which may severely undervalue goods and services paid for at local price levels, particularly in developing countries, thus making international comparisons unfair.
- Account is taken of any hidden subsidies that may affect the costs of one institution but not its comparator. Generally speaking, analysts use the actual price of resource inputs as a measure of their value, but these do not always reflect the true economic cost of a resource. Economists then use a *shadow price* that better reflects the opportunity cost to a society or an institution of engaging in some activity. One of the issues raised in the early cost studies of the UK Open University was whether the University was paying the true market price for some of the facilities it used. The extent to which the actual prices paid in a particular system represent the true cost of its system may affect judgements about the relative cost-efficiency of systems.
- Account is taken of the full system costs of the activity, including those costs that are carried by the end users of the system (generally students and their parents – e.g. costs of personal equipment such as computers, stationery, etc.) but are not reflected in the system’s own budget (as is the case with fees).
- Future costs are projected with care. Projecting costs forward is fraught with difficulties, and great care must be taken to ensure that the assumptions used are reasonable. In particular, current unit costs per measure of output may not be a guide to future unit costs. Many of the models used to project costs forward assume that the overhead costs of the institution are fixed. This is a dangerously wrong assumption. At the same time the models used to project costs forward have tended to be surprisingly simplistic. Typically, cost functions of distance teaching universities (c.f. Wagner, 1977; Snowden & Daniel, 1980) took the form:

$$E = \alpha + \beta Cd + \gamma Cp + \delta S$$

where:

E = the total recurrent expenditure (usually in a given financial year)

α = the total (‘fixed’) overhead costs of the enterprise in the financial year

Cd = the number of new standard course equivalents in development/production in the year

Cp = the number of existing standard course equivalents being presented in any one year

β = the average direct cost of developing/producing a new standard course equivalent

γ = the average annual direct cost of presenting an existing standard course equivalent

S = the number of full-time equivalent students

δ = the average variable direct cost per full-time equivalent student per year

Such one-product, one-customer-type models of the system, in which average ‘students’ are held to study ‘average courses’, totally disregard both the variety of and variation in intensity of use of media, technologies, and student support that occurs in practice across courses and in response to the variety of needs of students (either individuals or groups). Moreover, any more detailed analysis of the costs is often impossible because mid-20th century cost accounting, while identifying the direct costs of products and

services, allocates overheads to products and services on an over-simplistic basis (usually proportionate to the direct labour hours or direct cost of labour). As a result the many cost drivers that give rise to overheads (for example, the number of personnel, the age of buildings) are ignored. Even where more of the variables driving costs are explicitly recognised, as in the cost functions developed to explain the costs of educational television systems (c.f. Jamison, Klees & Wells, 1978: 93-8), the problem of allocating overheads remains, and is generally made more problematic in that in modern times overheads have become an increasing proportion of total expenditure. The problems are exacerbated by the failure of standard management accounting practices (still used in many educational establishments) to deal adequately with the complexity of organizations with multiple products and services (c.f. Johnson & Kaplan, 1987). While there is a solution to this problem - the adoption of activity based costing systems - the fact remains that all the economic and cost studies of distance education have been based on management accounting systems that are essentially flawed.

In addition to these problems, it is commonly assumed that the costs of traditional education are themselves constant, but this is not in fact the case. There have been very considerable efficiency gains in traditional education, particularly at the higher education level where in countries such as the United Kingdom, which used to have a well-resourced but highly elitist higher education system, the number of students per member of staff has risen sharply in an effort to contain the costs of the shift from an elitist to a mass higher education system. Writing about UK higher education, but linking this to developments elsewhere, Scott (1997a: 38, *my italics*) commented:

“ ... the massification of British higher education is demonstrated [by] the sharp reduction in unit costs. Overall productivity gains of more than 25 per cent have been achieved since 1990. ... This pattern, which exactly matches the expansion of student numbers, closely follows the cost curves in other countries where mass higher education systems developed earlier than in Britain. *It supports the claim that mass systems have a quite different economy from that of élite systems*”.

A more recent assessment of the British higher education system indicates that “in the past decade staff: student ratios have doubled and real resources per student have been halved” (Bogdanov, 2002).

One cannot, then, safely assume that a system such as the UK Open University, which clearly was cost-efficient in comparison to traditional UK higher education when Wagner (1977) studied its costs in 1976, is still cost-efficient. This is particularly so because on the whole, as Wagner showed (pp. 370-1), most of the economies of scale of the Open University were reaped in its first few years, during which it expanded its student population from 25,000 to 51,000. Even though the Open University now has in excess of 150,000 students, the nature of the cost curve in distance education is such that it becomes increasingly hard to bring the average cost per student down merely through an expansion in student numbers. Moreover, because the direct cost per student tends to be low, it is very hard to make any significant savings on student costs. In traditional systems, where direct student costs are much higher, changes in teaching-learning strategies can have a marked affect on direct student costs and hence on average costs. Distance education systems seeking to reduce their costs must look to the costs of their overhead and course development and production costs – a point made by Mace (1978: 95) when he suggested that the real question about the Open University’s costs was not

whether they were lower than traditional university costs, but whether they were as low as they might be. Mace's strategy was to query whether the broadcasting component actually added to the University's effectiveness, and to suggest that the University's efficiency might be enhanced by abandoning this relatively expensive component of its teaching system.

Technology Costs

Each medium (broadly, text, video, audio, face-to-face) together with its associated technologies (e.g. radio, audio-cassette, television, DVD, computer-based learning) has its own cost structure, involving a balance of fixed and variable costs, with the variable elements driven by a range of factors. Research into the costs of different media was reported in a number of early studies (c.f. Eicher, 1977, 1978a, 1978b; Schramm, 1977; Jamison & McAnany, 1978; Jamison, Klees & Wells, 1978; Jamison & Orivel, 1978, 1981; Eicher, Hawkridge, McAnany, Mariet & Orivel, 1982; Perraton, 1982b) and, more recently, in Bates (1995) and Hülsmann (2000).

In spite of this research, it has proved difficult to come to any firm conclusions about the costs of the various media given the range of variables that affect costs in particular systems. In the early 1990s Bates (1995) concluded, on the basis of his own studies, that print, audio-cassettes, and pre-recorded Instructional Television are the only media that are relatively low cost for (1) courses with small populations (under 250 students a year) - where the cost is likely to be less than US\$2 per student contact hours; (2) courses with populations of from 250 to 625 students per year - where the cost is likely to be less than \$1.50 per student contact hour; and (3) large population courses (over 1000 student a year) - where the cost is likely to be less than \$1.50 per student contact hour. In addition, radio is also likely to be low cost (under \$1.50 per student hour) on courses with populations of 1000 or more students (Bates, 1995: 5). Of the various media:

- audio cassettes and radio have low fixed and low variable costs
- good quality broadcast television has high fixed costs but zero variable costs
- pre-programmed computer-based learning and multimedia have high fixed and high variable costs.

Bates warns that his figures must be treated with care. Many of the costs given in his study are based on hypothetical situations, and even those based on the 'concrete' experience of the UK Open University and the Open Learning Agency in British Columbia would change if the underlying socio-technical conditions were changed (ibid.: 6).

While not wishing to depart from Bates's conclusions, it is worth bearing in mind that in general there are significant problems with any such generalisations:

- Firstly, new technologies have been developed and introduced. Advances in computing in particular have revolutionised printing, while the development of telematics has revolutionised access to information and communications, with major implications for distance education and its costs. However, it is only relatively recently that any significant cost studies been taken on the costs of e-education (see the references in my own articles on e-education in chapters 11, 12 and 13 of this book), and it is probably fair to say that the jury is still out on exactly how costly these media are.

- Secondly, the costs of technologies are not static. As a technology develops and is adopted by the market so typically its costs fall. What was once an expensive option becomes increasingly affordable. In part this has been due to advances in the production and distribution technologies employed, but it has also been aided by the fact that the nature of the supply-side in some industries has changed. In broadcasting, the rise of independent producers has had significant implications for the economics of the industry. On the other hand, this alone does not mean that it is affordable. As income disparities between rich and poor widen, and more and more people fall into the ranks of the poor, so issues of access become starker.
- Thirdly, there have been changes in the labour market, with a marked increase in the number of people who are contracted to do a particular piece of work, rather than employed in a permanent job. The rise in the number of self-employed editors, designers, producers, and academic writers working within distance, open and flexible learning environments has affected the wages bill - still a significant part of any budget within distance education systems.
- Fourthly, there may be other factors at play – for example, the effects of taxes on imports, and the effects of inflation and fluctuations in foreign exchange rates, and the vast differences in national cost structures. Orivel (2000: 1478) reminds us that the costs of new information and communications technologies “are not linked to national price structures, but quite the opposite, they tend to be similar worldwide for equipment, software, spare parts and consumables”. The hourly cost of using a computer in a school environment (of approximately US\$1.7 including amortisation costs) compares well with the cost of learning with a teacher in developed countries, which ranges between £4 and \$12 per pupil per hour, but poorly when compared with the per pupil/per hour cost of below \$0.01 in many developing countries (ibid.: 149).

Not surprisingly, studies indicate a wide range in the costs of particular media against some kind of standard measure such as a Student Learning Hour, as the detailed figures of costs per SLH for media across different European programmes provided by Hülsmann (2000: 147) show. This should not surprise us. There is no necessary connection between technology, organisational structure, and the way in which work is organized. It is dangerous to believe that the adoption of a particular technology will result in a given level of cost. Such a position smacks of technological determinism, the view that holds that technology “coerces social and economic organisations and relationships” (Grint & Woolgar, 1997: 11) and hence cost. Current research in the field of technology and work does not support this view.

While technological determinism has now been discredited (c.f. Grint & Woolgar, 1997: 11-14 for a résumé of the arguments), the perspective has a long history and was still being advocated in the 1960s and 1970s (Bell, 1960, 1973; Kerr, Dunlop, Harbinson & Myers, 1964; Blauner, 1964). Blauner (1964: 6), for example, maintained that “the most important single factor that gives an industry a distinctive character is its technology”. In spite of this, the view that it is the technology itself that determines the structures of distance education systems persists within distance education literature. Thus Daniel (1996: 15) cites McGuinness’s (1995) claim that “*technology, distance learning and global networks* for scholars and students *are transforming institutional practices* in ways that may make current institutional structures and governmental policies obsolete” (my italics). Elsewhere Daniel (1996) suggests that what he calls the mega-universities

(that is, universities that have distance teaching as their primary activity, a focus on higher education, and a size in excess of 100,000 active enrolments [p. 29]) “operate differently from other universities in many ways, not least in the way they have redefined the tasks of the academic faculty and introduced a division of labour into the teaching function” (p. 30). He goes on to claim that “*changes in technology transform the structures of industries and are great equalisers*” (p. 80, my italics). Further, this is a continuing process since “it is clear that *new technologies*, such as computer conferencing and the Internet, *will* [in the future] *change* the format of university courses taught at a distance” (p. 130, my italics).

In point of fact, of course, the relationship of technology to structure, work roles, skill levels, etc. is not simple, not constant across settings and firms, and not determined by the technology itself, but by management. This does not negate the fact that management can use technology to reduce costs. Thus working practices can be changed to reduce costs. The course team approach adopted by the UK Open University, and judged by its first Vice-Chancellor to be justified by the superior quality of the materials developed and the fact that these are used on courses with large student populations - even though it was an expensive way to develop courses (Perry, 1976: 91), is not a given. There are other approaches to the development of materials, including not only the use of consultants, and changes in working practices such as the use of a simple author-editor to produce shorter more modularized courses that are cheaper to develop because less people are involved in their development. Also it is possible to ‘commodify’ traditional lectures (by, for example, video-taping them), or ‘wrap’ new material around existing material, and buy-in material developed elsewhere (c.f. Rumble, 1997: 78-91). All these strategies reduce costs.

Results

The costs of a particular system are usually measured in terms of the annual cost per student in the system, the cost per student learning hour, or the cost per graduate. The actual results for any particular system depend upon the relative impact of a number of factors, such as:

- The number of learners or students involved, however these are counted: all commentators recognise that this is a crucial factor affecting both total system costs and average student costs. As Eicher (1978b: 14) put it, “a sufficient number of students must be reached to benefit fully from the economies of scale resulting from the use of modern technology”.
- The number of courses on offer.
- The number of years over which courses are presented, and the frequency with which materials have to be remade.
- The technologies used.
- The way in which each technology is used.
- The extent to which students are supported by staff. Eicher (1978b: 14) for example stated that “staff costs must clearly be lower than those in traditional educational systems. This implies at least that the number of hours spent by students and teachers together should be greatly reduced”.

- The organisational structure.
- The working practices in place.
- The structure of the internal labour market and in particular the balance between core and peripheral staff.

These factors impinge on each other, making it difficult to disentangle cause and effect, and so link decisions about size, curriculum, technology, structure, working practices, and personnel policies to cost outcomes.

As a result, there has been a surprising consistency in judgements about the relative cost-efficiency of distance education. Writing in the early 1980s, Perraton (1982b: 61) felt able only to conclude that “it is possible to claim that there are circumstances in which distance teaching looks attractive from an economic point of view”. A decade later, he argued that:

“There is no *a priori* or simple answer to the question, ‘Is distance education a cheap alternative?’ The question is likely to depend on the number of students enrolled, the sophistication of the media used, the amount of face-to-face support provided, and the range of courses offered to students. And the answer may depend on a decision about whose costs are to be included in the equation.” (Perraton, 1993: 382).

Even so, the early cost studies indicated that correspondence and multi-media-based distance education methods could result in a unit cost per student lower than that found in traditional, classroom-based, approaches to education. Garrison (1993: 18), for example, claimed that “the great advantages [of first generation – i.e. correspondence-based – distance education] were a cost-effective and efficient method of providing access and meeting the demand for educational service”. The optimism engendered by some of the early findings – most notably Wagner’s early cost studies of the relative costs of the UK Open University and the then highly elitist higher education system within the UK (Wagner, 1972, 1977) – led some commentators to believe that large-scale distance teaching universities were particularly cost efficient. Reddy (1993: 247), the founding Vice-Chancellor of both the Andhra Pradesh Open University and the Indira Gandhi National Open University in India, and later Chair of the Indian University Grants Committee, claimed that “the general belief that education through open universities is highly cost-effective is *fully supported by the empirical data*” (my italics). Writing in the mid-1990s, Daniel (1996: 62), the then Vice-Chancellor of the Open University in the UK, and a leading exponent of distance education, identified eleven ‘mega-universities’ (that is, universities that have distance teaching as their primary activity, a focus on higher education, and a size in excess of 100,000 active enrolments [p. 29]). These are the (remote class-room based) China TV University system, the Centre National d’Enseignement à Distance in France, the Indira Gandhi National Open University in India, the Universitas Terbuka in Indonesia, the Payame Noor University in Iran, the Korea National Open University, the University of South Africa, the Universidad Nacional de Educación a Distancia in Spain, the Sukhothai Thammathirat Open University in Thailand, the (strictly-speaking dual-mode) Anadolu University in Turkey (which had a massive 557,000 students in 1995) distance programme that dwarfed its on-campus programme, and the Open University in the United Kingdom. To support his contention

that the mega-universities have not only “increased university capacity dramatically while lowering costs sharply”, Daniel makes:

“A simple comparison The 3,500 colleges and universities in the USA have an enrolment of 14 million students and annual spending on higher education is about \$175 billion (Gifford, 1995). This represents an average cost of \$12,500 per student. The 11 mega-universities enroll 2.8 million students for an aggregate budget of around \$900 million, which is less than \$350 per student.” (Daniel, 1996: 32).

Elsewhere Daniel (1998) argues that the eleven mega-universities, as a group, enrol 2.8 million students at an average institutional cost per student that is at most half that of the combined 182 higher education institutions in the UK (about \$10,000 per student with 1.6 million students) or the 3,500 institution US higher education system (about \$12,500 with some 14 million students). However, the conclusion is suspect. This is partly because Daniel is comparing the collective costs of a group of eleven often significantly different institutions operating in eleven jurisdiction, each of which has its own national price structures, with the collective costs of universities in two high price countries – the USA and the UK. It is also suspect because Daniel is comparing the costs of the ‘mega-university system’ with higher education systems that are still, in the main, very traditional in their teaching methods. If the traditional system were to be fully re-engineered, adopting open and flexible learning methods to teach both off-campus and on-campus students in significant numbers by these means, the comparison might be somewhat different. Until such times as proper cost studies are undertaken, all we have is opinion. In the absence of proper research to inform decision makers, the better option is scepticism.

It certainly looks as if traditional forms of higher education can be re-engineered to be more efficient. Cost studies of ‘dual-mode’ institutions that teach both on campus, using traditional means, and off-campus, using distance education methods, suggest that such approaches may bring the costs of on-campus teaching down. Moreover, the approaches used to teach off-campus may then be used to bring down the costs of on-campus teaching. Generally the idea that traditional higher education might be re-engineered to provide an even cheaper way of expanding higher education than by setting up single-mode distance education systems has not been explored adequately. It seems clear, though, that *if* traditional institutions can teach off-campus students more cheaply than can a distance teaching university, and *if* they also use similar resource-based teaching methods to teach their on-campus students, they may be able to reduce their costs to such an extent that they can challenge single-mode distance education systems on cost grounds. I suggested (Rumble 1992 [chapter 5], 1994 [chapter 9], 1997, pp. 152-9) that this is a distinct possibility, and that, further, such systems may provide their students with a wider range of course options than can single-mode distance education systems. Admittedly, the Committee of Scottish University Principals (1992: 34-9, 41) and Scott (1997b) felt unable to come to a conclusion one way or another; and not everyone accepts the possibility that dual-mode systems might be more efficient than single-mode distance education (c.f. Keegan, 1994 [chapter 8]; Daniel, 1996, p. 32, 68), but I am not alone in my suspicions. Hallak (1990: 200) has commented that while “data concerning costs in dual-mode institutions are insufficient to draw valid conclusions ... this would appear to be a promising solution [to the problem of educational costs]”; Renwick (1996: 59-60)

suggests that traditional universities adopting dual-mode approaches may have an edge on single-mode distance education because “they already offer a wide range of degrees and qualifications that rival open universities, could diversify at less cost, would not necessarily have to rely on large numbers of enrolments to be viable as providers of distance programmes, and could offer a wider range of options to potential students”.

Those who still rest their case for the efficiency of distance education on the comparative cost studies of the 1970s and 1980s need to bear in mind that while some distance education systems, such as the UK Open University, have been subject to pressures to increase their productivity, the post-1980s massification of traditional higher education and its re-engineering as a result of the development of dual-mode strategies and flexible learning methods suggests that it is time to re-evaluate the relative efficiency of single-mode distance education against the alternative options available.

Another important change in the field at the present moment is the effect on costs of the increasing use of new information and communications technologies. As indicated above, their costs are still being explored. Two questions need to be answered: firstly are these new technologies more or less efficient than either existing class-room based education or earlier generations of distance education technologies (basically, correspondence-based approaches, broadcast-based approaches, and non-computer-based multi-media approaches); and are they more or less effective than such systems?

In the mid-1990s, opinion was divided on their costs. Thus, for example, Tiffin and Rajasingham (1995: 166) argued that “the virtual class scenario makes economies of scale possible. There are no limits to the size of virtual lecture theatres, no costs for building, maintenance, cleaning, lighting and ventilating, virtual class spaces”, although “the costs of an interface device so that teachers and learners can access virtual classes”. However, the unit costs of such systems depend on scale: “As long as the numbers of people using virtual classes are small the costs will be high, but when millions of students around the world are using the technology, the costs per capita will be low” (ibid., p 166). Collis (1996), however, was rather more cautious. Reviewing the development of tele-learning, she pointed to the substantial cost of setting up a home-based tele-learning environment (p. 139), and the problems of funding the installation of the necessary infrastructure in schools, and of meeting the costs of accessing network resources, particularly the Internet (pp. 266-7, 373-5). The very considerable change in the way in which distance education is being conceived and designed, the lack of knowledge about the effects of change on costs is worrying. Among the issues that are not being addressed are the impact on the cost structures of distance education, on the total institutional costs of systems in the process of change, on the costs that students have to meet, and on access and equity issues arising from changes in student costs.

The analysis of distance education costs pointed to two fundamental truths: firstly, adopting distance education methods actually increases the amount of time academics need to spend in designing and producing their teaching. This decline in productivity only pays off when the materials can be used (and re-used) to teach greatly increased numbers of students. Secondly, it only pays off if the amount of time spent teaching and supporting students is reduced. The earlier approaches to distance education tended to reduce the amount of direct face-to-face teaching offered to students, substituting materials for labour. While education was (and to a large extent has remained) a labour-intensive process, distance education through its use of technology changed the

production function of education, offering what Wagner (1982: p. ix) described as “a mass production alternative to the traditional craft approach”. The new constructivist approaches designed around on-line provision seem to be reversing this trend. They also tend to increase student costs. While many people are quite prepared to pay the additional costs, reflecting their conviction that on-line education is better qualitatively than earlier forms of distance education, the increased contribution required of students is pricing distance education out of the pockets of many people, and thus challenging the emphasis on opening up access for disadvantaged peoples that informed so many distance education systems in the 1960s and 1970s. How important this is, and whether we shall see the emergence of a two-tier distance education sector based around different technologies, remains to be seen.

Positioning my Papers Within This Context

How do the papers included in this volume fit into this background? The first part of the book contains three papers. Chapter 2, “*The economics of mass distance education*”, was written in 1988, before the new information and communications technologies began to impact on distance education, and is in effect a summary of the factors affecting the costs of large-scale (mass) distance education. In a way it is a very conventional paper for its time – focusing as it does on the costs of the distance teaching universities. By 1988 a number of cost studies of distance teaching universities had been published (Wagner, 1972, 1977; Laidlaw & Layard, 1974; Mace, 1978; Snowden & Daniel, 1980; Rumble, 1981, 1982; Muta, 1985). This particular paper was commissioned by UNESCO for one of two special issues of the journal *Prospects* to focus on distance education. Rather than merely rehearse the specific cost findings of the various cost studies of individual institutions, I chose instead to focus very much on the factors affecting the costs of developing, producing and distributing course materials, and the costs of student support, and the influence the breadth of the curriculum relative to the number of students enrolled has on costs. The paper can be regarded as an antidote to the optimism reflected in some of the early cost studies of the distance teaching universities (c.f. Wagner, 1972, 1977; Snowden & Daniel, 1980; Rumble, 1981, 1982), in the sense that it seeks to indicate why some of the expectations of cost-efficiency can be dashed.

In a sense Chapter 3, “*Technology, distance education, and cost*”, which was written in 1999, updates the 1988 paper in its rehearsal of the factors affecting costs in distance education. Although the earlier article did not entirely ignore the cost implications of organisational structures, working practices, and the nature of the internal labour market, this paper is far more explicit about the weighting given to these issues, but without going into details. In part this was because the paper was delivered at a Conference held in Georgetown, Guyana – and the limits of time precluded exploration of these issues in depth. Also it was important, in 1999, to begin to reflect some of the early conclusions I was drawing on the costs of on-line learning. However, Chapter 4, “*The effect of employment practices on the costs of flexible and distance learning*”, which was written in 1994, does explore these issues in greater detail. Some further comments on organizational issues, within the context of e-education systems, are contained in Chapter 11 in Part 3.

Part 2 of the book contains five papers written around the debate on the competitive vulnerability of the distance teaching universities. I have indicated above why I think the issue was, and remains, important. The original paper (Chapter 5), written in 1991 and published in 1992, was sparked by a discussion that took place within the Open University's Council (supreme governing body) on the implications for the Open University of the growing number of competitors offering distance education programmes. Many of these were very small, prompting the comment that the Open University, as a 'supertanker among minnows', hardly needed to be worried if others were entering the field. I was not so sure – not least because, drawing on my understanding of what was happening in Australia, I had become convinced that the application of flexible, resource-based learning methods to on-campus education could significantly lower the costs of traditional education, thus eroding any apparent cost advantages enjoyed by distance education. The then editor of *Open Learning*, Alan Tait, engineered a debate around this paper when he asked three scholars involved in distance education – Ian Mugridge, Desmond Keegan, and the late Vernon White – to comment on the paper (Chapters 6 to 8). My initial response to these critics appeared in 1994 (Chapter 9), and some further thoughts, dating from 1998, are given in Chapter 10.

Part 3 of the book focuses on my most recent research interests, and in particular on the costs of online education or e-education. I first undertook research in this area in 1989 when I looked at the costs of computer mediated communications (chiefly computer conferencing) within an Open University course, DT200 *An Introduction to Information Technology: Social and Technological Issues*. This was the first course in the world to make extensive use of computer conferencing for a large number of students (in its first year the course had just over 1400 students enrolled on it). My conclusion – contained in the title of my study – was that interactivity came at a price which in fact represented a significant increase on the average cost of teaching in the UK Open University at that time (Rumble, 1989). Ten years later, with the evident growth in interest in online courses and e-education, I returned to the issue, undertaking a survey of the factors affecting the costs of online education. I presented the results for the first time at a Conference at Sheffield Hallam University held in 1999 (Rumble, 1999b), using this material as the basis for my comments on the costs of online learning contained in Chapter 3. Over the next two years I continued to carry out research in this area, that led to the papers contained in Part 3 of this book (Chapters 11 to 14). These chapters seek not only to identify the actual cost elements involved (the main focus of Chapter 12), but also to look at some of the policy issues that they raise (Chapters 11, 13 and 14).

References

- Ansari, M. M. (1992). *Economics of distance higher education*. New Delhi: Concept Publishing Company.
- Ansari, M. M. (1993). Economics of distance education in India. In Asian Association of Open Universities (1993). *Economics of distance education. AAOU VIIth Annual Conference 1993: Conference Book*, Hong Kong: Open Learning Institute of Hong Kong.
- Bates, A. W. (1995). *Technology, open learning and distance education*. London: Routledge.

- Bell, D. (1960). *The end of ideology*. Glencoe, Ill.: The Free Press.
- Bell, D. (1973). *The coming of post-industrial society*. New York: Basic Books.
- Blauner, R. (1964). *Alienation and freedom*. Chicago: Chicago University Press.
- Bogdanov, V. (2002). A certain degree of privilege. *The Observer*, Sunday 17 November 2002, Main Section, p. 29.
- Christopher, G. R. (1982). The Air Force Institute of Technology: The Air Force reaches out through media. In L. Parker & C. Olgren. (eds.), *Teleconferencing and electronic communications*. Madison, Wisconsin: Center for Interactive programs, University of Wisconsin.
- Chute, A. G., Hulik, M. & Palmer, C. (1987). *Teletraining productivity at AT&T. Paper presented at the International Teleconferencing Association Annual Convention*. Washington D. C., 5 May, Cincinnati, Ohio: AT&T Communications.
- Collis, B. (1996). *Tele-learning in a digital world. The future of distance learning*. London: International Thompson Computer Press.
- Committee of Scottish University Principals (1992). *Teaching and learning in an expanding higher education system*. Edinburgh: CSUP.
- Coopers & Lybrand in association with the Open University (1990). *A report into the relative costs of open learning*. Milton Keynes: The Open University.
- Daniel, J. S. (1996). *Mega-universities and knowledge media. Technology strategies for higher education*. London: Kogan Page.
- Daniel, J. S. (1998). Virtually all you'll need to know. *The Guardian Higher Education Supplement*, Tuesday 7 April 1997, pp. ii - iii.
- Eicher, J.-C. (1977). Cost-effectiveness studies applied to the use of new educational media. In UNESCO (1977), *The economics of new educational media*. Paris: The UNESCO Press.
- Eicher, J.-C. (1978a). *Quelques réflexions sur l'analyse économique des moyens modernes d'enseignement*. A paper presented to the International Conference on Economic Analysis for Education Technology Decisions, University of Dijon, Institut de Recherches sur l'Economie de l'Education, 19-23 June 1978.
- Eicher, J.-C. (1978b). Some thoughts on the economic analysis of new educational media. In UNESCO (1980), *The economics of new educational media. Vol. 2: Cost and effectiveness*. Paris: The UNESCO Press.
- Eicher, J.-C., Hawkrige, D., McAnany, E., Mariet, F. & Orivel, F. (1982). *The economics of new educational media. Volume 3: Cost and effectiveness overview and synthesis*. Paris: The UNESCO Press.
- Garrison, D. R. (1993). Quality and access in distance education: theoretical considerations. In D. Keegan (ed.). *Theoretical principles of distance education*. London: Routledge.
- Grint, K. & Woolgar, S. (1997). *The machine at work. Technology, work and organization*. Cambridge: Polity Press.
- Hallak, J. (1990). *Investing in the future. Setting educational priorities in the Developing World*. Paris, UNESCO: International Institute for Educational Planning and Pergamon Press.

- Hülsmann, T. (2000). *The costs of open learning: a handbook*. Oldenburg: Bibliotheks- und Informationssystem der Universität Oldenburg.
- Jamison, D. T., Klees, S. J. & Wells, S. J. (1978). *The costs of educational media. Guidelines for planning and evaluation*. Beverly Hills: Sage Publications. [Also published as Jamison, D. T., Klees, S. & Wells, S. (1976). *Cost analysis for educational planning and evaluation: Methodology and application to instructional television*. Washington, D. C.: U. S. Agency for International Development.]
- Jamison, D. T. & McAnany, E. G. (1978). *Radio for education and development*. Beverly Hills: Sage Publications.
- Jamison, D. T. & Orivel, F. (1978). The cost-effectiveness of distance teaching projects. *Educational Broadcasting International*, December 1978, 169-75.
- Jamison, D. T. & Orivel, F. (1981). *The cost-effectiveness of distance teaching projects*. Washington, D.C.: The World Bank (DEDPH Discussion Paper).
- Jamison, D. T., Suppes, P. & Wells, S. (1974). The effectiveness of alternative media: a survey. *Review of Educational Research*, 44 (1), pp. 1-67.
- Johnson, H. T., & Kaplan, R. S. (1987). *Relevance lost. The rise and fall of management accounting*. Boston: Harvard Business School Press.
- Keegan, D. (1994). The competitive advantages of distance teaching universities. *Open Learning*, 9 (2), pp. 36-9.
- Kemp, J. E. (1995). Costing training delivery distance education and face to face options: a methodology and case studies. In D. Sewart (ed.), *One world, many voices: Quality in open and distance learning. Papers for the 17th World Conference for Distance Education, Birmingham, 26-30 June*. Milton Keynes: International Council for Distance Education and Open University.
- Kerr, C., Dunlop, J. T., Harbinson, F. H., & Myers, C. A. (1964). *Industrialism and industrial man*. London: Oxford University Press.
- Laidlaw, B., & Layard, R. (1974). Traditional versus Open University teaching methods: a cost comparison. *Higher Education*, 3 (4), pp. 439-68.
- Lumsden, K. G., & Ritchie, C. (1975). The Open University: a survey and economic analysis. *Instructional Science*, 4 (2), pp. 237-91.
- Mace, J. (1978). Mythology in the making: is the Open University really cost-effective? *Higher Education*, 7 (3), pp. 295-309.
- MacKenzie, N., Postgate, R., & Scupham, J. (1975). *Open learning. Systems and problems in post-secondary education*. Paris: The UNESCO Press.
- McGuinness, A. C. (1995). The changing relationships between the States and universities in the United States. *Higher Education Management*, 7 (3), pp. 263-79.
- Muta, H. (1985). The economics of the University of the Air of Japan. *Higher Education*, 14 (5), pp. 269-96.
- Muta, H., & Sakamoto, T. (1989). The economics of the University of the Air of Japan revisited. *Higher Education*, 18 (5), pp. 585-611.
- Muta, H., & Saito, T. (1994). Comprehensive cost-analysis of the University of the Air of Japan. *Higher Education*, 28 (3), pp. 325-353.

- Oliveira, J. B., & Rumble, G. (eds.) (1992). *Educación a Distancia en América Latina: Análisis de costo-efectividad*. Washington, D.C.: World Bank.
- Orivel, F. (2000). Finance, costs and economics. In C. Yates & J. Bradley (eds.). *Basic education at a distance*. London: Routledge Falmer.
- Perraton, H. (ed.) (1982a). *Alternative routes to formal education: Distance teaching for school equivalency*. Baltimore: John Hopkins University Press.
- Perraton, H. (1982b). *The cost of distance education*. Cambridge: International Extension College.
- Perraton, H. (ed.) (1993). *Distance education for teacher training*. London: Routledge.
- Perry, W. (1976). *Open University. A personal account by the first Vice-Chancellor*. Milton Keynes: Open University Press.
- Pillai, C. R., & Naidu, C. G. (1991). *Cost analysis of distance education: IGNOU*. New Delhi: Indira Gandhi National Open University, Planning Division.
- Pillai, C. R., & Naidu, C. G. (1997). *Economics of distance education. The IGNOU experience*. New Delhi: Indira Gandhi National Open University.
- Reddy, G. Ram (1993). Open universities: the new temples of learning. In K. Harry, M. John, & D. Keegan (eds.). *Distance education: new perspectives*. London: Routledge.
- Renwick, W. (1996). The future of face-to-face and distance teaching in post-secondary education. In OECD, *Information Technology and the future of post-secondary education*. Paris: OECD.
- Rumble, G. (1981). The cost analysis of distance teaching. Costa Rica's Universidad Estatal a Distancia. *Higher Education*, 10 (4), pp. 375-401.
- Rumble, G. (1982). The cost analysis of learning at a distance: Venezuela's Universidad Nacional Abierta. *Distance Education*, 3 (1), pp. 116-40.
- Rumble, G. (1989). On-line costs: Interactivity at a price. In R. Mason & A. Kaye (eds.), *Mindweave. Communication, computers and distance education*. Oxford: Pergamon Press.
- Rumble, G. (1992). The competitive vulnerability of distance teaching universities. *Open Learning*, 7 (2), pp. 31-49.
- Rumble, G. (1994). The competitive vulnerability of distance teaching universities: a reply. *Open Learning*, 9 (3), pp. 47-9.
- Rumble, G. (1997). *The Costs and Economics of Open and Distance Learning*. London: Kogan Page.
- Rumble, G. (1999a). Cost analysis of distance learning. *Performance Improvement Quarterly*, 12 (2), pp.122-37.
- Rumble, G. (1999b). The costs of networked learning: what have we learnt? Paper presented to the FLISH99 (Flexible Learning on the Information Superhighway) Conference, Sheffield Hallam University, Sheffield, UK, 25-27 May, 1999.
- Rumble, G. & Oliveira, J.-B. (eds.) (1992). *Vocational education at a distance. International perspectives*. London: Kogan Page in association with the International Labour Office.

- Schramm, W. (1977). *Big media, little media: Tools and technologies for instruction*. Beverly Hills: Sage.
- Schultz, T. (1961). Investment in human capital. *American Economic Review*, 51, 1-17.
- Scott, P. (1997a). The postmodern university? In A. Smith & F. Webster (eds.) (1997), *The postmodern university? Contested visions of higher education in society*. Buckingham: Open University Press.
- Scott, P. (1997b). The economic costs and benefits of Information Technology assisted teaching and learning: A literature overview. In Higher Education Funding Council for England (1997), *Information Technology assisted teaching and learning in higher education*. Bristol: HEFCE.
- Snowden, B. L. & Daniel, J. S. (1980). The economics and management of small post-secondary distance education systems. *Distance Education*, 1 (1), pp. 68-91.
- Taylor, J. C. & White, V. J. (1991). *The evaluation of the cost-effectiveness of multi-media mixed-mode teaching and learning*. Canberra: Australian Government Publishing Service.
- Tiffin, J. & Rajasingham, L. (1995). *In search of the virtual class. Education in an information society*. London: Routledge.
- UNESCO (1980). *The economics of new educational media. Volume 2: Cost and effectiveness*. Paris: The UNESCO Press.
- Vaizey, J. (1958). *The costs of education*. London: Faber.
- Wagner, L. (1972). The economics of the Open University. *Higher Education*, 1(2), pp. 159-83.
- Wagner, L. (1975). Television video-tape systems for off-campus education: A cost analysis of SURGE. *Instructional Science*, 4 (2), pp. 315-32.
- Wagner, L. (1977). The economics of the Open University revisited. *Higher Education*, 6 (3), pp. 359-81.
- Wagner, L. (1982). *The economics of educational media*. London: The Macmillan Press.

2. The Economics of Mass Distance Education

This paper was commissioned by the Editor of Prospects, the UNESCO journal, in 1986 as part of a two part edition of the Journal on Distance Education. It was published in 1988 in Prospects, Volume 18, No. 1, pp. 91-101.

There is a belief that distance education is cheaper than traditional forms of education. What is usually meant by this is that the cost per student and/or per graduate is less than in traditional forms of education. Since students can progress at different rates (either full-time or part-time), the cost per student is often expressed in some kind of standard measure such as the cost per student-hour or cost per full-time student equivalent.

It is not always easy to compare the costs of distance and traditional systems. They may have different objectives; they may teach different subjects, or the same subjects in very different ways; the previous educational qualifications of the students entering the systems may be different, and this may affect their success in producing graduates; and the quality of the teaching may be different. Any one of these variables may affect costs and the way we view them. Generally, however, cost comparisons are confined to institutions teaching at the same level (primary, secondary or tertiary) and the assumption is made that the quality of the education offered is similar.

Of course, distance-education systems are not set up just because they are believed to be cheaper. However, cost is an important factor, and those responsible for their establishment rightly point out that they can be cheaper. The organizing committee of the Venezuelan Universidad Nacional Abierta stated its belief that the institution would “contribute in significantly reducing the annual cost per student and the social cost per graduate” (COUNA, 1979). The Andhra Pradesh Committee on the Establishment of an Open University (1982) cited evidence drawn from early cost studies of the British Open University to the effect that the average recurrent and capital cost per student in the latter was less than that found in conventional British universities, and implies that the foundation of a distance-teaching university in Andhra Pradesh would be cheaper than any alternative course of action open to the state government.

Unfortunately the hopes of politicians and planners are not always realized. There are examples of distance-teaching schemes where the cost per student or cost per graduate, and sometimes both, have been higher than costs in traditional systems doing comparable tasks, just as there are plenty of examples of distance teaching systems which have been cheaper (Perraton, 1982).

The cost structures of distance and traditional education are so different that those setting up distance systems experience considerable difficulty in describing the operation and economics of their institution to officials in government and funding agencies (Snowden & Daniel, 1980).

To understand why this is so, and why distance systems may be both cheaper and more expensive than traditional ones, it is necessary to have some knowledge of the way educational costs behave.

The Basic Cost Function

The total costs of an enterprise are made up of both fixed and variable costs. Fixed costs do not vary continuously in relation to changes in volume of activities, although they may change if activities are ended or if there are very significant changes in volumes. (What is a significant change in volume needs to be defined within the context of the enterprise.) Variable costs tend to increase or decrease directly (linearly) with fluctuations in the volume of activity.

The basic cost function for any educational system is

$$T = S\alpha + C\beta + P\gamma + F$$

where T is the total cost, S is the number of students, C is the number of courses which are being developed, P is the number of courses being presented to students, F is fixed cost of the system (administrative costs and other overheads), α is the direct cost per student, β is the direct cost of developing a course, and γ is the direct course-related cost of presenting a course. The total direct cost of teaching students is $S\alpha$, the total direct cost of courses in development is $C\beta$, and the total direct cost of courses in presentation is $P\gamma$. The variables for which volumes of activity are identified here as being of significance are S, C and P. There may be others which are of importance in particular distance-education systems: for example, the number of local study centres at which teaching takes place. However, the model used in this article ignores the influence of other variables. All the costs on the right hand side of the equation are dependent on management choice.

In distance-education systems, student related costs include the costs of materials supplied to students, the costs of distributing materials where these are sent to each student, the costs of paying tutors to mark students' assignments and examination scripts, and the costs of any face-to-face tuition. Obviously, the cost per student goes up if one gives students more rather than less material, while the cost per student of tuition, for example, will vary depending on the amount of tuition given and the student/tutor ratio.

The direct costs of developing a course will include labour costs (payments to authors, editors, designers, broadcast producers) as well as the development and production costs of producing 'master copies' or prototypes of course materials (for example, payments to consultants, payments for rights, cost of editing broadcasts and preparing master tapes, etc.). The way a cost behaves can be changed by management decision. The cost of producing copies of the materials which are given to the students is a direct student cost, while the cost of producing a stock of materials which one lends to students while they are registered on a particular course is a direct course cost. For example, if one gives students the videocassettes associated with a course, the cost of this copy is a direct cost which is incurred for each student; if one has a stock of videocassettes from which one loans a copy to each student, then the cost of the stock of copies is a direct cost of the course.

The direct course-related costs of presenting a course includes such items of expenditure as the cost of transmitting broadcasts associated with the course, re-writing examination questions, monitoring the course, and generally updating and clarifying the materials.

Overhead costs are more or less self-evident, covering the costs of management functions (personnel, finance, management services, administration, institutional planning and evaluation, etc.). The more sophisticated the management and control system, the greater these costs are likely to be. Overhead costs may also include an allowance for the replacement of capital (studio and transmission equipment, computers, etc.), all of which will in due course wear out and need to be replaced. There are a number of ways of treating capital costs, but for practical purposes what is really important is the cost to the enterprise of replacing the capital item when it is worn out with a new item which will fulfil a similar function.

The use of media and the problems of managing distance-taught students means that the overhead costs of the institution (F), the costs of developing a course (β), and the course related costs of presenting courses (γ), are in general higher in distance teaching institutions than in traditional institutions with comparable student numbers. However, the relatively limited amount of support given to students means that the direct, cost per student (α) is lower. This is because much of the managerial and academic effort of the institution is being put into the development and maintenance of educational materials and administrative systems for the control of distance students. This then represents a form of capital investment which replaces direct student-teacher contact, and which can be used to teach many times the numbers of students that can be catered for in such traditional forms of education as the (face-to-face) lecture, seminar and tutorial. In essence, capital replaces labour, offering to educationists what Wagner (1982) described as “a mass production alternative to the traditional craft approach”.

The extent to which fixed (capital) costs can predominate in distance education was shown in a comparative study of the costs of courses at conventional British universities and at the distance-teaching Open University: whereas the ratio of variable to fixed course costs at conventional British universities was about 1:8, at the Open University it was about 1:2,000 (Laidlaw & Layard, 1974).

The Costs of Developing, Producing and Distributing Course Materials

A particular feature of distance-education systems is the level of investment required in the system before a single student can be enrolled. The investment in capital items (buildings, equipment, etc.) can be considerable, particularly if studio-based technologies and satellite or terrestrial broadcasting are used, and these facilities have to be built, as opposed to being hired as required. Use of computer-based technologies for teaching and administration also adds significantly to cost. Provision needs to be made for the warehousing and handling of course materials, so warehouses may have to be built and will certainly need to be equipped to meet the institution's needs. Additional costs will be incurred if it is decided to set up an in-house print shop rather than use existing commercial printers.

A range of course materials sufficient to meet the academic objectives of the institution and provide potential students with an element of choice has to be designed and produced. The most significant cost here is likely to be the cost of the academic and related staff required to develop the materials. Sparkes (1984) has suggested that whereas it takes from 1 to 10 hours of staff time to develop one hour of small group teaching, and from 2 to 10 hours to prepare a one-hour lecture, it will take from 3 to 10 hours to prepare one hour of tutored video instruction (TVI), 50 to 100 hours to prepare a teaching text which

will occupy a student for one hour, 100 hours or more to develop a 'broadcast quality' 60-minute television programme, 200 hours or more to prepare one hour's worth of computer aided learning, and 300 hours or more to prepare one hour's worth of material on interactive videodisc.

These figures need to be treated with some care. Broadly speaking, there are four approaches to the creation of distance learning materials. The first of these is to look around for some existing material which can be used either as it stands or in adapted form to meet the needs of distance-taught students. It is quite common, for example, for an institution to recommend certain textbooks to its students, which they are then required to buy in order to take the course. Obviously, this vastly reduces the costs of the institution, which then only has to prepare a few notes of guidance and some assessment questions in order to begin teaching. This approach involves hardly any creative effort on the part of the teaching institution, and is a very cheap way of proceeding. It is used by some commercial correspondence colleges preparing students for professional and other examinations. It rarely produces good self-instructional teaching materials, but it does allow a wide range of courses to be developed at very little cost. It is also used in a modified form in some high-level Open University courses, where the amount of self-instructional materials produced to support student learning is limited.

The second approach is to 'tack' the distance teaching system on to a conventional teaching system by video-recording lectures given to conventional students and preparing lecture notes to accompany the videos. The lecture notes can be reproduced (in modified form) lecture hand-outs, examples written up on blackboards, flipcharts or overhead projector acetates, photographic slides, etc. Once lecture theatres have been equipped with video cameras and recording equipment, the additional per capita costs of preparing videos and lecture notes for use by off-campus students can be very little, as Wagner (1975) showed in respect of the off-campus graduate engineering programme at Colorado State University, and Leslie (1979) demonstrated in respect of the University of Waterloo Correspondence Program. A vast library of video material can be built up rapidly for relatively little total cost. While the quality of these videos may not be very high, they are adequate for their purpose. Broadcast by satellite, they can enable students spread over very wide geographical areas to listen into lectures providing up-to-date information on technological advances. Students may also be able to participate in the lectures through telephone links (tutored video instruction, or TVI). Such approaches are now being used by a number of universities including the National Technological University in the United States.

Both the third and fourth approaches are based on the development of special self-instructional materials (print, audio-visual, broadcast, etc.) designed to teach distance students. There is little doubt that the quality of specially designed and produced distance teaching materials can be very high indeed.

The third approach is to plan the curriculum and to specify course content in broad outline, and then appoint academic consultants to develop the written materials and scripts for broadcasts and audio-visual materials. This kind of approach was adopted by the Universidad Estatal a Distancia in Costa Rica. It has the great advantage that payment is by results. The academics are not permanent members of full-time staff, so there is no long-term commitment to train them, provide them with time to undertake research, deal with staff problems arising from low productivity or obsolescence of knowledge relative

to institutional needs, etc. Curriculum planners specify the aims, objectives and broad content of new programmes of study, and academic editors and educational technologists turn the consultants' drafts into finished products. If the authors fail to deliver the goods, they do not get paid. Advance notification of a course may be given, but sometimes (as at the Open Learning Institute in British Columbia), a course is only announced after all the materials have been handed over for production. The process has more in common with a publishing house than a university. Commercial correspondence colleges which create their own materials use consultants because this is obviously a relatively cheap and flexible way of employing academic course writers and broadcast and audio-visual producers. The cost of employing an author on contract can nevertheless vary, depending on 'supply'. In some countries or in some subject areas suitable authors can be hard to find and they may command high fees.

The fourth approach is to employ a core of full-time academic staff to create the course materials. Such staff may be appointed on permanent or temporary contracts. Where the appointments are permanent, the staff need to keep themselves abreast with their subjects areas, hence they need time off for study and possibly research. After a time, permanent staff may acquire many of the skills of instructional designers and educational technologists. Unlike temporary staff, they are not always looking towards the next job, but bad appointments may become a long-term liability, particularly in systems where there is tenure.

The total salary bill also depends on how the academic staff are deployed. Institutions such as the Open University, Athabasca University in Canada, and Deakin University in Australia, which have adopted a course team approach (in which groups of academic and technical staff work together on a project team to develop a course) need higher levels of staffing than those that require the staff merely to stick to their own specialist task. On the other hand, while the course team approach is expensive in staff time and hence pushes costs up, it does enable staff to work in a very creative environment. Of these four approaches, the first is the cheapest and the last the most expensive.

A further factor to be taken into account in considering the cost of the course development, production and presentation system is the choice of media. Here again, management choice can greatly influence the cost of the system.

We have already noted Sparkes's contention that the time required to develop material designed to serve one hour of student learning varies significantly depending on the choice of media. The costs of developing the material are, however, not the only costs. Printed material needs to be designed, edited, typeset, printed and distributed¹; video and audio material has to be disseminated through appropriate channels and received on appropriate equipment; computer-based systems require extensive equipment and access to networks, as well as a great deal of investment in software.

To take the case of print, all material will require editing and design work. The cost of editing an author's manuscript into a form suitable for a self-instructional learning package is likely to be greater if contract authors are used. The cost of design can vary significantly, depending on the extent to which illustrations and artwork is incorporated

¹ At the time of writing word processing was in its infancy. Electronic text production has revolutionised the production of print. [GR 2003]

into the text. The way the text is set affects costs. Offset lithography from typed originals is generally cheaper than letterpress printing from hot-metal type. Use of word processors instead of typewriters makes the preparation of camera-ready copy even easier, and can affect authoring costs. Timmers (1986) reckoned that the use of word processors at the Vancouver-based Open Learning Institute cut the time taken to develop and prepare for production a page of text from 120 hours to 50². On the other hand, where texts have to be handwritten, costs can escalate. The Allama Iqbal Open University pays its calligraphers on the same scale as university lecturers. Some institutions, such as the Sri Lankan Open University, prepare their texts in more than one language, thus incurring the costs of translation. The costs of printing can also vary. Paper costs differ from country to country; different grades of paper may be used; and the costs of printing change depending on the method used. The costs of the offset litho process are affected by whether paper or metal plates are used. The former are cheaper but are good for only about 500 copies. The use of colour adds greatly to the costs of printing. Variations in distribution costs can be so significant that it is difficult to make generalizations, but obviously it depends on whether the materials are mailed direct to individual students' homes, as happens at the British Open University, or are dispatched to local centres for collection by students, as happens at the Universidad Estatal a Distancia in Costa Rica. Finally, printing costs are susceptible to economies of scale. The length of the print run makes a great deal of difference to the unit cost per title. On the other hand, where more than one year's stock is printed, the costs of storage will also need to be taken into account.

The production costs of video vary enormously too. The cost per hour of video-taped lectures is much less than broadcast-quality television. The latter is expensive for a number of reasons. The cost of equipment to produce broadcast-quality television is greater than that required to produce video. Broadcasting unions in some countries have pushed the rates of pay to very high levels, and in many cases this has been coupled with agreements on staffing levels which have also exacerbated costs. What constitutes broadcast-quality television is also subject to different standards. In the United States the Public Broadcasting Service broadcasts three-quarter-inch Lo-band Umatic tape generated material, which is cheaper to produce than the three-quarter-inch High-band tape material used by the television companies in the United Kingdom. It is perfectly feasible to produce 'broadcastable' educational material at low cost. The National Technological University, for example, broadcasts low-cost video-tape lectures by satellite which is perfectly adequate for its purpose.³

The distribution costs of video can also vary significantly, depending on whether video-cassettes or terrestrial or satellite-based systems are used (the latter encompassing both direct broadcasting by satellite (DBS) and satellite to cable head ends), and the extent to which the distance-education institution is responsible for meeting the capital costs of the distribution system or has access to transmission time at economic or marginal costs. In general, television is an expensive medium and cannot be justified in circumstances where the basic infrastructure to support it (maintenance services and trained manpower)

² A misreading of the details given by Timmers – Shannon Timmers, Personal Communication. But the substantive point that production costs were reduced remains true. [GR 2003]

³ Again, the details no longer apply given changes in technology, but the substantive point is still true: there is more than one way of developing and producing video materials, so costs per hour can vary greatly. [GR 2003].

are lacking or a significant proportion of homes are not equipped with television sets (Eicher et al., 1982). The costs of home-based video systems, in which individual students are expected to equip themselves with video players and either record off-air or play cassettes which have been provided by the teaching institution on loan or for purchase can also be significant. The Open University found that it was cheaper to give each student a 60-minute video-cassette than transmit over the air provided that there were fewer than 133 students on the course. Between 134 and 233 students it was cheaper to loan a cassette to each student, paying the costs of postage each way. Over this level, it was cheaper to transmit once using the national television channels of the BBC. These cross-over points were obtained using cost-volume charts and, of course, apply only to the situation and costs in the Open University at the time the study was undertaken (1984). However, selling the cassettes to students merely puts increased costs on them. Video-cassette recorders can, of course, be installed in local centres with students accessing cassettes from a library of tapes held at the centre. The overall costs of such a system will be lower but there are drawbacks, not least, the needs for the institution to maintain the equipment, ensure its safe-keeping, and provide sufficient players and quiet rooms so that students do not have to wait too long to view the cassette of their choice, and for students to travel to the centre at times when it is open.

Radio and audio-cassettes have the advantage that they are relatively cheap, and audio-cassettes can be used in imaginative ways with printed material to provide an audio-visual element. Eicher et al. (1982) were nevertheless sceptical about the cost-efficiency of radio in systems with under 2,000 students, while the Open University found that for courses with under 1,000 students, it was cheaper to provide audio-cassettes to each student rather than transmit radio programmes over the air.

The comments on the use of cassettes versus over-the-air transmission relate to costs and not to the educational effectiveness of the two modes of distribution. There is little doubt that distribution by cassette or systems where students record off-air onto cassette are educationally more effective since students can replay, as well as stop and start, the cassettes at will.

The costs of computer-based systems have been insufficiently studied to date, but the experience of the Open University, which has some 75,000 students taking degree-level courses, has been that the cost of providing each student with a personal computer is such that the institution itself cannot hope to fund the project. Even if the University restricted itself to providing computers to students taking courses where a significant level of computing is deemed to be academically essential, it would quickly have to provide for the needs of at least 13,000 students. A machine which meets the needs of the University (basically MS DOS operating system, 512K memory and VT 100 communications capability) costs in the region of \$900 -1,000 at 1987 prices, so the University cannot afford to equip students with personal computers. In view of this the University has recently instituted a policy under which it hopes that students will either buy the machines outright at a negotiated rate of discount, with or without a bank loan, or hire them from the University at a rate which still makes student purchase an attractive option for those students who can foresee the need to have a machine for several years.⁴

⁴ Now, of course, the University just assumes that students will have a suitable computer and be connected to the Internet. [GR 2003]

The Problem of Student Variable Costs

Another factor which affects the costs of distance-education systems is the extent to which students are provided with access to support systems. The cheapest form of distance education is found in those systems which register students for an examination, provide them with details of the syllabus and a list of books which will help them, and leave them to prepare themselves. This approach is that used by the University of London external degree system⁵. With the exception of those taking the economics degree, students who wish to receive tuition have to enrol with a commercial correspondence college which provides them with lecture notes, set assignments, and arranges for these to be marked and commented on by a tutor. When students are ready, they present themselves for the examination. The cost of tuition is paid by the student. On the other hand, many of the new wave of distance-teaching universities founded in the 1970s and 1980s in the wake of the British Open University have developed a sophisticated system based not only on the provision of educational course materials but also of student support services including counselling, correspondence tuition and face-to-face tuition (Rumble & Harry, 1982). The cost of tuition and counselling is either a direct (variable) student cost or a semi-variable cost related to the number of students taken on by tutors and counsellors. Clearly, the provision of such services represents a reversion to the labour-intensive methods found in traditional education. The higher the direct variable or semi-variable cost per student, the nearer the teaching cost of distance education will approach that of traditional forms of education. Thus, for example, one of the Open University's early geography courses had a direct variable cost per student that was much higher than the variable cost of social science courses in traditional British universities, thus preventing the Open University from reaping any of the economies of scale said to be present in distance education, at least on this course (Laidlaw & Layard, 1974).

Obviously, as the amount of face-to-face tuition provided increases, so a basic characteristic of distance teaching, the physical separation between the teacher and the learner, is lost. Ultimately, the situation occurs in which conventional classroom-based teaching, whether provided by regular teachers or by semi-trained animators, is being supported by centrally produced materials. There are or have been numerous systems of this kind, particularly at primary and secondary level (for example the Radio Mathematics Project in Nicaragua, the Mauritius College of the Air, the El Salvador Educational Television project, Telescundaria in Mexico, etc.). Schemes of this kind may have a lower cost per student because the additional cost per student of developing, producing and distributing the centrally produced materials is more than offset by reductions in cost arising from the use of semi-trained animators. However, they are not distance education systems.

The Costs of the Curriculum

A further factor which influences the costs of distance education is the number of courses which the institution offers. Each course represents an investment in course materials. The more courses on offer, the greater the total investment and the greater the cost of maintaining them, or eventually replacing them with new versions or with entirely different courses.

⁵ The comments apply to the situation in 1986. [GR 2003]

The number of courses is determined to some extent by the number of subject areas to be covered, the extent to which students pursue a single subject in depth (for example a specialized single-subject degree course) or a combination of subjects, and the extent to which a range of optional courses is provided.

The most efficient distance-education system will be one with a relatively small range of courses and large numbers of students. The distance-teaching programme of the Universidad Pedagógica Nacional in Mexico is a good example. Dedicated to the in-service training of primary- and secondary-school teachers, the range of courses offered by the University is relatively limited and the numbers of students (60,000 in 1980) substantial, thus ensuring that each course has a large number of students.

As more courses are added to the curriculum, so the numbers of students per course will decline provided the total number of students remains constant or does not increase pro rata to the increase in course options. For example, the British Open University was established in 1971. From the start it was assumed that it would grow quickly in size. In its first year it took in 25,000 students, registered on four courses. But by its second year, with course numbers increasing rapidly and student numbers still climbing, Laidlaw and Layard (1974) were already able to foresee that the case for developing higher-level courses with relatively small numbers of students would have to be justified “on the grounds that they are an integral part of a system providing wider access to complete degree courses rather than that they are a cheap way of doing this”. By 1976 Wagner (1977) could point out that the economies of scale reaped by the Open University had been achieved in its first years of operation, since when it has been following the conventional university pattern of little increase in productivity. Wagner argues that the major reason why this was so was that the University had been using the economies of scale produced by rising student numbers to increase the overall number of courses offered to students.

However, there were limits to the extent that the Open University could justify increases in its course offerings at the expense of economies of scale. Early in its development, the University prepared an academic plan which aimed at presenting an undergraduate academic profile equivalent to 111 credits (each credit equivalent to about 420 to 450 hours of student work). It quickly became apparent that it could not develop and support this load within existing or likely resource levels, and accordingly a more modest plan for the presentation of 87 credits was approved. This plan, with minor modifications, still forms the basis for the Open University’s undergraduate academic plan⁶. It is accepted that the University’s first degree is a general degree, and that students will not be able to specialize in a particular subject area. Moreover, it is recognized that further expansion of the profile of courses will have to be accomplished through the development of inexpensive courses or be accompanied by an increase in student numbers.

One way of minimizing the costs of a profile is to extend the life of a course so that the costs of development can be written off over more years. Again the experience of the Open University is instructive. Originally it planned to replace its courses every four years. It rapidly became obvious that it could not both sustain this aim and increase the number of courses on offer to students. Courses now routinely have to last for from

⁶ In 1986: It is no longer true. [GR 2003]

eight to ten years, with all the implications this has for credibility as course content becomes dated. It is only fair to say that the University is very conscious of this problem.

Commercial correspondence colleges have solved these problems by only presenting courses with comparatively low development and production costs, concentrating on courses that will not rapidly become outdated, and resolutely not developing courses which will attract relatively few students over their life. The new video-tape lecture systems such as that developed by the National Technological University in the United States has solved the problem of presenting state-of-the-art material which dates rapidly by video-taping lectures given in conventional universities, but the videos fall far short of the standards of self-instructional teaching material adopted by the best distance-education systems.

Absolute Costs, Average Costs, Efficiency and Effectiveness

The many examples given above show not only how difficult it is to cost distance education in the abstract, but also how the costs of particular systems can be affected by management decisions. For this reason, relatively few costs have been cited in this article.

The absolute cost of a system can be very high. On the other hand, the cost per student can be brought down below that found in traditional systems operating at the same educational level. Whether this happens may well depend upon the number of students attracted into the system. The chances of the Venezuelan Universidad Nacional Abierta reducing its average costs to a level where it could achieve its planners' aim that it should bring down the annual cost per student and reduce the social cost per graduate was threatened by the disastrously high drop-out rates it experienced in its early years (only 22.6 per cent of the 1978 intake passed the introductory course), and the fact that the number of students attracted into the University actually fell between 1978 and 1981 while course offerings increased (Siqueira & Lynch, 1986). With an annual enrolment of about 4,400, the costs per course enrolment at Athabasca University were comparable with those found in conventional Albertan universities, while in 1972 the average cost per student at the more capital-intensive British Open University was found to equal that in conventional British universities when the university had 21,700 students (Laidlaw & Layard, 1974). (At the time of this study, it already had over 31,000 students.)

Most economic studies measure the relative cost-efficiency of distance and traditional educational systems. Efficiency is concerned with the cost of achieving outputs: an organization is efficient relative to another enterprise if its output costs less per unit than that of the other institution. It becomes more efficient to the extent that it maintains outputs with a less than proportionate increase in inputs. The fact that a distance-education institution has a low cost per student, credit hour or graduate does not necessarily mean that the institution is as efficient as it could be. It may well be able to reduce its unit costs by increasing its internal efficiency through changes in practice and cost reductions, as Mace (1978) commented in respect of the British Open University.

Generally, in making a comparison, it is assumed that the quality of the output of systems operating at the same educational level is comparable. This is not always the case. There is, however, some concrete evidence that the level of comprehension of students completing traditionally taught economics courses at Heriot Watt University in the United Kingdom and those completing distance-taught economics courses at the Open

University was similar (Lumsden & Scott, 1982). More generally, however, “planners will be disappointed at the amount of evidence available” (Eicher et al., 1982), since what there is suggests that motivated students can learn from any medium provided it is competently used and adapted to their needs (Eicher et al., 1982; Wells, 1976).

Who Should Pay?

The costs of any distance-education project may be met by a number of agencies. Broadly speaking, the possibilities are government, international aid agencies, employers and students.

In considering who should meet the costs, a distinction is sometimes made between projects that aim to reach students in the normal school-age population and those aimed at post-secondary or adult populations. It is often argued that the costs of adult education should not fall on government. The reasons for this include: (a) adherence to a ‘front-loaded’ model of education which undervalues adult education, and hence believes that it is not something that should be paid for by government; (b) the belief that non-vocational adult education is essentially a private affair, of benefit to the individual, and that therefore the individual should pay for it; (c) the belief that the costs of vocational and professional education should be met either by the individual or his or her employer; and (d) concern at the open ended nature of the commitment to ‘continuous education’ that is implicit in the extension of state aid to adult education.

There is, however, another perspective that argues that the education of adults is not a luxury, that increased technological and social change leading to the obsolescence of knowledge acquired during the initial period of education and training requires continuing investment in the retraining and re-education, of individuals, and that this is not just something which the individual or employer should pay for (since the capacity of individuals and employers to pay for it is limited), but also a responsibility of government.

Many governments are aware of the need to retrain large numbers of people in areas of national skill shortages, but they have been much more reluctant to acknowledge a responsibility for the development of adult and continuing education in non-vocational subjects and areas where there are no skill shortages. The question “Who pays?” is thus linked to the question “What is being taught?”

It is clear that large employers are seriously concerned about skills shortages and the need for retraining. Several large companies have set up in-house distance- and open-education programmes to meet the needs of dispersed workforces. The State University of California, Chico, has set up a satellite-delivered video-tape and tutored video instruction system to meet the needs of engineers working for HewlettPackard. Small firms, however, cannot afford to invest in the development of distance-teaching systems.

Individuals, while they may be willing to invest some personal resources in their further education, have to do so within the level of discretionary income which they have available (that is, the income they have left over after they have paid for the basic necessities of life for themselves and their families). What constitutes discretionary income will be determined by income levels, personal expectations about what is a necessity, and the cost of these. It is clearly important that those setting up a distance-education system should know what the discretionary income of the target student

population is in order that judgements can be made about students' potential ability to pay fees and meet the costs of studying.

In a commercial correspondence college, the fee per student per course (δ) will need to cover: (a) the direct (student variable) cost of teaching (α); (b) the direct costs of presenting the courses ($P\gamma$); (c) the development and production costs of the courses ($C\beta$), annualised over the life of the courses (L), and uplifted by projected rates of inflation in order to generate the capital required for investment in the replacement course; and (d) the fixed costs of the enterprise, including an allowance for the replacement of capital (F). The more student courses (η') there are in the system, the lower the fee can be:

$$\delta = \alpha + \frac{P\gamma + (C\beta / L) + F}{\eta'}$$

A commercial correspondence college may also wish to generate a profit.

The institution will need grants from government or other sources to the extent that student fees do not meet total costs. Not surprisingly, commercial correspondence colleges have restricted themselves to course lines which do not need constant updating and which will attract high volumes of students. There is always the danger that the number of students attracted to the programme will be insufficient to generate sufficient funds to replace the stock of courses and the other capital tied up in the enterprise. Indeed, this was a major problem in the British Open Tech project: when the government's pump-priming funds came to an end, the projects had to become self-sufficient. Relatively few of them had enough students to be able to make this change.

One other aspect of costs needs to be mentioned here, and this is the cost to students of equipping themselves to study. Depending on the media choice made by the institution, students need to have access to a range of equipment in order to study. In some cases personal ownership of the equipment is already widespread among the population at large and it may be reasonable to expect all students to supply their own equipment (radios). In other cases (television sets, audio-cassette players, video-cassette players, personal computers), student ownership will depend in part on the market penetration of the equipment among households, given the society in question, or the extent to which it is reasonable to expect students to equip themselves out of their discretionary income. Among other factors which may come into play is the extent to which the piece of equipment is required on a number of courses, or will only be used on one or two courses. In the latter case, or where it is clear that students will be unable to afford the equipment themselves, then the institution may have to provide it for students. It is very important that in deciding what media to use, the cost to the student of the particular choice is evaluated against the students' ability to meet it.

It is clear that the introduction of new technologies can change the cost structure of distance education and also the balance between the extent to which the institution or the student is expected to meet the cost. Distance education is seen as a means of lowering the cost per student and hence of reaching more students. It will be particularly ironic if, through the adoption of new information technologies based on the computer and advanced telecommunications, students should have to bear an increased proportion of

the costs of learning, for, as the cost to the student rises, so it becomes more likely that only the better off will be able to afford access to distance courses without government and employers' help. If help is not forthcoming, then 'advanced technology' distance education will become yet another service restricted only to those whose discretionary income is large enough to meet the cost. The disadvantaged, the unemployed and the low paid will lose out, though low-cost, traditional correspondence-based systems (based on print and correspondence tuition with some use of audio) may continue to serve their needs. In Third World countries, this latter form of distance education may be the only kind that can be provided, given the costs involved in setting up and running the more expensive 'high tech' forms of distance education.

This article has shown why, given the differences, in the structure of costs between distance and traditional education systems, the former can be cheaper per student, credit hour or graduate than the latter. Distance education can also be as good as traditional forms of education, in terms of the quality of what is learnt. Whether distance education is actually cheaper depends on a number of factors, including choice of media, the number of subject areas covered and courses offered, the extent to which the direct variable student cost is kept below the level found in traditional forms of education, and, of course, the number of students. It has also shown that the issue of who pays (student, employer, or government) is an important one which has a bearing on both what is taught and access, and it has suggested that, as new technologies develop, so the technologization of distance education will put in creasing costs on to students, with further implications for access. Third World countries, it is suggested, may be unable to exploit the new 'high tech' forms of distance education now being developed in the advanced industrialized countries.

References

- Committee on the Establishment of an Open University (1982). *Towards an open learning system*. Hyderabad, Osmania: University Department of Publication and Press.
- COUNA (Organizing Commission of the National Open University) (1979). *The National Open University of Venezuela*. Caracas: Universidad Nacional.
- Eicher, J.-C., Hawkrigde, D., McAnany, E., Mariet, F., & Orivel, F. (1982). *The economics of new educational media. Vol. 3: Cost and effectiveness overview and synthesis*. Paris: Unesco.
- Laidlaw, B., & Layard, R. (1974). Traditional versus Open University teaching methods: A cost comparison. *Higher Education*, 3 (4), pp. 439-68.
- Leslie, J. D. (1979). The University of Waterloo model for distance education. *Canadian Journal of University Continuing Education*, 6, pp. 33-41.
- Lumsden, K., & Scott, A. (1982). An output comparison of open university and conventional university students. *Higher Education*, 11 (2), pp. 573-91.
- Mace, J. (1978). Mythology in the making: Is the open university really cost-effective? *Higher Education*, 7 (3), pp. 295-309.
- Perraton, H. (1982). *The cost of distance education*. Cambridge: International Extension College.

- Rumble, G., & Harry, K. (eds.) (1982). *The distance teaching universities*. London/ New York: Croom Helm/St Martin's Press.
- Siqueira de Freitas, K., & Lynch, P. (1986). Factors affecting student success at the National Open University, Venezuela. *Distance Education*, 7 (2), pp. 191-200.
- Snowden, B. L., & Daniel, J. S. (1980). The economics and management of small post-secondary distance education systems. *Distance Education*, 1(1), pp. 68-91.
- Sparkes, J. (1984). Pedagogic difference between media. In A. W. Bates (ed.), *The role of technology in distance education*. London: Croom Helm.
- Timmers, S. (1986). Microcomputers in course development. *Programmed Learning and Educational Technology*, 23 (1), pp.15-23.
- Wagner, L. (1975). Television video-tape systems for off-campus education: A cost analysis of SURGE. *Instructional Science*, 4 (2), pp. 315-32.
- Wagner, L. (1977). The economics of the Open University revisited. *Higher Education*, 6 (3), pp. 359-81.
- Wagner, L. (1982). *The economics of educational media*. London: Macmillan.
- Wells, S. (1976). Evaluation criteria and the effectiveness of instructional technology in higher education. *Higher Education*, 5, pp. 253-75.

3. Technology, Distance Education, and Cost

This paper was first published in 1999 in the Journal of Education and Development in the Caribbean, Vol. 3, No. 2, pp. 91-104. The paper had its origins in an address given to the University of Guyana. First International and Second National Conference on Distance Education, held in Georgetown, Guyana, in September 1999.

People are interested in the costs and economics of distance education because they think it lowers costs. Education was, and to a large extent still is, labour-intensive. By the 1970s few countries could afford the costs of providing education for burgeoning populations of young people, let alone the emerging demand from adults for lifelong learning. It was hoped that the use of technology would bring the unit costs of education down (Jamison, Suppes & Wells, 1974: 57; Eicher, Hawkrigde, McAnany, Mariet & Orivel, 1982: 40).

The educational arena within which technology has been applied most spectacularly to education is distance education. This developed in the 1840s (as correspondence studies), and was initially mainly a commercial venture. Since then, of course, it has been adopted as part of the publicly funded educational system of many countries. Also, its methods have changed. The 1940s and 1950s saw the development of educational broadcasting, first on radio and then on television. The foundation of the Open University in the United Kingdom (1969) brought together for the first time correspondence education, educational broadcasting, instructional design and educational technology (audio-cassettes, video-cassettes, radio and television broadcasting, improved printing technologies, etc). More changes have come in the last fifteen years with the development of telecommunications, the personal computer, the Internet, electronic-, audio- and video-conferencing, and the ability of networked computers to access print-, audio-, and video-based information in stored and on-line form.

Studies in the Economics of Distance Education

The economics of education did not develop as a subject until around about 1960. Initially interest was focused on attempts to quantify the economic benefits on investment in education to the individual and the State, but there were other concerns too - notably the efficiency of public expenditure. Then, as educational budgets exploded, governments and international agencies became interested in whether or not technology could cut educational costs. From the early 1970s research into the costs of distance education and educational broadcasting was sponsored and carried out by a number of bodies (e.g., UNESCO, USAID). Groups at institutions such as the Stanford University Institute for Communications Research and the Institut de Recherche sur l'Economie de l'Education at Dijon, undertook research. Over the years a fairly wide range of cost studies have been published (for collections of these see Jamison, Klees & Wells, 1978; UNESCO, 1980; Perraton, 1982; Oliveira & Rumble, 1992; Rumble & Oliveira, 1992; Perraton, 1993).

Most of the studies to date have analysed the costs of

- educational broadcasting systems
- correspondence and multi-media distance learning institutions, including several of the distance teaching universities
- training using distance means.

The problem with most of these studies is that they aggregate the costs to find the average cost per learner in the system as a whole, rather than costing individual elements. Indeed, there is usually an assumption that both the students and courses conform to a particular model (the average student and the average course). Such one-product, one-customer-type approaches ignore the many factors that drive costs in institutions, fail to identify the costs of the various technologies employed, and hide the real variations in costs within institutions. The nature of the analysis takes the media mix as a given. It is rarely possible, from the data available, to judge what the effect on total and unit costs would be of changing the mix of media. This was precisely the complaint that Mace (1978: 295, 303) laid at the door of the UK Open University when he queried whether the Open University, with its (then) heavy reliance on the expensive medium of broadcasting, was as cost efficient as it might be.

More detailed analysis of the costs is often impossible because modern cost accounting methods, while identifying the direct costs of products and services, allocates overheads to products on an over-simplistic basis (usually proportionate to the direct labour hours or direct costs of labour).

Typically the studies establish an average cost per student or graduate and compare this with the average cost per student or graduate in a traditional education system. This can show that, at a particular point in time, and for a given number of students, one system is more efficient than the other. Very often it is the distance education system that is more cost efficient. A further factor limiting the explanatory value of the cost functions is the sheer number of factors that can affect actual costs. These include:

- The number of learners or students: all commentators recognise that this is a crucial factor affecting both total system and average student costs.
- The number of courses on offer.
- The number of years courses are presented, and the frequency with which materials have to be remade.
- Choice in the way in which technology is used.
- The level of student support. The staff costs of teaching must be lower than in traditional educational systems if economies are to be achieved.
- The organisational structure.
- Working practices.
- The nature of the internal labour market and the nature of the contracts of employment.

These various factors all impinge on each other, making it difficult to disentangle cause and effect, and so link decisions about size, curriculum, technology, structure, working practices, and personnel policies to cost outcomes. This poses particular problems when it comes to assessing the likely impact of technology choice on costs.

Notwithstanding the crudity of the costing methods, information on the average student cost of educational broadcasting, correspondence, and multimedia distance education systems, shows that these systems can achieve lower unit costs per student than those found in traditional classroom-based education. This expectation has led to some quite odd assumptions, for example, the planners setting up the Andhra Pradesh Open University cited a 1977 study of the cost-efficiency of the UK Open University (Wagner, 1977) as evidence that similar cost savings could be achieved in India. This wholly ignored

the very different conditions in India and the United Kingdom - for example, the relative cost of labour to equipment differs in the two countries, as does the way in which labour is deployed and organised. Ram Reddy (1993: 247), the founding Vice-Chancellor of both the Andhra Pradesh Open University and the Indira Gandhi National Open University in India, has claimed that “the general belief that education through open universities is highly cost-effective *is fully supported by the empirical data*” (my italics). This is not so. Of course, there are distance teaching universities that are cheaper than traditional ones, but there are also systems that are more expensive than comparable face-to-face systems. The most one can conclude is that, in the right circumstances, distance education may be cheaper than traditional face-to-face systems (Perraton, 1993: 382).

It is also assumed that large-scale distance teaching universities are particularly cost efficient. Of course, high enrolments are an important factor in bringing unit costs down. But Daniel (1996), the current Vice-Chancellor of the Open University in the UK, goes further. He holds that eleven distance teaching, 100,000-plus student ‘mega-universities’, enrol between them 2.8 million students at an average institutional cost per student that is almost half that of the combined 182 higher education institutions in the UK or the 3,500 institution US higher education system. The comparison is, however, flawed. This is because the traditional sector is undergoing a revolution that is changing its cost structures. Now I agree that large-scale correspondence- and multi-media-based distance teaching systems can be very cost-efficient relative to unreformed traditional systems (Rumble, 1997), but one has to ask whether they are cost-efficient when compared with a reformed system.

The Efficiency of Mass Higher Education Systems

Many traditional universities are adopting flexible and distance learning methods. A variety of terms is used, including open learning, independent study, resource-based learning, etc. All include reducing the amount of face-to-face teaching and support provided to students. This is done by investing in the development of teaching materials that can then be re-used from one year to the next. The materials may involve the video-taping of lectures (so that the lecture need not be given again), the preparation of teaching notes that help students study on their own, the development of intelligent tutoring systems, etc. Studies show that the additional costs of doing some of these things are very low. For example, particularly if the video-tapes are re-used for a number of years, the cost per hour may be very low indeed (Fwu et al., 1992; Bates, 1995: 103-11). Once the materials exist they can be used both to support distance students and to substitute for lectures to traditional on-campus students.

This suggests to me that traditional higher education can be re-engineered to provide an even cheaper way of expanding higher education than by setting up single-mode distance education systems (see Rumble, 1992; 1994b; 1997: 152-9). I am not alone in this view: Hallak (1990: 200) has commented that while “data concerning costs in dual-mode institutions are insufficient to draw valid conclusions ... this would appear to be a promising solution [to the problem of educational costs]”. Renwick (1996: 59-60) suggests that universities adopting dual-mode approaches may have an edge on single-mode distance education. “They already offer a wide range of degrees and qualifications that rival open universities, could diversify at less cost, would not necessarily have to rely on large numbers of enrolments to be viable as providers of distance programmes, and could offer a wider range of options to potential students”.

These changes have resulted in enormous increases in ‘productivity’ in traditional education from the mid-1980s on. Writing about UK higher education, but linking this to developments elsewhere, Scott (1997: 38, *my italics*) has commented:

“... the massification of British higher education is demonstrated [by] the sharp reduction in unit costs. Overall productivity gains of more than 25 per cent have been achieved since 1990. ... This pattern, which exactly matches the expansion of student number, closely follows the cost curves in other countries where mass higher education systems developed earlier than in Britain. *It supports the claim that mass systems have a quite different economy from that of elite systems*”.

Those who rest their case for the efficiency of distance education on the comparative cost studies of the 1970s and 1980s need to bear this in mind. While many distance education systems, including the UK Open University, have also been subject to pressures to increase their productivity, the massification and re-engineering of traditional higher education suggests that it is time to re-evaluate the relative efficiency of single-mode distance education against the alternative options available. Their cost structure is not the same as that found in ‘traditional’ higher education in the 1960s and 1970s which still form the almost mythical basis for the comparisons between the ‘open universities’ and campus-based higher education. Certainly, if I were a government minister, I would be pushing this revolution forward. I would not be setting up mega-universities.

Technology Choice and its Impact on Costs

Particular problems with the cost studies that we have is that, firstly, they are in general about 20 years old (e.g. Jamison, Klees & Wells, 1978; Eicher et al., 1982), and the work has not been updated. This makes them a dangerous base for decision-making about the future. The costs of media have changed as new technologies and processes have been introduced. New jobs have emerged, and old ones have been redefined or done away with. The supply-side in some linked industries has changed. In broadcasting, for example, the rise of independent producers has had significant implications for the economics of the industry. The shift towards the use of self-employed academics, designers and editors, and the casually-employed tutor, has cut costs.

Secondly, the studies we have do not allow accurate costing of the relative contribution of different technologies to the teaching-learning process in distance education. True, some more recent studies have drawn some broad conclusions about the relative costs of media (cf. National Board of Employment, Education and Training [NBEET], 1994; Bates, 1995). However, this information tends to be either specific to a certain project, or so generalised as to be of only limited use in decision making.

Thirdly, different approaches towards the organisational structuring of development, production and support affect costs. For example, a course team preparing all the materials from scratch is much more expensive than a single academic preparing wrap-around material to support an existing textbook. Yet the fact that the technological determinism of organisational structures has been discredited (Grint & Woolgar, 1997: 11-14), and that there is no necessary connection between technology, organisational structure and cost, seems not to be understood. Daniel (1996: 30), for example, suggests that the mega-universities “operate differently from other universities in many ways, not least in the way they have redefined the tasks of the academic faculty and introduced a division of

labour into the teaching function". He holds that "changes in technology *transform* the structures of industries" (p. 80, my italics). McGuinness (1995) claims that "technology, distance learning and global networks for scholars and students *are transforming* institutional practices in ways that make current institutional structures and governmental policies obsolete" (my italics). But in point of fact, of course, the relationship of technology to structure, work roles, skill levels, etc., is not simple, not constant across settings and firms, and not determined by the technology itself, but by management. This does not negate the fact that organisational structures, work roles, and patterns of employment can be used in distance education to reduce costs, and that technological change can be used as the reason to further such changes (Rumble, 1988; 1994a; 1997).

What then do we know about the cost of technologies and media? Our accumulated knowledge is basically encapsulated in generalisations such as the following:

- Each media (print, audio, video, face-to-face, and computer-based) and each technology (e.g., terrestrial, satellite and cable distribution of video) has its own cost structure.
- The development of content is a major cost.
- The development costs of particular media (e.g., print, video, computer-based material) can vary enormously.
- Many of the costs of development are fixed costs, so economies of scale operate where student populations are large and where materials are used over a number of years.
- In general the media with the greatest capacity to deliver economies of scale for even quite small student populations are print, radio and audio-cassettes.
- Face-to-face teaching and computer-mediated student support had low fixed but high variable costs.
- The way in which work is organised and structured, and labour employed, affects costs considerably.

These are of limited help in telling us what the costs of any particular system are likely to be.

The Costs of On-Line Learning

The advent of new technologies and the fact that distance educators are keen to exploit them would, one would think, place a premium on information concerning the relative costs of technologies. Generally, however, such studies are not undertaken in the early years of the introduction of a new technology. This is partly because those exploring a new technology are more interested in its capabilities than its costs. Also, the investment of time and effort is usually at the margin of activities, and while this is the case management usually remains unconcerned by questions of the costs. Thus, just as the 1960s saw few cost studies of the emerging technology of mass educational broadcasting, so until very recently the 1990s have seen relatively few studies of the costs of the newer technologies. Exceptions included studies of the costs of interactive videodisk instruction (cf. Fletcher, 1989) and of information technology-based distance education (e.g. Rumble, 1989; Phelps, Wells, Ainsworth & Hahn, 1991; McGraw & McGraw, 1993).

In the absence of any cost studies, opinion as to the costs of telematics-based distance education was divided. Tiffin and Rajasingham (1995: 166) argued that "the virtual class scenario makes economies of scale possible. There are no limits to the size of virtual

lecture theatres, no costs for building, maintenance, cleaning, lighting and ventilating, virtual class spaces”, although this needs to be set against “the costs of an interface device so that teachers and learners can access virtual classes”. However, the unit costs of such systems depend on scale. “As long as the numbers of people using virtual classes are small the costs will be high, but when millions of students around the world are using the technology, the costs per capita will be low” (ibid.: 166). Collis (1996), however, is rather more cautious. Reviewing the development of tele-learning, she points to the substantial cost of setting up a home-based tele-learning environment (p. 139), and the problems of funding the installation of the necessary infrastructure in schools, and of meeting the costs of accessing network resources, particularly the Internet (pp. 266-7, 373-5). Collis (1996: 375) cites Moonen (1994) to the effect that “to reduce costs in the long run, some costs must be shifted to the student. Students must take more responsibility for learning themselves, and expect less personal contact from instructors”.

Recently, however, a number of studies on the costs of on-line learning have begun to appear (Roderick, 1998; Leach & Smallen, 1998; Whalen & Wright, 1998; Rumble, 1999).

- Because the basic technology is so similar, the materials-elements of courses delivered on-line can be delivered in CD-ROM format. However, on-line courses generally incorporate an interactive element that must be delivered via the network.
- On-line materials encompass text, sound, still images (graphics and photos), moving images (video and animation), and computer program-based learning. It is very difficult to talk about development costs in any meaningful way. The reported costs of developing on-line learning materials vary widely, from Canadian \$2500 to \$21,170 per student-hour for the development of computer-based learning materials (Bates, 1995: 197), or “from US\$ 6000 to \$ 1,000,000 for a three unit course, depending on the range of materials presented” (Arizona Learning Systems, 1998: 13-14). Much of this cost is the cost of human labour, which is high (Tergan, Hron, Mandl with Hartge, & Schneider, 1994: 179), though, with experience, it may be possible to reduce this cost (Ravet & Layte, 1997: 140-1). Most studies seem to be amortising the fixed costs of developing materials over five years (Arizona Learning Systems, 1998, Whalen & Wright, 1998). In my view this is over optimistic.
- Based on the experience of the Library of Virginia, the costs to the library of providing a single copy of a four page report is US\$ 18.56 to supply a surface-mail customer, \$12.15 to supply an on-site user, and \$ 0.90 to supply an on-line customer. To the latter cost must be added the cost of developing the service, which at the level of use experienced added another \$ 0.94 per customer (Roderick, 1998).
- The on-line use of third party copyright materials is problematic and costly for distance teaching institutions (Moran, 1996).
- Training programmes may require the establishment of training resource centres. Ravet and Layte (1997: 146) suggested a budget of UK£ 37,000 to install a networked 15-station resource centre, with recurrent costs of £ 6000 per year. The equipment then has to be replaced - usually every three to five years. Ritschard and Spencer (1999) suggest that the replacement budget is about 61% of the current budget, while upgrade costs are 8% of the current budget. This excludes any costs arising from growth. Universities catering for many thousands of students face much greater sums. It is too costly for universities with thousands of students to provide them

with computers. At the (UK) Open University the costs of computer provision have been passed on to the student.

- The costs of those supporting students who need access to computers. Many universities provide staff with a computer through a variety of means. At the UK Open University this is still true for core staff, but policy is rapidly moving towards one in which tutors (of which there are some 7000) will be responsible for providing themselves with their own “tools”. Given the rate of obsolescence in the face of rising course specifications, this will be a significant and more or less regular renewal cost for OU tutors.
- On-line teaching in support of in-house training give rise to some savings (Ravet & Layte, 1997: 142-3). These come from reducing the costs of the time and travel spent in attending courses. Phelps et al. (1991: 12-14) compared the costs of the on-line version of a two-week residential course for US Army reservists with the original version. The on-line version would have been about 20 per cent more costly if it only substituted for one presentation of the residential course, but total costs were halved when it substituted for ten presentations. British Telecomm used a CD-ROM to train its operators in the use of computerised telephone exchanges. The cost of this was 6 million ecus, against an estimated costs of 60 million ecus had traditional training methods been used (Van der Brande, 1993: 112). Whalen and Wright (1998) said that the Net Present Value and Returns on Investment calculations for the provision of Web-based courses at the Bell Online Institute in Canada were all positive. The average savings per students were US\$702 for asynchronous courses, and \$1103 for synchronous courses.
- There are the up-front costs of creating a virtual campus, and the recurrent costs of running it. Rumble (1989), in a study of the costs of supporting the on-line element of an Open University course with 1364 students and 65 tutors, identified development costs of UK£1.54 million, with annual running costs of £368,000 across all stakeholders (students, tutors, University, special Government development grant) (1989 price levels). Edith Cowan University spent Australian \$500,000 in 1993 to install the basic hardware and software, with the direct per student cost reckoned to be about A\$150 of which \$50 is for support to the service and \$100 is to meet the student’s on-line costs (NBEET, 1994: 78). Staffing costs to support the service came to another A\$130,000 in 1994. The number of students and tutors supported on the virtual campus in 1993 was, however, only 170 and 25 respectively.
- The cost of supporting networked services varies. The full costs of networked services are not as yet reflected in the annual operating budgets of organisations, nor are the costs of maintaining services (e.g., repairing desktop computers and printers) (Leach & Smallen, 1998).
- On-line education involves connection charges. Institutions that started out supporting the costs of student’s connection have found the cost of doing so too great, and transferred the costs to the students once the costs of carrying student connection charges became clear (Muzio, 1992). In the Open University students had to meet their own connection charges from the start (Rumble, 1989).
- In distance education, where materials substitute for face-to-face support, the danger is that students learn from standardised packages and have little opportunity to discuss their work. The great advantage of on-line systems is that they can support

individualised, constructivist models of teaching and learning. However, this is a labour-intensive activity. The cost structure of on-line distance education is thus nearer face-to-face models than first- and second-generation models with their economies of scale. The biggest and I suggest the least costed ingredient is the costs of supporting learners on-line. Tutors at the Open University consistently say that they are spending more time supporting learners on-line than was the case when they supported them through correspondence and telephone contact. They are not paid for this increased workload. The University has been talking about protocols to curb student demands on their tutors. At one level this reflects a process of change from an industrialised distance learning system in which the students were expected to study more or less independently with relatively little direct support from a tutor, to a more supportive environment. The costs of this are unclear. Annand (1999) suggests that it is these costs that may in the end constrain the extent to which large scale distance teaching universities can adopt on-line technologies. Arizona Learning Systems (1998: 20) report that "All providers of Internet courses ... have reported that this direct communication [between teachers and students] takes more time than preparation and delivery of a classroom lecture and the corresponding contact with students". These faculty workload costs have pushed the typical direct cost per course enrolment of an Internet course (US\$571) above that of traditional classroom instruction (\$474), but they suggest that faculty workload be reduced through improved support and processes. They project that measures such as the development of academic help desks could result in unit costs falling to \$447 (*ibid.*: 7). In some cases colleges have restricted course enrolments in order to bring instructor time down (*ibid.*: 22). Arizona Learning Systems (1998: 24) suggest that the average cost per course enrolment should fall as enrolments rise. For a simple text course unit costs would fall from \$782 per enrolment with 10 students to \$453 with 500 enrolments, and for a multi-media course with images, the cost per enrolment would be \$1496 with 10 students, falling to \$467 with 500 students (*ibid.*: 24).

The costs of on-line learning suggest that this is not the way to keep costs down. Adoption of on-line learning reverses the trend towards the industrialisation of education, with all the economies of scale that implies. Institutions recognise this fact. Ursula Franklin, a leading Canadian scientist, wisely observed: "whenever someone talks to you about the benefits and costs of a particular project, don't ask 'What benefits?', ask 'Whose benefits and whose costs?'. At times it helps to rephrase an observation in line with a perspective from the receiving end of technology." (Franklin, 1992: 124).

Institutions that are being fiscally squeezed are passing the costs of on-line on to students. The economics of on-line education require that very significant costs are placed on the student to equip and regularly re-equip him- or herself as a lifelong learner, to fund the costs of the consumables of learning, to pay the connection charges, and ultimately to pay directly for tutorial and mentoring support and for access to databases and information. Many people will not be able to afford this kind of education. For many (perhaps most) people, there will still be a need for access to low cost education. Given that one of the advantages of distance education has been its ability to open up low-cost educational opportunities to the many, it will be ironic if distance education - through its adoption of on-line learning - prices itself out of that market.

References

- Annand, D. (1999). The problem of computer conferencing for distance-based universities. *Open Learning*, 14 (3), pp. 47-52.
- Arizona Learning Systems (1998). *Preliminary cost methodology for distance learning. Report dated August 21, 1998*. Arizona Learning Systems and the State Board of Directors for Community Colleges of Arizona.
- Bates, A. W. (1995). *Technology, Open Learning and Distance Education*. London: Routledge.
- Collis, B. (1996). *Tele-learning in a digital world. The future of distance learning*, London: International Thompson Computer Press.
- Daniel, J. S. (1996). *Mega-universities and knowledge media. Technology strategies for higher education*. London: Kogan Page.
- Eicher, J. C., Hawkrigde, D., McAnany, E., Mariet, F., & Orivel, F. (1982). *The economics for new educational media. Volume 3; Cost and effectiveness overview and synthesis*. Paris: The UNESCO Press.
- Fletcher, J. D. (1989). The effectiveness and cost of interactive videodisc instruction. *Machine-Mediated Learning*, 3 (4), pp. 361-85.
- Franklin, U. (1992). *The real world of technology*. Concord, Ontario, House of Anani Press Ltd.
- Fwu, B. J., Jamison, D., Livingston, R., Oliveira, J., Skewes-Cox, T., & Van der Kelen, B. (1992). The National Technological University. In G. Rumble & J. Oliveira, (eds.). *Vocational education at a distance: International perspectives*, London: Kogan Page.
- Grint, K., & Woolgar, S. (1997). *The machine at work. Technology, work and organization*. Cambridge: Polity Press.
- Hallak, J. (1990). *Investing in the future. Setting educational priorities in the Developing World*. Paris, UNESCO: International Institute for Educational Planning and Pergamon Press.
- Jamison, D. T., Klees, S. J., & Wells, S. J. (1978). *The cost of educational media. Guidelines for planning and evaluation*. Beverly Hills, Sage Publications. [Also published as Jamison, D. T., Klees, S., & Wells, S. (1976) Cost analysis for educational planning and evaluation: Methodology and application to instructional television, Washington, D.C., U.S. Agency for International Development.]
- Jamison, D. T., Suppes, P., & Wells, S. (1974). The effectiveness of alternative media: a survey. *Review of Educational Research*, 44 (1), pp. 1-67.
- Leach, K., & Smallen, D. (1998). What do information technology support services really cost? *CAUSE/EFFECT*, 21 (2), pp. 38-45.
- McGraw, B. A., & McGraw, K. L. (1993). The performance support system as a training solution: Cost/benefit considerations, *Journal of Instructional Delivery Systems*, 5 (3), pp. 7-19.
- McGuinness, A. C. (1995). The changing relationships between the States and universities in the United States. *Higher Education Management*, 7 (3), pp. 263-79.

- Mace, J. (1978). Mythology in the making; is the Open University really cost-effective? *Higher Education*, 7 (3), pp. 295-309.
- Moonen, J. (1994). How to do more with less? In K. Beattie, C. McNaught & S. Wills (eds.), *Interactive multimedia in university education: Designing for change in teaching and learning*. Amsterdam: Elsevier.
- Moran, L. (1996). *Distance Education, copyright and communication in the Information Society*. Report prepared for UNESCO meeting of the Committee of Experts on copyright in the Information Society, New Delhi, India, November 1996.
- Muzio, J. (1992). Distance-taught computer education for managers and professionals at the University of Victoria. In G. Rumble & J. Oliveira (eds.). *Vocational education at a distance: International perspectives*, London: Kogan Page.
- NBEET (National Board of Employment, Education and Training) (1994). *Costs and quality in resource-based learning on- and off-campus*. Commissioned Report no. 33. Canberra: Australian Government Publishing Service.
- Oliveira, J. B. & Rumble, G. (eds.) (1992). *Educación a Distancia en América Latina: Análisis de costo-efectividad*. Washington, D.C.: World Bank.
- Perraton, H. (ed.) (1982). *Alternative routes to formal education: Distance teaching for school equivalency*, Baltimore, John Hopkins University Press.
- Perraton, H. (ed.) (1993). *Distance education for teacher training*. London, Routledge.
- Phelps, R. H., Wells, R. A., Ainsworth jr., R. L., & Hahn, H. A. (1991), Effectiveness and costs of distance education using computer-mediated communication. *The American Journal of Distance Education*, 5 (3), pp. 7-19.
- Ravet, S., & Layte, M. (1997). *Technology-based training. A comprehensive guide to choosing, implementing, managing and developing new technologies in training*. London, Kogan Page.
- Reddy, G. Ram (1993). Open universities: the new temples of learning. In K. Harry, M. John & D. Keegan (eds.). *Distance education: new perspectives*. London, Routledge.
- Renwick, W. (1996). The future of face-to-face and distance teaching in post-secondary education. In OECD. *Information technology and the future of post-secondary education*. Paris, OECD.
- Ritschard, M. R., & Spencer, E.L. (1999). *Planning for technology replacement: Is it possible?* A paper presented to the College and University Information Services Conference CUMREC '99.
<http://www.educause.edu/ir/library/html/cmr9933/cmr9933.html>.
- Roderick, E (1998). *More than just pretty pictures: A cost/benefit analysis of digital library holdings*. A paper presented to the CAUSE98 Conference, Seattle, December 1998. <http://net.educause.edu/ir/library/html/cnc9804/cnc9804.html>
- Rumble, G. (1988). The economics of mass distance education. *Prospects*, XVIII (I), pp. 91-102.
- Rumble, G. (1989). On-line costs: Interactivity at a price. In R. Mason & A. Kaye (eds.). *Mindweave. Communication, Computers and Distance Education*. Oxford, Pergamon Press.

- Rumble, G. (1992). The competitive vulnerability of distance teaching universities. *Open Learning*, 7 (2), pp. 31-49.
- Rumble, G. (1994a). The effects of employment practices on the costs of flexible and distance learning. In SCIENTER (1994) *DELTA Project 2104: DELTA Concerted Action on the economics of flexible and distance learning*: First collection of papers for delegates at the Brussels Workshop on 16-17 February, Bologna, SCIENTER.
- Rumble, G. (1994b). The competitive vulnerability of distance teaching universities: a reply. *Open Learning*, 9 (3), pp. 47-9.
- Rumble, G. (1997). *The costs and economics of open and distance Learning*. London, Kogan Page.
- Rumble, G. (1999). *The costs of networked learning; what have we learnt?* A paper presented to the FLISH99 (Flexible Learning on the Information Superhighway) Conference, Sheffield Hallam University, Sheffield, UK, 25-27, May, 1999. <http://www.shu.ac.uk/flish/rumblep.htm>.
- Rumble, G. & Oliveira, J. B. (eds.) (1992). *Vocational educational at a distance. International perspectives*. London: Kogan Page (in association with the International Labour Office).
- Scott, P. (1997). The postmodern university? In A. Smith & F. Webster (eds.). *The postmodern university? Contested visions of higher education in society*. Buckingham: Open University Press.
- Tergan, S-O, Hron, A., Mandl, H. with Hartge, T., & Schneider, B. (1992). Computer-based systems for Open Learning: State of the Art. In G. Dimmer & D. Blume (eds.). *Open Learning and Distance Education with Computer Support*. Nürnberg: BW Bildung und Wissen, Verlag and Software GmbH.
- Tiffin, J., & Rajasingham, L. (1995). *In search of the virtual class. Education in an information society*. London, Routledge.
- UNESCO (1980). *The economics of new educational media. Volume 2: Cost and effectiveness*. Paris: The UNESCO Press.
- Van der Brande, L. (1993). *Flexible and distance learning*. Chichester: John Wiley.
- Wagner, L. (1977). The economics of the Open University revisited. *Higher Education*, 6 (3), pp. 359-81.
- Whalen, T., & Wright, D. (1998). *Cost-benefit analysis of Web-based tele-learning. Case study of the Bell Online Institute*. University of Ottawa: Faculty of Administration.

4. The Effect of Employment Practices on the Costs of Flexible and Distance Learning

This chapter was presented as a paper to a workshop on the costs of flexible and distance learning, organised under DELTA Concerted Action project D2104 by SCIENTER. The paper was published in SCIENTER (ed.) (1994) DELTA Concerted Action on the economics of flexible and distance learning. First collection of papers for delegates at the Brussels Workshop of 16-17 February, Bologna, SCIENTER. This paper has been marginally edited.

Distance Education as an Industrialised Form of Education

One of the most influential views of distance education is Peters's vision of distance education as an industrialised form of education (Peters, 1973, 1983, 1989). Peters focuses on rationalisation; change of function; the division of labour, including increased emphasis on preparation, planning, organisation, and scientific control; mechanisation; the formalisation of processes, coupled with processes analogous to an assembly line; the objectification of work; mass production and standardisation; and the concentration and centralisation of capital (Peters, 1983: 98-110). He argues that enterprises involved in distance education exhibit these features in a way that is not true of traditional education, and that as a result one can describe distance education as an industrialised form of education. Most distance educators acknowledge the power of Peters's analysis.

Peters equates rationalisation with efficiency - that is, the pressure to achieve a given level of "output with a comparatively (compared to earlier situations) lower input of power, time and money" (Peters, 1983: 98). Rationalisation has been a feature of industrialisation. Many of the other features of distance education which Peters identifies, such as the division of labour, the use of technical equipment, the application of organisational principles, and the drive to improve the quality of the materials and the teaching process, are aimed at increasing efficiency (Peters, 1983: 98-99). Peters reflects the shift from the limited number of craft trades in traditional societies, in each of which the craftsman normally carried out all aspects of the production process from beginning to end, to the highly differentiated occupational structure of a modern industrialised society, when he cites König's definition of the division of labour as "dividing one complete work process into a number of elementary procedures" (König, cited in Peters, 1983: 99). He sees traditional classroom-based teaching as a complete work process, in contrast to distance education where the teaching process has been broken down into the discrete processes of curriculum planning, developing teaching materials such as written texts and audio-visual materials, tutoring students, advising students, and correcting the students' assignments and examination scripts. Particular sub-tasks are allocated to different specialists such as editors, graphic designers, designers of computer assisted learning, and so on, supported by secretaries and technicians (Peters, 1983: 100-01). The original function of the lecturer as conveyor of education and counsellor (*ibid.*: 100) is divided and sub-divided into specialisms dealing with the development of the course, assessment, and counselling (*ibid.*: 100, 108). Academic staff are further sub-divided into specialist disciplines, so that the distance teaching materials are commonly preparation of materials "by leading experts in the specialist fields concerned" (*ibid.*: 100), though sometimes their role "is reduced to that of a consultant whose involvement in distance teaching manifests itself in periodically

recurrent contributions” (ibid.: 108). The processes and volumes involved depend upon mechanisation for the manufacture (e.g. printing, copying cassettes) and distribution of the materials (ibid.: 101). This in turn imposes upon distance education an assembly line approach, with materials - for example, manuscripts - being passed from one area of responsibility to another, and ultimately to storage, distribution, and the student. Assignments are similarly routed from one person to another along a pre-determined line that is reminiscent of Leffingham’s principle of the “straight-line flow of work”, the difference being that the individuals involved do not sit along side one another as they would have in Leffingham’s Taylorist office (Peters, 1983: 102; Leffingham, 1925: 333). The division of labour, the control of production, and the need to dovetail distribution and student use of the materials, necessitates considerable preparatory work, planning, and organisation which has to be done by management (Peters, 1983: 103-05). Evaluation fulfils the function of scientific control methods as a means of measuring, controlling, and seeking improvements in the teaching process (ibid.: 106). The whole process needs to be formalised to a much greater extent than class-based teaching, with rules, manuals, and schedules determining who does what, when, how, and in what order. The assessment process provides an example of this (ibid.: 106). Standards are laid down and applied governing production formats, assessment, and so on. The courses themselves are objectified (ibid.: 109) and standardised, in the sense that once written, they cannot be changed without modifying the materials, so that teachers have lost the flexibility of exploring new avenues of the subject enjoyed by the traditional lecturer, except possibly in the occasional written communication or meeting with the student (ibid.: 106-7, 109). The objectivisation of the teaching function, coupled with the mechanised production and delivery, enables very large numbers of students to be served by comparatively few academics. Distance education is thus a mass produced form of education (ibid.: 103) that depends upon the concentration of capital and centralisation of resources in large institutions which enjoy a virtual monopoly position (ibid.: 109-10).

In his analysis Peters contrasts the industrialised features of distance education with the pre-industrial, craft-like features of traditional higher education, with its lectures, seminars, and practice sessions (ibid.: 95-6). Traditional lecturers are responsible for the “complete work process” of initiating and guiding the learning processes of students by conveying information to them and counselling them (ibid.: 100). They personally select the content of the lectures (ibid.: 98) and can vary it at will in order to explore “interesting deviations” (ibid.: 107) which reflect their subjective judgements on content (ibid.: 109). They can also vary their teaching methods (ibid.: 109). Such freedom and responsibility is denied the distance teaching lecturer.

Industrialisation is marked by division of labour, de-skilling, and the separation of doing from the management job of deciding. Both Peters and Raggett point to the increasing specialisation of work within distance education (Peters, 1983: 99; Raggett, 1993: 25, 26). Raggett notes that strong boundaries can emerge between the various specialists involved (Raggett, 1993: 26). Members of teams developing courses tend to work sequentially, with the specialists coming in to do a particular task and then leaving the ‘team’, rather than working together in an integrated way (ibid.: 27). Maintenance of labour divisions (specialisation) inhibit academics from taking on responsibility for manuscript production from writing to print ready copy, even though desktop publishing technology would allow this to happen (ibid.: 27). The various specialists tend not to work closely together in teams, centred around the production technology (ibid.: 28). Finally, many distance

education systems have a highly centralised, bureaucratic planning model (ibid.: 26), involving very considerable numbers of administrative staff (ibid.: 26) who have been empowered to take a wide range of decisions, including some with academic implications: for example, deciding on economic rather than educational grounds the number of years over which a course is presented (ibid.: 24).

“Fordist” Images of Distance Education

Distance education systems using industrialised labour practices to produce relatively inflexible, materials-based courses for a mass-market are said to be “Fordist” in nature. A number of recent studies by Campion (1990), Campion and Renner (1992), Farnes (1993), and Raggett (1993), have criticised such “Fordist” models of distance education.

Fordist production systems epitomise the de-skilling of labour, based on fragmentation and routinisation of skills, coupled with managerial control based on the separation of conception and execution. Fordism primarily describes a labour process involving mass production on a moving assembly line, made possible by the development of interchangeable parts. It also reflects a juxtapositioning of technology and management style. In respect of the latter, Henry Ford built on F. W. Taylor’s work, so that Fordism shares with Taylorism some of its notable features: division of work, de-skilling of labour, removal of any decision-making from the shop-floor, identification of decision-making as a management function, and the organisation of management on hierarchical lines within functions.

Such developments were not, of course, confined to manufacturing. Mechanisation of the office, stemming from the introduction of typewriters (first introduced in the mid-1870s, and selling at the rate of 60,000 per year in 1893), bookkeeping machines, envelope feeders, etc., “made it possible to extract from the clerk’s job the laborious tasks associated with copying, preparing and checking data, printing, preparing mail and internal correspondence, billing, time keeping, and routine arithmetic calculations” (Zuboff, 1988: 115). Elements of clerical work could thus be separated out and routinised, to be carried out by “a combination of lower-paid labour and mechanical support”, under the control of a hierarchy of supervisors. Not surprisingly, F. W. Taylor’s ideas were applied to clerical work: W. H. Leffingham dedicated his text on *Office Management: Principles and Practice* (1925) to the Taylor Society for its “inspirational and educational influence” (cited in Zuboff, 1988: 117). He advocated “the straight-line flow of work” in which desks were arranged such that work could be passed from one clerk to the next “without the necessity of the clerk even rising from his seat (Leffingham, 1925: 333, cited in Zuboff, 1988: 118). The effect of such developments could soon be seen in many clerical offices, typing pools, data preparation offices, etc., leading to a general de-skilling of many office workers that parallels that of manufacturing labour.

The McDonaldisation of Education

The American sociologist, George Ritzer, provides an interesting analysis of the McDonaldisation of education, drawing on his experiences in of American higher education. Ritzer believes that McDonald’s is the “paradigm case” of “a wide-ranging process” which he calls McDonaldisation - that is, “the process by which the principles of the fast-food restaurant are coming to dominate more and more sectors of American

society as well as of the rest of the world” (Ritzer, 1993: 1). He sees McDonaldisation as a natural extension of developments out of Weberian bureaucracy, F. W. Taylor’s Scientific management, and Henry Ford’s assembly line.

Ritzer (1993: 34) identifies five characteristics of McDonaldised enterprises: efficiency, calculability or quantification, predictability, increased control through the substitution of non human technology, and increased irrationality as a by-product of rational systems. He argues that these principles are affecting an increasingly wide variety of organisations and activity. In the university sector, for example, he identifies among other things the pressure for greater efficiency and control (ibid.: 55-7, 115-6).

Pressures for greater efficiency can be seen in the shift from examining students verbally on a one-student to one-professor basis, to examination by essays, to examination by machine-graded multiple choice questions; the development of books full of multiple choice questions provided free of charge to professors to go along with textbooks required for use in large classes; the development of disk versions of multiple choice question books, thus eliminating the need to retype from the text; the development of other materials - lecture outlines, computer simulations, discussion questions, video tapes, ideas for guest lecturers, etc. to fill in other class hours; and the development of custom publishing, whereby the publishing firm recruits a wide range of authors to write chapters on a specific topic, which are then given to the professor, who chooses the ones he or she wants to incorporate into a textbook for class use, and their order, and the delivery of the custom built book in the precise numbers required for the class.

Control is evidenced by the training of students to accept highly rationalised procedures such as rote learning and objective testing; the development of timed lesson plans; and the specification of what will be taught in a particular lesson. Ritzer cites the case of Kinder-Care where employees “with little or no training in child care” teach classes in which what they “do in the ‘classroom’ is largely determined by a uniform ‘instruction book’ that includes a pre-set, ready-made curriculum” that is “spelled out in detail on a day-to-day basis”; and the case of the franchised after-school centres for remedial education Sylvan Learning Centers, in which the corporation “trains staff and tailors a McDonald’s type of uniformity, down to the U-shaped tables at which instructors work with their charges” (Newsweek, 1985, cited in Ritzer, 1993: 116).

Ritzer (1993: 141) concludes that the “modern university has, in various ways, become a highly irrational place”. Many students and staff are put off by “the huge, factory-like atmosphere in these universities” in which education can be “a dehumanising experience” with huge lecture classes, making it difficult to get to know other students, and virtually impossible to know professors on a personal basis, and in which grades may be posted impersonally, often by social security number rather than name (ibid.: 141-2). In this respect, technology such as educational television, closed-circuit television, computerised instruction and teaching machines, is leading to even greater irrationalities by further limiting student - teacher contact.

It is easy enough to identify McDonaldisation in distance teaching institutions. The search for greater efficiency, predictability, and calculability, and the ability to lower labour costs as a result of the peripherisation and de-skilling of labour, can lead to lower unit costs. At a time when educational budgets are being reduced, and expansion is being funded at marginal cost, the ability to economise and cut costs allows non-profit

making institutions to continue to exist and even to expand. It is also in tune with other changes in society: distance education, for example, enables people to study without leaving the comfort of their own homes, without having to contend either with shoddy classrooms and poorly stocked libraries at a local educational institution, or with the need to create their own teach yourself course by identifying and obtaining source materials. It is the equivalent of choosing a pre-prepared frozen meal which only needs micro waving or a pizza delivery service, as opposed to the option of going out to a restaurant, or buying, preparing and cooking the ingredients for a meal at home. It is, in other words, convenience education. Like many McDonaldised products, it has been made possible by the development of appropriate technologies (computers and the educational technology equivalents of the automatic drink and food dispenser, the microwave oven, factory farming, and cash machines).

Employment and Work in Distance Education

Distance education is both a manufacturing and a service industry. That is, it is involved in the design and production of materials, and also in the delivery of services to its customers. From an economic point of view, distance education is little different to any other manufacturing and service industry. This suggests that there are sound reasons for bringing down costs, including the costs of labour, to improve profitability (in the case of private distance education systems), to reduce the drain on the public purse (in the case of State-funded systems), and to reduce the costs which need to be passed on to the consumers through fees.

Three main strategies exist to reduce the cost of labour. The first is to improve labour productivity. The second is to reduce the cost of labour by de-skilling it, effectively through the division of labour. The third is to employ more peripheral workers.

We shall consider each of these in turn.

Efficiency as a Means to Increased Productivity and Lowered Labour Costs

The belief that distance education is a cheaper, more *efficient* way of educating people has underpinned the planning of a number of distance teaching institutions (Rumble, 1986: 60-1). Bureaucratic procedures are devised to handle the progress of students through the organisation - admission, course choice and registration, residential summer school choice and allocation, assignment handling, examination centre choice and allocation, etc. - thus ensuring efficiency in the handling of large numbers of students. Courses are often designed to a standard format and mix of media. There is often a relatively limited range of courses, at least compared to traditional universities. The whole process is designed to help the student study the course efficiently. For much of the course, students do not even have to leave their own homes. The courses are an educational equivalent of a pre-prepared, packaged, TV dinner. Virtually all administrative procedures can be carried out from the home, using pre-printed forms, letters or the telephone to contact the University. Assessments may also be done at home, though students may have to attend in person for an end-of-course examinations. On some courses, a proportion of assessments are computer-marked multiple choice questions.

As a direct result, distance education provides an excellent vehicle for teaching large numbers of students. The emphasis on teaching many thousands of students (*calculability*) is

widespread, and cited as a major reason for embarking on projects by planning committees and government agencies.

The fact that courses are objectified in their materials ensures that they are *predictable*. The use of standard course formats adopted by many distance teaching institutions - for example, A4 size printed course texts with wide margins, opening pages which provided a contents list, course aims, and course objectives, the use of self-assessment questions and in-text questions - all provide many thousands of students with a predictable learning experience throughout their student career. Tutors are told not to challenge the course materials, but rather to support students in their study of the course. The risk that students could be “disorientated” by another viewpoint is thus reduced. The use of computer-marked multiple choice questions removes the unpredictability associated with tutors’ subjective grading. The development of courses is also made more predictable. Successful courses are replaced by similar courses - thus providing an educational equivalence to the publishing industry’s book and Hollywood’s film sequels. Moreover, those parts of a course that had worked particularly well can be reused in the new version. This predictability has, however, another side to it: it reduces the degree of autonomy which workers have over the design, production and delivery of the courses, and thus de-skills them.

Finally, McDonaldisation “involves the search for the means to exert increasing control over both employees and customers. ... Furthermore, and more extremely, non human technologies have been steadily replacing the people who work in rationalised settings” (Ritzer, 1993: 100). Distance education replaces teachers by teaching materials. It involves a restructuring of the labour process within educational institutions, centred on the division of labour between those teachers who design the courses and create the teaching materials, and those who tutor and mark students’ assignments. In the [UK] Open University this market is two-tiered: the former kind of teacher is a core worker in permanent, full-time employment; the latter is a peripheral worker in a “non-standard” job. The work of the latter kind of teacher has been de-skilled, in the sense that it involves less skill than a traditional academic job. It is also heavily controlled, in the sense that the tutor’s role is closely defined. The work of the former has changed radically from that undertaken by full-time teachers in traditional educational institutions; while they often do not teach students themselves, they do have to exercise a range of skills related to the development of teaching materials which their colleagues in traditional institutions are not called upon to deploy.

The main factor in increasing the efficiency of distance education is, of course, the substitution of capital for labour costs. This arises from the use of labour to develop teaching materials which then replaces labour in the class room. In essence this is a way of improving the efficiency or productivity of labour by finding ways in which a teacher can teach more students than it is possible to teach in a class-room. It is this, above everything else, which has given rise to the belief among economists and politicians that distance education is, at least potentially, a more efficient means of teaching than traditional forms of education. Of course, one has qualify this. Firstly, many distance education systems retain some face-to-face or mediated staff-student contact, thus reducing extent to which capital actually replaces labour. And secondly, the economies of scale inherent in distance education depend on their being sufficient students following the

course to justify the investment in materials. If there are insufficient students, then the efficiencies that arise from replacing labour by capital will not be achieved⁷.

De-Skilling and the Division of Labour

Industrialisation is marked by division of labour, de-skilling, and the separation of doing from the management job of deciding. Both Peters and Raggett point to the increasing specialisation of work within distance education (Peters, 1983: 99; Raggett, 1993: 25, 26). Raggett notes that strong boundaries can emerge between the various specialists involved (Raggett, 1993: 26). Members of course teams at the [UK] Open University tend to work sequentially, with the specialists coming in to do a particular task and then leaving the 'team', rather than working together in an integrated way (ibid.: 27). Maintenance of labour divisions (specialisation) within the Open University has also inhibited academics from taking on responsibility for manuscript production from writing to print ready copy, even though desktop publishing technology would enable this (ibid.: 27). Equally, there is no encouragement to get the various specialists to work closely together in teams, centred around the production technology (ibid.: 27), nor is there any attempt to make greater use of more flexible, peripheral (temporarily contracted) workers in the production process (ibid.: 28). Finally, the University remains wedded to a highly centralised, bureaucratic planning model (ibid.: 26), involving very considerable numbers of administrative staff (ibid.: 26) who have been empowered to take a wide range of decisions, including some with academic implications: for example, deciding on economic rather than educational grounds the number of years over which a course is presented (ibid.: 24; see also Rumble, 1981: 182).

There is little doubt that both the number of students involved in large scale distance education projects, and their geographical dispersal, results in a division of labour between those who create courses, and those who tutor, counsel students, and mark students' assignments and scripts. The fact that some course writers will also tutor, and some tutors may write on course teams, does not lessen the divide. Similarly, there is little doubt that the production process requires new skills (editing, design, video-production, etc.), which many academics will not have. So academics producing distance taught courses need to be supported by a variety of specialists. Further, production and service delivery needs to be planned, co-ordinated and executed, and this too is usually done by specialist managerial staff who have an overview of the processes involved. Quite rightly, these specialists take a range of decisions which affect the work of academics, and constrain the latter's freedom.

The traditional task of the academic is thus divided, as Peters observes. Peters identifies a three-fold division between knowledge providers (curriculum designers, authors), knowledge elucidators and evaluators (tutors, script markers), and subject or programme advisors or counsellors (Peters, 1983: 100). In some systems [for example, at the Universidad Estatal a Distancia in Costa Rica], the tasks of developing the curriculum and writing are separated as well (Rumble, 1986: 116), while there may be separate contracts for tutors who mark assignments and examination script markers. Obviously, such divisions affect the degree of labour power over activities: systems which divorce

⁷ Not least because it takes more time per hour of student learning to develop materials than it does to develop face-to-face teaching sessions. [GR 2003]

curriculum design from writing, for example, or course development from tutoring, inevitably reduce the power and responsibility of those involved at a later stage in the production and delivery process.

The Concept of a Two-Tier Labour Market

The concept of a two-tier labour market envisages a pattern of employment based on two distinct groups of workers: core workers and peripheral workers (Atkinson, 1984). Core workers are in permanent, full-time employment, enjoying a degree of job security, an expectation that they have a career within the employing organisation, and hence an expectation that they will be offered job-related training. Peripheral workers, whether they are subcontracted, self-employed, or on temporary contracts, have “non-standard” jobs which enable the employer to match payment for labour closely to the work done. It does not matter whether such workers are self-employed, and hence hired direct by the employer, or employed by a subcontracting agency of some kind. From a managerial point of view, such workers are numerically flexible - that is, management can hire and discard according to need (Fevre, 1991). They are also paid less than standard workers.

The employment of peripheral labour in higher education is growing. Reports on non-standard labour in traditional UK higher education make the point that many part-time “casualised teaching staff” are underpaid in that most of them are paid only for the hours spent in class, and not for preparation, assessment, administration, and general contact with students. Teaching-only staff who were on non pro-rata contracts worked on average three times as many hours as they were paid for, while postgraduate students worked four times as many hours as they were paid for. Most of them are paid on a lower scale than their full-time colleagues, and are poorly treated in respect of promotion and staff development (AUT, 1993: 4-5). The report shows that taking in preparation and other non-teaching time brings the average hourly pay of teaching-only staff down from £23 to £7.66, and that of postgraduate students from £12.90 to £3.22. In distance education, rates of pay for tutors marking correspondence scripts are generally said to be low when compared with the hours actually spent marking.

In the light of the developing ideas about the nature of non-standard work, another interpretation of the division of labour within distance education would be that the original task of the teacher has indeed been divided between one group of workers which continues to be employed as part of the core, and another which is employed as part of the periphery. And, indeed, in nearly all sizeable distance education organisations, tutors and student advisors or counsellors are employed on contractual terms which enable the institution to dispense with their services if there are insufficient students to warrant their employment. In other words, they are numerically flexible.

Arguments favouring the employment of staff on casual terms and conditions of service include numerical flexibility, and the fact that many of these staff will have other, full-time jobs. Thus tutorial and counselling jobs are generally assumed to be part-time rather than full-time, and pay is related to some measure of the amount of work done - for example, the number of students supported, the number of tutorial hours taught, or the number of student assignments marked. Further, in most distance education systems, a proportion of those who create and develop the materials will be peripheral workers, paid by results (for example, a

flat fee for writing or editing a correspondence text). In some institutions, such as the National Extension College⁸, the majority of staff will be on non-standard contracts, with only a small core of managerial and administrative staff on permanent contracts. In others, such as the British Open University, the majority of academic, editorial and design course development and production staff will be permanently employed, with most of the printing being subcontracted, and the tutorial and counselling staff being peripheral workers.

Peters certainly believed that distance education encouraged non-standard work: “frequently, the original role of the lecturer is reduced to that of a consultant whose involvement in distance teaching manifests itself in periodically recurrent contributions” (Peters, 1983: 108). One of Raggett’s arguments is that a strong case can be made for increased use of contracted services and temporary staff (Raggett, 1993: 27). Certainly, a two-tier system of employment helps “to solve the practical problems of making labour cheaper” (Fevre, 1991: 65), which is one of the advantages which Raggett sees in the approach (Raggett, 1993: 27). However, this kind of numerical flexibility should not be confused with flexible specialisation, which does not involve any necessary increase in non-standard work.

A Vicious or Virtuous Circle?

It seems clear that the various factors - the search for efficiency, the division of labour, the de-skilling of labour, and the emergence of a two-tier labour market of core and peripheral workers, interact. The search for more efficient ways of teaching - exemplified in Ritzer’s conception of McDonaldised education - routinises and mechanises educational processes and thus effectively de-skills the work involved. The division of labour within distance education also de-skills the labour process. As a result, it becomes easier to hire casual labour which needs little or no training to do the job. This leads to a fall in costs. Whether one believes that this is a vicious or a virtuous circle will depend upon one’s point of view.

Let us now return to the question of whether or not the division of labour found in distance education involves a measure of *de-skilling*. There seems little doubt that the work undertaken by non-standard workers within distance education - particularly those who tutor and counsel students, or mark their assignments and examination scripts - involves less skill than a traditional academic job. However, many non-standard workers in distance education are employed elsewhere in higher education or in the professions (e.g. as a manager or teacher). The distance education employer reaps considerable advantages, in as much as the individual’s subject expertise has been built up and is maintained elsewhere, and hence in a sense paid for within the context of his or her full-time employment, but the advantage is not all one way. The individual who undertakes to develop teaching materials, or to tutor or counsel distance education students as an additional task, may well enrich their overall experience, gain experience which will be of use within their main job, and be paid - though not particularly well - for the work. Indeed, they may well be able to develop new skills which their full-time jobs do not enable them to pursue: for example, tutors and counsellors may well gain the skills of helping motivate students, as Peters suggests (Peters, 1983: 108). The trend though is towards de-skilling. Some areas of work, such as assessment, are “largely formalised”,

⁸ Headquartered in Cambridge, UK. [GR 2003]

so that those marking student assignments work within “standard guidelines” (ibid.: 106). Indeed, “tutors and counsellors do not act autonomously but perform well defined functions in a teaching-learning system” (Peters, 1989: 6). As Peters says, “in a special sense they are instrumentalised as they are normally not expected to teach in their own right” (p. 6). Significantly, those who undertake such work, where the work is the main source of employment, are clearly doing a job which is de-skilled, relative to the task of a traditional teacher, and which is certainly not well paid.

What of the core workers? Peters seems clear that there is a degree of de-skilling, in which “the role of the traditional professor is reduced mainly to the function of a subject matter specialist, as members of the course team relieve him or her of many tasks of instructional planning”, so that “most phases of the teaching-learning process take place without the professor’s intervention” (Peters, 1989: 5). Obviously the division of labour means that lecturers working in distance education do not carry out the full range of duties carried out by traditional lecturers. In some cases, where writers are employed on contract, Peters argues that the work of the original lecturer has been reduced to that of a consultant whose involvement is at best periodic (Peters, 1983: 108). Moreover, unlike traditional lecturers, lecturers working in distance education are no longer able to determine their own academic aims and methods “and change them spontaneously during a lecture” (p. 109), nor can they indulge in an interesting deviation during a lecture (p. 107). However, in their authorial role, they may be freed from some time consuming tasks, such as the need to look up exact references, by virtue of the support they have from editors (p. 100).

The central tasks of lecturers involved in the design and development of courses and course materials thus differs from those of lecturers in traditional education in two major respects: firstly, they may have no contact with students - though in fact there is usually nothing to prevent them from taking on a tutorial or counselling role. Secondly, the task of designing and developing courses is very different, involving as it does appropriate media choice, control of content, cost control, and quality control in the design of learning materials. However, the situation is changing. Traditional institutions are increasingly making use of new teaching technologies. Reports indicate that at least some academics in such institutions are acquiring new skills: these include increased levels of academic preparation before using technologies such as videoconferencing, as well as the technical skills of presentation (MacLeod, 1993: 16). Professor Jack Stockman of the School of Business at California State University has even speculated “that star teams of academics may emerge, teams that combine leading researchers with good teachers who can exploit the new media effectively, either producing videos and teaching materials, or contracting to ‘perform’ a course of tele-lectures” (ibid.: 16). However, Ritzer’s account of work within McDonaldised traditional higher education provides an antidote to this optimistic assessment. While some may benefit, others are likely to find their work de-skilled. In other words, a two-tier skills structure is emerging in traditional education.

This development seems even more pronounced in distance education. The two aspects of the divided job in distance education begin to look very different: those academics involved in developing courses and materials have a job where the range of skills they are called upon to exercise incorporate new areas of expertise and new skills. Notions of academic freedom mean that the essential professionalism of the core academic member

of staff remains intact. This provides the academic with considerable discretion within their specialist area of competence - particularly in respect of what is taught, and how. However, in distance education, academics work with a range of other specialists, who bring their own professionalism to their jobs. Academics thus remain subject to technical constraints. Where they lack relevant skills, they are unable to challenge the boundaries established by the technical specialists with whom they have to work. Academics are not craftspersons, directing the work of the technical staff who support them from a position of knowledge in which they had acquired all the relevant skills during their own apprenticeship. However, as production technologies become more flexible and user friendly, so they are increasingly able to assert more influence over the production process. Indeed, in some areas, they are now far more skilled than their counterparts in traditional institutions.

The technical constraints on academic can be reinforced by the organisational structure. In the Open University the functional differentiation between academic and supporting technical staff was institutionalised in hierarchical management structures and operating rules which were enshrined in production manuals. Specialist publishing, design, and audio-visual departments were set up. This functional centralisation made standard operating procedures more and more attractive. Arguments against it, and for increased flexibility, were countered by reference to the economies of scale derivable from such standardisation. However, the Open University was also an academic environment, and gradually academics were able to win back concessions through the governmental structure of the University, which they dominate. This led to increased flexibility. Later, the development of more user-friendly technologies, coupled with academics increasing expertise in those technologies, aided this process. However, the final step, in which academics have direct control over the technical labour force, and in which power is given to the project team leaders driving through the development and production of courses, so that they can choose between in-house and external sources of technical expertise and production, has yet to be taken. Until it is, the University is unlikely to derive the full benefits of lean production.

In contrast with those who develop the courses, those who tutor and advise students occupy highly specialist, well-defined jobs. While they have developed some new skills, the overall trend has been towards a loss of skills. Their control over what is taught, and when, is less than their traditional counterparts because they are subject to centrally determined content and timetables.

These changes can be examined from the related perspectives of specialisation and discretion. Child distinguished between two main forms of specialisation, which are distinguished in the main by their different levels of discretion (Child, 1984: 26). The first is found in repetitive, short-style, routine manual or clerical operations, where levels of de-skilling are high. The second is found among those who carry out technical or professional work, and who literally are 'specialists'. Many such jobs involve relatively narrow areas of expertise based on a considerable depth of knowledge. Such specialists often have considerable discretion over how to plan and carry out their work. Child thus sees jobs defined in terms of high or low levels of specialisation or discretion (Figure 1):

Figure 1: Examples of jobs with different levels of discretion and specialisation

		Discretion	
		High	Low
Specialisation	High	Specialist jobs	Routine “de-skilled” operatives
	Low	Higher managerial jobs	Supervisors, salesman, assembly line utility men, junior reporters

Source: Child, J. (1984, 2nd. edn.) *Organization. A Guide to problems and practice*, p. 27.

Specialist jobs include hospital consultants and craftsmen, both of whom have high levels of discretion, and routine manual and clerical jobs, with low levels of discretion. Jobs with low levels of specialisation and low discretion include supervisors, salesmen, and jobs such as junior reporters. Jobs with low specialisation but high discretion include most higher managerial jobs. Occupants of the latter generally have the authority to take major decisions - unless the organisation is highly centralised. Indeed, the individuals in such jobs largely design their own jobs, which is why the concept of job design is rarely applied to higher management (Child, 1984: 28). Within this framework, core lecturers involved in designing and developing courses have high levels of discretion; those lecturers brought in on peripheral contracts to write or develop materials have lower levels of discretion; and those who tutor and mark assignments have very little discretion. However, the core lecturers involved in designing courses have to work with other academics and appropriate technical specialists, hence the discretion they enjoy is shared among the team, rather than being individualised.

Conclusions

This paper has sought to identify certain trends in the labour market and apply them to distance education. It suggests that distance education lends itself to a situation in which capital replaces labour, resulting in increased productivity; tasks which were previously regarded as part of a single academic job are divided up among different workers, so that labour is divided; as a direct result of the division of labour and the search for efficiency, de-skilling takes place; and as a result of all these factors, a two-tier pattern of employment emerges. This means that labour costs can be driven down, thus improving efficiency.

I have tried to avoid, in this paper, passing too many judgements on whether or not these labour practices are desirable or not. Whether one believes that the interactions comprise a vicious or virtuous circle will depend upon your point of view. What is surprising is that to date economists have tended to focus on the effect of technology on the costs of teaching. They have not sought to analyse the economic effects of the changes in the labour market which distance education makes possible. Until they do, our understanding of the economics of flexible and distance education will remain only partially complete.

References

- Association of University Teachers (1993). *Part-time, poor deal. A survey of part-time staff in traditional universities*. London: AUT Research Department.
- Atkinson, J. (1984). Manpower strategies for flexible organisations. *Personnel Management*, August.
- Campion, M. (1990). Post-Fordism and research in distance education. In T. Evans (ed.), *Research in distance education 1*. Geelong: Deakin University.
- Campion, M., & Renner, W. (1992). The supposed demise of Fordism: Implications for distance education and higher education. *Distance Education*, 13 (1), pp. 7-28.
- Child, J. (1984, 2nd. edn.). *Organization. A guide to problems and practice*. London: Paul Chapman.
- Farnes, N. (1993). Modes of production: Fordism and distance education. *Open Learning*, 8 (1), pp.10-20.
- Fevre, R. (1991). Emerging 'alternatives to full-time and permanent employment. In P. Brown & R. Scase (eds.), *Poor work. Disadvantage and the division of labour*. Buckingham: Open University Press.
- König, R. (ed.). *Soziologie, Das Fischer Lexikon*, p.27, cited in O. Peters (1983), Distance teaching and industrial production. A comparative interpretation in outline. In D. Sewart, D. Keegan, & B. Holmberg (eds.), *Distance education: International perspectives*. London: Croom Helm.
- Leffingham, W. H. (1925). *Office management: Principles and practice*. Chicago and New York: A. W. Shaw .
- MacLeod, D. (1993). Meet my professor, the movie star. *The Independent*, Thursday 28 January 1993, p. 16.
- Newsweek (1985). The McDonald's of Teaching. *Newsweek*, 7 January, p. 61.
- Peters, O. (1973). *Die didaktische Struktur des Fernunterrichts Untersuchungen zu einer industrialisierten Form des Lehrens und Lernens*. Weinheim: Beltz.
- Peters, O. (1983). Distance teaching and industrial production. A comparative interpretation in outline. In D. Sewart, D. Keegan & B. Holmberg (eds.), *Distance education: international perspectives*. London: Croom Helm.
- Peters, O. (1989). The iceberg has not melted: further reflections on the concept of industrialisation and distance teaching. *Open Learning*, 4 (2), pp. 3-8.
- Raggett, P. (1993). Post-Fordism and distance education - a flexible strategy for change. *Open Learning*, 8 (1), pp. 21-31.
- Ritzer, G. (1993). *The McDonalidization of society*. Thousand Oaks: Pine Forge Press.
- Rumble, G. (1981). Organisation and decision-making. In A. Kaye & G. Rumble (eds.), *Distance teaching for higher and adult education*. London: Croom Helm.
- Rumble, G. (1986). *The planning and management of distance education*. London: Croom Helm.
- Zuboff, S. (1988). In the age of the smart machine. The future of work and power. Oxford: Pergamon.

5. The Competitive Vulnerability of Distance Teaching Universities

This article appeared in Open Learning, Vol. 7, No. 28, pp.31-45 (June, 1992). It was written at a time when in my capacity as Regional Director of the Open University's East Anglia Region (1990-1992) based in Cambridge, I was increasingly concerned at the growing level of competition facing the University. The article sought to generalise the argument by examining the vulnerability of the 26 or so distance teaching universities around the world to competition both from the increasing number of campus based universities taking initiatives in distance teaching, and the dual mode universities which have worked across a range of methods for some years. The article questions whether there is a future for the single mode university in a competitive environment, and suggests strategies that they might adopt in the future. Responses to the article appear in chapters 6, 7 and 8, and my responses to my critics in chapters 9 and 10.

It is ten years since Rumble and Harry (1982) surveyed the emergence of what they called the distance teaching universities – that is, universities set up to teach through the use of various media (print, audio-visual, computer-assisted instruction) students who are physically separated from their teachers. The method of teaching does not mean that students never meet a teacher, but in general the role of those they meet is to support the students' learning from the materials provided them, and not to direct their learning through lectures, seminars and tutorials.

One of the advantages of distance education is that students do not have to go to a central location to attend lectures, seminars and tutorials nor do they need ready access to a library (the course materials coupled with a few set books replace the need to use a library extensively). Most of the students therefore study at or from home. The physical distance separating a student from the university is in a sense immaterial. What is important is the student's ability to receive the materials at the appropriate time from the university; to be able to return assignments to the university or its tutors reasonably easily; and to contact the tutor if need be, again reasonably easily. As a direct result, tutorials - where they are offered - tend to take place in local centres near where students live, while the tutors are usually as remote as the students from the university.

This highly distributed system looks very different to the residential or non-residential campus-based university, which students have to attend for lectures, seminars, and tutorials, and to make use of laboratories, libraries and other facilities.

The vast majority of institutions of higher education are of this latter type. In this article we shall refer to them as campus-based universities (CBUs)⁹. CBUs, as defined here, may teach full- or part-time students, but all teaching takes place on-campus, either in the daytime or in the evenings. Teaching methods are based on the lecture, seminar or tutorial, and independent study by the students, using books and other resource materials provided by the university's library, computer centre, laboratories, or audiovisual resource centre. CBUs do not teach off-campus students using distance means.

⁹ In this article the term *university* is used partly for convenience, but also because the majority of higher education level distance teaching institutions have in fact the status of a university. Where appropriate, however, *university* can be substituted by the term *polytechnic*, *college*, etc.

Given the enthusiasm and interest which distance teaching universities (DTUs) have aroused, it is perhaps surprising that there are relatively few of them. The existing ones are listed in Table 1, together with their date of foundation. One of the purposes of this article is to indicate why there are relatively few DTUs in the world.

Table I Distance Teaching Universities

University of South Africa, RSA	1951
Open University, UK	1969
Universidad Nacional de Educación a Distancia, Spain	1972
Free University, Iran	1973*
Fern Universität - Gesamthochschule, Germany	1974
Open University (formerly Everyman's University), Israel	1974
Allama Iqbal Open University (formerly People's Open University), Pakistan	1975
Athabasca University (as reconstituted), Canada	1975
Universidad Nacional Abierta, Venezuela	1977
Universidad Estatal a Distancia, Costa Rica	1977
Sukhothai Thammathirat Open University, Thailand	1978
Radio and Television University of China, People's Republic of China	1979
Sri Lanka Open University (previously the Sri Lanka Institute of Distance Education), Sri Lanka	1980
Open Universiteit, Netherlands	1981
Korea Air and Correspondent University, South Korea	1981
Andhra Pradesh Open University, India	1982
University of the Air, Japan	1983
Universitas Terbuka, Indonesia	1984
Indira Gandhi National Open University, India	1985
al-Quds Open University, Jordan	1985
National Open University, Taiwan	1986
Payame Noor University, Iran	1987
Kota Open University, India	1987
Nalanda Open University, India	1987
Yashwantrao Chavan Maharashtra Open University, India	1989
Open Learning Institute, Hong Kong	1989

*closed

Although there are relatively few DTUs, there are now a large number of universities which use distance teaching methods to teach off-campus students, as well as more traditional methods (lecture, seminar, tutorial, laboratory, etc.) to teach on-campus students. These universities, referred to in this article as dual-mode universities (DMUs), may use distance teaching methods for only one or two courses, or alternatively may have a significant proportion of their students studying off-campus by distance means.

Some DMUs, recognising the value to students of studying from well-prepared materials, now allow full-time on-campus students to use the materials originally prepared for off-campus students. As we shall see, this may lead to a reduction in the number of contact

hours of these on-campus students. Such programmes, called mixed-mode study in Australia, are really a form of on-campus resource-based learning, and are treated here as such.

With the exception of the University of South Africa, all the distance teaching universities date from the late 1960s¹⁰. In contrast, many of the DMUs date from the late nineteenth and early twentieth centuries. Among the most early to develop distance as well as on-campus programmes were the Illinois Wesleyan University (1874)¹¹, the University of Chicago (1891), the University of Wisconsin (1906), the University of California, Berkeley (1913), all in the USA, the University of Queensland in Australia (1911), and Queen's University, Ontario, Canada (1889).

Establishing Distance Teaching Universities

The establishment of individual DTUs was often controversial. Perry recorded the “profound scepticism garnished with ridicule and hostility” (Open University, 1972: 117) with which the UK Open University's foundation was greeted. It requires some effort, now, to recall that an institution which is so often seen as one of the most successful and most admired innovations in Britain's post-Second World War educational history (Keegan, 1990: 4; Holmberg, 1986: 29; Hall, 1991: 140; Jevons, 1984: 26) was, at the time of its launch, being referred to as a “completely bogus institution” and “an unlovely centralised colossus” (House of Commons, Debates, Vol 709, col. 2007, cited in Woodley, 1981: 23).

Looking back at the planning processes which led to the establishment of the DTUs, it is clear that in many cases there was little attempt to consider whether the needs which they were to meet could, in fact, have been met in other ways.

Broadly speaking, there were two strands to the arguments favouring the establishment of a DTU. The first was that there existed a pool of individuals who were now past the normal age of entry to the universities, who would benefit personally or professionally from access to a university education, but who at the time they left school had been unable to attend or gain entry to a CBU. In addition, there were a number of adults who had already gained a university-level education, but who needed to update or refresh themselves professionally. With family and job responsibilities, such individuals could only study part-time. But the existing universities were uninterested in part-time students - hence the only way to meet this need was to establish a distance teaching university dedicated to their needs. This kind of approach is seen in the foundation of, for example, the UK Open University and the Dutch Open Universiteit (Perry, 1976: 55; de Moor, 1983: 59).

The second was that there was in the country in question an enormous pool of frustrated demand for entry to the existing universities, from among the population of school leavers. It would be too expensive to expand the existing CBUs, or establish more of them. It was now clear from experience elsewhere (the case cited was usually that of the UK Open University) that the per capita student cost of distance education was significantly less than that of campus-based universities. So, one solution to the problem of insufficient resources to meet demand would be to set up a DTU. This kind of

¹⁰ There was a short-lived attempt to found a correspondence university at Ithaca, New York, in 1883.

¹¹ Discontinued 1910.

argument was deployed in Andhra Pradesh, Sri Lanka and Venezuela (Reddy Committee, 1982: 8, 17-18, 55-6; UNDP, 1978: 5, 7; COUNA, 1977: 32). Little justification was given for these conclusions. As Dodd and Rumble pointed out in their analysis of the planning processes underpinning the establishment of many of the DTUs, the decision to set up the DTU had usually been taken by the time the planning committee met, and the terms of reference of the committees were therefore constrained to considering *how to* establish a DTU, not *whether to* establish one (Dodd and Rumble, 1984: 233, 241, 249-51; Hall, Land, Parker and Webb, 1975). The committees were often responsible to, and in the case of the Advisory Committee for the UK Open University, actually chaired by a politician who was deeply committed to the project (Dodd and Rumble, 1984: 232-4; Hall, Land, Parker and Webb, 1975: 254).

The over-riding impression is that, as an exercise in business planning, the processes which led up to the establishment of the various DTUs was sorely lacking in analysis of the likely market (characteristics of those who would be attracted to the programme and extent of that market), pricing policy, expenditure (Perry [1976: 20], for example, points out that the costs of the UK Open University were seriously underestimated during the planning stage), and perhaps most significantly – in respect of the likely response of competitors.

At the time this probably did not matter, either because there was little likelihood of the CBUs being very interested in the markets at which the DTUs were directed, as in the UK and the Netherlands, or because the level of frustrated demand was so high, and the capacity of the CBUs so limited, as to accommodate the entry of a new competitor. Competition was thus not an issue. (Indeed, in the case of the UK Open University, the initial decision not to teach under-21 year-olds meant that the University was not competing with CBUs for the school leavers' market.)

In retrospect, however, it is clear that the position of a DTU could change if the school leavers' market were ever to be saturated, and if CBUs were to decide that it was feasible and financially worth their while going after the part-time adult learners market. If this happened, one would expect to see growing numbers of CBUs either expanding their on-campus part-time provision, or converting themselves from CBUs into DMUs.

The Strengths of Distance Teaching Universities

The arguments in favour of DTUs are based on a particular conception of their academic and organisational strengths.

First, it is said that the administrative structures of CBUs are not suited to the development and management of distance education (Peters, 1973: 310; Daniel and Smith, 1979: 64). As early as 1968, Perry had argued that a new DTU would be able to “experiment with new patterns of teaching with a freedom that would be impossible to achieve in established universities” (Perry, 1976: 55), while Peters' comparison of distance teaching and the industrial production of goods, and his belief that distance education is a quite distinct form of education¹², suggests that distance education may be best carried out in institutions dedicated to distance education.

¹² See Keegan (1990: 76-7) for an analysis of Peters' work in English.

A second line of argument is to hold that the needs of part-time, adult distance students will be better served in an institution that is wholly dedicated to their needs. The marginalisation of distance teaching and external students in DMUs is often cited as justification for this position. Thus Siaciwena's report that "at the University of Zambia there has always been some obvious prejudice against correspondence teaching among certain academics" (Siaciwena, 1988: 201; 1983: 70); Singh's comment that academics in those Indian universities offering distance education through Correspondence Directorates "regard correspondence education as a second rate education and look down upon correspondence educators also as second rate" (Singh, 1979: 87); and Hall's comment that in the USA the students served through extension, evening school and correspondence are "often considered to be peripheral students" (Hall, 1991: 31), are seen as justifications for single-mode DTUs.

A third, closely related argument is that DTUs, once established, develop important strengths in the technology and processes of materials development and the delivery of support services to distant students. This is evidently true in the case of many DTUs - but it does not necessarily follow that these skills cannot be developed or acquired by other institutions - including dual mode institutions.

Yet another argument favouring DTUs is that they are capable of achieving greater economies of scale than universities which teach on-campus. As we shall see, this is potentially true in respect of CBUs. However, it is often assumed that DTUs will be more cost-efficient than dual-mode institutions as well. While it is true that they may be more cost-efficient than the campus-based activities of DMUs, this is by no means true of DMUs' distance-taught programmes, which is where the comparison needs to be made. We shall return to this crucial point later.

The Strengths of Dual-Mode Universities

Dual-mode universities, unlike DTUs and CBUs, have a mandate to teach both on- and off-campus (external or distant) students. With the growth in interest in part-time higher education, there has been a rapid growth in the number of DMUs as CBUs have begun to target part-time adult students, and to recognise that distance education methods give them a powerful means of reaching this market. This market is significant. For example, by the autumn of 1988, 43 per cent or 5.5 out of the 12.8 million degree credit students in the USA were enrolled part-time, reflecting a "dramatic shift from first-time, full-time, usually residential students, to part-time, usually commuting, almost always older students" (Hall, 1991: 31); and, in the UK, 38 per cent of the total number of students in higher education were studying part-time in 1986/87 (Smith and Saunders, 1991: 26).

In countries with a long history of dual-mode provision, the growth of off-campus part-time studies has been matched by a growth in the number of DMUs. In Australia, for example, only one university (the University of Queensland) taught off-campus until the mid-1950s. Between then and 1980, four more universities opened external studies programmes (New England in 1955, Macquarie in 1967, Murdoch in 1975, Deakin in 1977). Even in 1980, only 8.7 per cent (14,109) of university enrolments were external students. During the 1980s, however, there was a substantial growth in the number of institutions teaching external students, ultimately leading to government intervention to limit the number of producers of distance education programmes to eight institutions.

Although consideration was given to the establishment of an Australian DTU, this option was rejected by the Karmel Committee, whose report (1975) argued that such a centralised approach might actually inhibit existing institutions from adopting innovative practices (Karmel, 1975: 80). Very similar conclusions were reached by the Swedish Committee for Television and Radio in Education in 1975, which also rejected the establishment of a DTU in favour of a decentralised model based on existing universities or colleges, arguing that this was likely to show a higher degree of adaptability to needs (Committee for Television and Radio, 1975: 51).

It is clear that, given the right conditions, campus-based institutions of higher education can adapt themselves to meet the demands of part-time students. But, equally, it is clear that those CBUs which convert themselves into DMUs, or are established from the very beginning as DMUs, have a number of advantages over DTUs.

Firstly, DMUs have a much wider choice of teaching strategies to meet the needs of their part-time students. They may, for example:

- allow a small number of part-time students into a full-time degree course. This is not always satisfactory for the would-be part-time students. Classes are generally held in the day-time when it is difficult for many potential part-timers to attend; there is rarely any attempt to adapt the curriculum or style of teaching to the needs of part-timers, who tend to be mature students; and there may be few other students with whom the individual part-timer can relate. But, for some individuals, the approach works well. A major limitation is that students need to live reasonably near the campus (in terms of commuting times).
- set up a special free-standing part-time degree programme, either in the day-time or, more usually, in the evening. Here, part-time students can mix with other part-timers, in larger groups, and the curriculum and style of teaching can be adapted to their needs. Not all potential students find attendance either in the day-time or evening easy. As with the previous model, students need to live reasonably near the campus. However, if there is a concentration of students in a particular area, the university may be able to send the lecturers to the students - thus greatly extending the range and hence area over which teaching can take place.
- adopt resource-based learning, so that most of the study is done by part-time students at times of their own choosing, either in college or in their own homes, using learning resources of various kinds. A wide range of fairly inexpensive approaches towards the development of learning resources is available, including the video-taping of lectures delivered to full-time campus-based students for subsequent viewing by part-timers, the printing of lecture notes, etc. While quality is variable it is the total mix of support and in particular the integration of learning materials, books and personal contact that is important and which makes many of the programmes as effective as, on the one hand, traditional campus-based programmes and, on the other distance education programmes based on carefully designed learning materials backed by correspondence and other forms of tuition.

The more resource-based the programme, the more similar it is to a distance education programme, and the less important it is that the students live near the campus.

Secondly, DMUs can at least potentially provide part-time students with a much wider spectrum of courses than can DTUs. The number of course options available at

universities teaching campus-based students is almost invariably greater than the number of courses which DTUs can afford to develop. Indeed, DTUs such as the UK Open University and the Universidad Nacional Abierta found that the cost of developing courses was such that the number of specialist higher level courses and degree options had to be restricted (Rumble, 1988a: 98).

Thirdly, it is argued that in those institutions where external students are taught by the same lecturers as the internal students, as in the Australian integrated model, one achieves a parity of academic standards between the internal and external systems which benefits the external students (Smith, 1979: 200). This is not always the case. The academics teaching external students may be of poor quality - or at least be perceived that way (Singh, 1979: 87), or they may have little interest in teaching external students and direct most of their attention to the full-time students (Siaciwena, 1983: 70). But the potential for parity with the very best that higher education has to offer is there.

Finally, DMUs may have distinct economic advantages over DTUs. We shall now explore this issue.

The Economic Vulnerability of DTUs in the Face of DMU Costs

In the late 1980s and early 1990s, the pressure for expansion of higher education is not, in general, being matched by a commensurate increase in resources. In this respect, this new wave of expansionism differs significantly from that of the 1960s when most governments supported expansion by investment. In both the UK and Australia, for example, the emphasis is on increased efficiency coupled with a search for alternative sources of funds - most notably from the students themselves. There also appears to be a distinct preference for larger institutions and for consortia. In Australia, the number of universities and colleges has fallen from its pre-1987 level of 64 to some 30 institutions, virtually all of which are called universities (Campion and Guiton, 1991: 15). Many observers believe that similar developments will occur in the UK, in the wake of the merging of the Universities and Polytechnics and Colleges Funding Councils. In the US, too, funds are more difficult to attract. And in many Third World countries, higher education is desperately underfunded, notwithstanding relatively high levels of investment and subsidy put into higher education, vis-à-vis primary and secondary education (Todaro, 1989: 340-1).

Obviously, in these circumstances, distance education, with its much-vaunted economies of scale, becomes an attractive proposition. DTU planners in Venezuela, Andhra Pradesh, Israel and elsewhere all hoped that the average cost per student would be lower in the DTU, *relative to that in campus-based institutions* and, indeed, so it has often proved. Study after study of the relative cost per student and cost per graduate concluded that their costs are or could be, assuming high enough numbers of students, lower in DTUs than in CBUs¹³. But is this the right comparison? Muta and Sakamoto extended the

¹³ On the relative costs of the UK Open University and UK campus-based universities, see Wagner, L. (1977) 'The economics of the Open University revisited', *Higher Education*, Vol. 6; Laidlaw, B. and Layard, R. (1974) 'Traditional versus Open University teaching methods: a cost comparison', *Higher Education*, Vol. 3. On the relative costs of the UK Open University, Loughborough University and Middlesex Polytechnic, see Smith, R.C. (n.d. but circa 1985) 'A comparative study of some performance indicators for a UGC funded university, a polytechnic and the Open University', mimeo. On the relative costs of the Japanese DTU and various forms of campus-based university education in Japan, see Muta, H. and Sakamoto, T. (1989) 'The economics of the University of the Air of Japan revisited', *Higher Education*, Vol. 18. On the relative cost of

study of the relative costs of the Japanese University of the Air (UAJ) to cover the costs of evening and correspondence programmes at private universities, as well as other programmes (see Table 2, derived from Muta and Sakamoto, 1989: 595, 597, 600).

These figures show that while the annual revenue cost per student at the UAJ is generally lower than other forms of provision, it is higher than the cost of the evening programme at a private university, and much higher than the cost of a correspondence programme at a private university. Furthermore, the relatively high drop-out rate at UAJ erodes this cost advantage when one comes to compare the cost per credit awarded and cost per graduation.

Table 2: Ratio of Japanese University of the Air revenue costs to that of other higher education in Japan

	Annual cost per student	Cost per credit awarded	Cost per graduate
UAJ			
yen (thousands)	395.4	40.9	4372.5
= base figure	1.0	1.0	1.0
National university			
- liberal arts	2.40	0.75	1.09
- science technology	3.23	1.04	1.14
Public university			
- liberal arts	2.07	0.66	0.87
- science/technology	1.83	1.55	1.79
private university day programme			
- liberal arts	1.38	0.45	0.54
- science/technology	1.97	0.71	0.80
Private university evening programme			
- liberal arts	0.89	0.41	0.43
- science/technology	0.93	0.57	0.62
Private university correspondence programme	0.15	0.22	0.52

The significance of Muta's figures is *not* that they will necessarily transfer to other contexts, but that they indicate the need to compare the costs of DTUs with other kinds of provision, including part-time day and evening provision, and other kinds of distance provision.

We now know a considerable amount about the behaviour of costs in DTUs (Rumble, 1987; 1988a). Basically, the total revenue cost of any distance education system is a function of four elements:

the Korea Air and Correspondence University and Sukhothai Thammathirat Open University, see Kim, S. (1985) 'The role of distance teaching universities in innovations of higher education today', in *Development of Higher Education in Korea*, Seoul, Korean Council for University Education, and Srisa-an, W. (1987) 'Financing and cost-effectiveness of distance education', in *Distance Education in Asia and Pacific*, Vol. 1., Manila, Asian Development Bank.

- the average direct cost per student including the costs of materials supplied to the student and of distributing them to each student, the cost of tuition and examination for each student, etc. - times the number of students in any one year;
- the average direct investment cost of each course being developed - that is the salary costs of academics, producers, editors, designers etc. who develop them; the costs of copyrights, graphics, production set up, etc. - times the number of courses being developed in any one year;
- the average annual direct cost of presenting each course - that is, the cost of transmitting radio and television programmes, the cost of rewriting assignment and examination papers, the costs of monitoring a course, etc. - times the number of courses being presented in any one year;
- the overhead costs of the institution's management and administration, premises, capital replacement from revenue, etc.

All of these cost elements can be affected by management decisions and practices, which in turn affect the behaviour of the average cost curve in distance education, relative to campus-based education. Basically, distance education systems incur high fixed costs, which are then spread over a large number of students to result in a relatively low average fixed cost per student. To this is added the direct cost per student. This is generally much lower than is the case in campus-based education - thus providing distance education with its cost advantage.

The actual cost curve in any system can be affected by a large number of factors:

- each medium has its own cost structure, affecting its development and delivery costs, relative to other media and to the number of students it will serve. Thus the use of television increases development costs sharply, but the cost of transmission is unaffected by the number of students served within the transmission area. However the total costs of providing video cassettes to each student rises sharply with student numbers, making this method of distributing video generally too expensive, except for courses with very small numbers, or where students buy the videos at or above cost price;
- the level of student support offered has a major effect on the direct cost per student and hence on the relative cost advantage of distance education vis-à-vis campus-based education. The economies of scale of distance education depend heavily on its low direct cost per student, relative to campus-based education. The more direct support given to students, the less likely it is that distance education will be able to offset its higher fixed costs over the student body to obtain a lower average total cost;
- individual systems can affect the costs of developing materials markedly by relying on consultant authors, editors and designers – and not supporting a full-time staff in these areas. Institutions which have adopted this transformer model are more like publishing houses than academic communities – but they have much lower costs;
- the more courses that are developed, the higher the total investment costs. The number of courses which need to be developed will depend on the size of the course profile and the number of years a course will be offered once it is developed. The more courses, the higher the development cost to start up *and replace* ageing courses. The longer one allows courses to last, the more the costs of development can be annualised, and hence the lower the annualised cost of development;

- the more students in the system, the more the development and fixed costs can be spread and the lower the average development and fixed costs per student. Having high student numbers is thus very important if average costs are to come down. However, the average fixed cost curve, while it falls quickly to start with, begins to flatten out - so that economies of scale tend to be gained in the early years of a project. Eventually, further expansion of student numbers ceases to have a significant effect on average costs, and the economic justification for expansion loses its force.

To summarise, then, the economic strength of distance education rests on two major pillars: firstly, the high cost of developing materials can be justified because they can be used to teach very large numbers of students; secondly, substitution of learning from materials for classroom activity (with its high labour costs) brings down the direct cost of teaching. As Wagner (1982: ix) put it, distance education offers “a mass production alternative to the traditional craft approach of classroom-based education”.

Most DTUs can currently point to their economic efficiency, vis-à-vis CBUs, but the price which they have paid is that they have had to limit (1) the range of subjects and (2) the level of student support services.

Perry drew attention to the first limitation in his book describing the initial years of the UK Open University when he admitted that the University had grossly underestimated the time and effort needed to produce one course, and concluded that in striving to have a large profile of courses with many honours level options, it was “in danger of abandoning something we could do very well [the provision of a general education at university level] for something we could do only poorly, if at all [the provision of specialized honours degrees]” (Perry, 1976: 73-4). Jevons (1984: 33), however, sees this limitation as a source of potential weakness: “I believe that the future lies at least as much with mixed institutions, if only because [DTUs] cannot provide the full range of subjects”. The second limitation is more obvious - since any attempt to increase the level of direct student support increases the direct cost per student, and rapidly erodes the cost advantages of a DTU.

Some measure of the importance of this can be gained by studying a recent report (Taylor and White, 1991) on costs at the University College of Southern Queensland, which underlines the vulnerability of DTUs to competition from DMUs. The study provides information on the relative costs of teaching the same group of four courses in three different ways, viz (1) traditional campus-based teaching, in which a typical semester course has 56 hours of face-to-face contact, divided evenly between lectures and tutorials; (2) external studies by distance means, with the students learning from print, videotapes, audiotapes and computers, together with some face-to-face support and (3) campus-based resource-based learning, in which full-time students studied the courses using the materials prepared for the external studies programme students, but had in most cases a significantly reduced amount of face-to-face teaching (namely 20, 26 and 28 hours on three of the courses, with one course maintaining the full 56 hours of contact). Table 3 (from Taylor and White, 1991: 33) summarises the costs involved.

Although the main thrust of Taylor and White’s study is to explore the viability of utilising the distance teaching materials developed by a DMU for resource-based on-campus teaching, the study also has implications for the relative costs of distance teaching in DTUs and DMUs.

The first point is that the amount of teaching given to the UCSQ off-campus students appears to be quite high (possibly nearly 24 contact hours) compared with that available in most DTUs. This stems from UCSQ's basic philosophy that "approximately equal budget allocations should be made to the teaching of all students, notwithstanding whether they are taught in an on- or off-campus mode" (ibid.: 27). The UCSQ off-campus cost per student for teaching could probably be reduced if necessary, by up to 50 per cent. But, far more significantly, the costs of developing the materials are based on the charging out, at daily rates, of the time actually spent on this activity. This marginal costing approach can be justified on the grounds that the staff are already employed to support the on-campus activities of the university¹⁴.

Table 3: Comparative costs of three teaching modes at University College of Southern Queensland

	Cost per student in Australian \$			Notes (1)
	Off-campus distance programme	On-campus face-to-face	On-campus resource-based learning	
Development of materials and infrastructure of distance education system	137	NIL	137	(2)
Production	44	NIL	30	(3)
Delivery				
- Teaching	208	308	246	(4)
- Exams, postage, handling, student support, library, capital, equipment, management and infrastructure	304	392	395	
Total	693	700	803	

Notes to Table 3

- (1) *The costs for off-campus students are based on a population of 90 students.*
- (2) *Development costs have been shared across all students using the materials.*
- (3) *Production costs for materials used by on-campus students are recovered because these students have to buy the materials, and hence the costs of production for this group of students is ignored in the original study. The authors suggest that since the production runs have to be set up for the distance students anyway, the cost of providing materials to the on-campus students in the marginal cost of the additional print run, which is about \$30. Since cost recovery cannot be guaranteed in every case, this cost is included here.*
- (4) *Number of hours teaching not given for off-campus students; normally 56 contact hours per semester course for on-campus students; and weighted average of 28.16 hours for on-campus*

¹⁴ Further information from another source may ultimately become available when and if Deakin University, an Australian DMU, completes and publishes the results of its activity costing exercise. Preliminary results are available in Deakin University (1989) *Further investigations into activity costing in a mixed mode institution*, n.p., Department of Employment, Education and Training, Commonwealth of Australia. The preliminary study had apportioned 89 percent of Deakin's costs between the three output areas of teaching, research, and community service, and had further apportioned teaching costs between on- and off-campus studies, by School. However, the report does not provide an analysis of the reasons why the differences in cost per equivalent full-time student on- and off-campus varies significantly from School to School.

resource-based learners, derived from data in the original study. Given this, and assuming an equivalent cost per student hour for teaching in the off-campus programme, it would appear that off-campus students have access to a fairly high number of hours of teaching (\$208/246 x 28.16 hours = 23.8 hours.)

This is the approach normally taken in exercises costing this kind of provision, so that the potential ability for any CBU to turn conventional lectures into basic distance teaching materials at very low marginal cost has been well known for many years (see for example, Wagner, 1975; Leslie, 1979). DTUs have tended to ignore this fact - but others, notably politicians and those in CBUs and DMUs seeking to justify their entry into distance education, have begun to point out the advantage which they have. One of the threads of this paper is that DTUs can no longer ignore this fact.

Much of this cost advantage stems from the way in which costs are allocated to the on-campus and distance programmes. Rumble (1986) has discussed the problems of apportioning joint-supply costs in dual mode institutions, and drawn attention to the implications for average costs per student of:

1. charging the distance-based system of a DMU with only those additional costs incurred in its development (marginal costing approach). This kind of approach is normally found in Canadian DMUs, and is the approach used in the UCSQ study discussed above;
2. taking the total development costs of the on-and off-campus programmes and dividing them equally between the on-campus and distance programmes;
3. charging the distance programme with the additional costs (on the grounds that these have arisen only because of the move into distance education), while dividing the development costs of the on-campus programme equally between the on- and off-campus programmes (on the grounds that the latter has benefited from the prior investment in the former);
4. apportioning the total costs of both programmes between the programmes, pro-rata to the number of full-time equivalent students on each programme;
5. charging all the additional costs to the distance programme, while apportioning the on-campus programme development costs to the two programmes, pro-rata to student numbers.

Similarly, the costs of delivery can also be apportioned in at least two ways. One approach is to identify the direct costs of teaching and support for the on-campus and off-campus student, and charge accordingly. Since the direct costs of distance programmes is generally lower than that of campus-based ones, this approach favours the distance programme. However, many Australian dual-mode systems ignore this difference, and merely apportion the total costs of teaching and support across all students, thus giving the same average cost for teaching and support for on-and off-campus students.

Which approach is taken is far from a matter of academic interest. Table 4 shows the approximate costs of an unidentified dual-mode programme. Tables 5 and 6 show how the cost per student can be affected radically, depending on the approach used. In general, however, a marginal costing approach is justifiable while the distance programme is relatively small in size - thus favouring the formation of new competitors, and enabling many competitors to enter the field in a small way, while the more equitable approach of

shared costs is more likely in cases where the distance programme constitutes a significant proportion of total activities.

Table 4: Costs of an unidentified dual-mode programme

	On-campus	Off-campus	Total
Development costs - teaching	790,000	400,000	1,190,000
Central computing and support services and production costs	294,000	187,000	481,000
Sub-total, development	1,084,000	587,000	1,671,000
Student services, teaching and postage costs	55,000	232,000	287,000
Total	1,139,000	819,000	1,958,000
Number of students	280	510	790

Table 5: Apportioning development costs

	Total costs apportioned to		Development cost per student (see note 1)	
	On-campus	Off-campus	On-campus	Off-campus
Method 1	1,084,000	587,000	3871	1151
Method 2	835,500	835,000	2984	1638
Method 3	542,000	1,129,000	1936	2214
Method 4	592,253	1,078,747	2115	2115
Method 5	384,203	1,286,797	1372	2523

Note 1: This assumes that development costs are spread over one year. It is more likely that they would be amortised over a number of years.

Table 6: Apportioning delivery costs

	Total costs apportioned to		Delivery cost per student	
	On-campus	Off-campus	On-campus	Off-campus
Method 1	55,000	232,000	196	455
Method 2	101,722	185,278	363	363

The ability of DMUs, quite legitimately, to adopt different approaches to the costing of their on- and off-campus programmes provides them with considerable flexibility in responding both to the costs of the programmes, the funding they attract, and the pricing strategies which they can deploy.

Finally, DMUs have one other advantage which stems from the greater flexibility they have to choose between different teaching modes. The point was made above that each medium – including the various kinds of face-to-face teaching – has a different cost structure. Some have relatively high fixed costs and low variable costs. Such methods are most economical where student numbers on a particular course are high. Some have relatively low fixed costs, and high variable costs. Such methods are most economical on courses with low student numbers. Because DMUs have a greater potential range of choice including that of adding the odd part-time student to a normal full-time campus-based course, they can draw on a wider range of methods than DTUs and hence maximise the economic advantage of the different teaching methods they employ.

The Strategic Vulnerability of DTUs: The Current Position

Until recently, DTUs have been able to assume that CBUs are not competing with them. In the UK, for example, the number of part-time degree level students in universities and polytechnics has been small, and the number of these being taught by distance means even smaller. Where competition has existed, it has been geographically patchy (limited by the catchment area for day and evening part-time programmes and by the locations of the providing institutions¹⁵), and often limited in respect of the breadth of studies being taught at a distance. The threat from other distance providers has been small – and actually fell during the 1970s with the running down of the London External Degree. Since then, however, the London External Degree system has been revitalised and is now expanding rapidly, and other providers have entered the distance learning field to challenge the Open University.

As Tight (1991: 54) has remarked, the situation is far from stable:

“Ever since the establishment of a monolithic and well-resourced Open University in the late 1960s, subsequent governments ... have been understandably reluctant either to break it up or create a competitor. The latter option has been left to other institutions to pursue, both individually and in consort.

Initially, such competition has not been direct, focusing on subject areas in which the Open University has lacked a presence until recently (e.g. business studies, languages, law). However, if the proposals for an Open Polytechnic – mixing face-to-face provision at local institutions with distance materials – gets underway, the Open University will be put on its mettle ...”

In Australia the level of competition in external studies has been limited more by government action than by the wish of the individual institutions.

It has long been clear that, at least in principle any CBU may launch a cost-effective distance programme, thus transforming itself into a DMU which can take advantage of the cost characteristics of the dual-mode approach, and the access to a much wider profile of courses, to challenge a DTU. Such distance teaching can also be combined with a growth in more traditional part-time provision (day and evening programmes) and on-campus resource-based teaching to make the most effective use of the total resources available to the DMU.

The evident growth, for social and demographic reasons, in the part-time market has led to changes which may well affect those DTUs which, to date, have enjoyed a monopoly position. For CBUs there is an evident market which they can enter with confidence, in the knowledge of the advantages which DMUs already have in many parts of the world. Although the danger of over-provision exists, the total risk to the DMU is relatively small, leaving the DMU with a distinct competitive edge over the CBU. Why this is so is discussed below.

The fact that many DTUs rely on the facilities and staff of CBUs (for teaching space and tutors) puts them in a weak position, should a CBU, in developing its own distance

¹⁵ See for example, Tight (1986) for an analysis of the geographical availability of part-time first-degree level provision in the UK.

taught system, decide to refuse to allow its facilities to be used to support the DTU's programmes. Here, too, DTUs are peculiarly vulnerable.

Further, there is no reason why a CBU should necessarily go it alone. One particular model is to establish a small, centralised organisation which provides a framework for the delivery of distance-mode versions of on-campus courses developed by a number of institutions. In the UK, the Open Polytechnic "sees itself as a consortium of institutions providing distance learning packages for use in conjunction with other teaching methods within collaborating institutions and integrating national provision through a coherent system of credit accumulation and transfer". It will actually act as a publishing company, by commissioning distance-taught versions of on-campus courses, and distributing them (Smith and Saunders, 1991: 86-7). Combined with strong tutorial and student support systems, located in the local polytechnic or in colleges of higher education franchised for the purpose, this could prove to be an attractive alternative within the UK to the Open University.

Another example is provided by the National Technological University in the USA. Opened in 1984, NTU provides a mechanism to deliver distance courses developed by the engineering departments "of a number of leading US universities to practising engineers working for companies which subscribe to receive NTU's educational services. The average cost per course is highly competitive with the cost which firms would have to pay if they were to release their employees for full-time, on-campus training and professional updating, and is available nationwide." (Fwu et al., 1992).

These models have all the advantages of DMUs, while providing CBUs with the support and expertise of a centralised coordinating body, and a ready-made collaborative framework with which to facilitate the movement of students between participating institutions. They thus enable a CBU to move beyond the limitations of campus-based day and evening part-time programmes, and benefit from the advantages of having a distance taught option, without having to bear the full risk of establishing its own administrative and production facilities in support of the distance programme. A collaborative framework will also help prevent the emergence of an over-fragmented and duplicated provision by a multiplicity of providers, which has been seen by so many Australian commentators as a danger, preventing – so it is claimed – the achievement of economies of scale¹⁶.

These developments, if widespread, would leave DTUs in a vulnerable position. In essence, the strategic dilemma now facing DTUs has been characterised by Ohmae (1983) as one of relative superiority. Although many DTUs appear monolithic, none of them are as large as the combined strength of the CBUs should the latter, or a significant proportion of them, decide to enter the distance market. Moreover, the DTUs ability to compete is made more difficult by the fact that it is competing with the established institutions not in their primary business (on-campus studies) but in a business that they can regard as secondary, or one into which they have moved for the sake of diversification. Thus while DTUs may appear to have a dominant market, they can be undercut by DMUs using marginal costing as a basis for pricing, and outsold by

¹⁶ See, for example, Jevons (1984:33), Campion and Kelly (1988:188, 190-1, 192-3 on the Johnson Report [1983], Hudson Report [1986], and Dawkins Green Paper [1987]), and Johnson (1991: 53).

DMUs using their ability to offer a wider range of courses with a wider range of teaching strategies to the potential students.

Strategic Options in a Competitive Environment

DTUs have a number of options in the face of competition (see Thompson [1990] for a theoretical discussion of the options briefly explored in this section). One option is to do nothing. This, however, is a dangerous strategy when change is required. One thrust of this article is to suggest that this is not an option.

A second option is to concentrate on doing better what one is already doing well. This option, which corresponds to Peters and Waterman's strategy of "sticking to the knitting" (Peters and Waterman, 1982) argues for the continued and profitable growth of the existing products in the same market using existing technologies. But DTUs offering a general degree or, as some do, a very limited number of specialist degrees, will find it difficult to compete with DMUs offering a significantly wider range of broad and specialised degrees, using a wider range of teaching strategies, and aimed at much the same market. In this situation, DTUs need to maintain and improve the quality of their materials in terms of their pedagogy, attractiveness, and packaging (where DTUs have real strengths), and – more significantly – compete locally. DTUs such as the UK Open University already have a local support network which is acknowledged to be better than that which can be offered by providers of small part-time degree programmes (Smith and Saunders, 1991), but they are vulnerable to what local DMUs can do. There is nothing to prevent a CBU committed to part-time higher education, or a DMU, from vigorously pursuing the adult learner. It is thus likely that the excellence of and ease of access to local support services and the ease with which an individual can move between on- and off-campus studies will be major areas in which competitor institutions will seek to establish relative superiority. Unfortunately for DTUs, the former will affect direct student costs, and hence cost-efficiency vis-à-vis DMUs, while the latter is something that can only be done with the express agreement of CBUs or DMUs.

To an extent, DTUs will be able to develop their markets by modifying and extending the range of their existing products. So far as courses are concerned, this will require further investment in course development and modification, and this is, as we have noted, an area in which DTUs are already constrained. Fortunately for DTUs, it seems likely that DMUs will also find the development of distance-teaching versions of their on-campus courses a further burden on the scarce resource of academic staff time. Thus DMUs may also find that they are constrained. However, DMUs working within the framework of a consortia may well get round this limitation.

A more fruitful development for DTUs might be to gain further students by internationalising their business. A number of DTUs (for example, the Universidad Nacional de Educación a Distancia, the FernUniversität, and the UK Open University) and DMUs (e. g. Deakin University, Australia) enrol out-of-country students.

The constraints under which DTUs operate may also limit significant product development – defined here as the substantial modification of or additions to existing products in order to increase market penetration within existing consumer groups. Nevertheless, this will obviously be an option. An example is the UK Open University's development of language courses. DTUs may also make even more extensive,

innovative changes to the products and services which they offer, akin, perhaps, to the UK Open College's switch from a market aimed at individual learners to one aimed at corporate trainers (Innes, 1992) or to a switch from printed and audio-visual materials to electronic media at the point of delivery. While innovation can be risky, those DTUs which are faced by increased competition will need to dissect the market imaginatively in order to identify its key segments and then capitalise on this by concentrating resources on a strategically key function (such as delivery).

In reviewing strategic options, it is important to recognise that any institution may have been led to a position of stagnation or relative decline by adhering to what had earlier constituted the key to success in respect of a given product or market (Ohmae, 1983: 58). For example, one of the strengths of DTUs has been the excellence of their courses, based on the careful development of course materials. A consequence of this has been long development time-scales. But this very strength may constitute a weakness in the face of competitors who provide adequate materials more quickly in response to changing market needs. The point of this remark is not to focus on course development, *per se*, but to argue for a "thorough going challenge to the accepted common sense of the industry" (Ohmae, 1983: 58). However, it remains the case that DMUs can charge only the actual time used on course development to the distance course, while DTUs with full-time academic staff have to charge the full cost of staff time to the development. DTUs could, by moving to a transformer model, in which materials are produced by consultants, reduce the costs of development – but at the certain cost of destroying the community of academics and hence the sense of being a university, and also, probably, at the cost of a reduction in the quality of materials (Rumble, 1988b: 13-20).

A particularly fruitful development for DTUs might be to establish campus-based operations of their own, thus giving themselves some of the strengths of DMUs. Such concentric diversification would hopefully result in synergy between the two businesses, as has happened in Australia with the use of distance materials to teach on campus students.

Other developments could come from acquisition, merger, joint ventures (collaboration and consortia), or franchising. Horizontal integration, involving the acquisition of or merging with a competitor, has not been practised by, though it has occurred in the commercial correspondence field. For example, the UK-based National Extension College has over the years gained business through acquisition and merger¹⁷.

Joint ventures – for example, the sharing of courses in order to reduce the burden of development costs – could also be an important factor. One can see this happening among European DTUs, and also between Australian DMUs¹⁸, though only to a limited extent. Another possibility is the sharing of study centres – as in Düsseldorf where the FernUniversität and UK Open University share facilities. However, DMUs can also play this game by, for example, sharing production and distribution facilities (through ventures such as the National Technological University and the Open Polytechnic) and study centres (as in Australia).

¹⁷ In 1964 NEC acquired a correspondence college, the University Correspondence College, established in 1887 but in the early 1960s in decline. In 1984 it took over, with the agreement of British Telecommunications plc, BT's distance learning Technician Training Scheme.

¹⁸ For example, the Taught Masters in Distance Education programme, jointly developed by Deakin University and the University of South Australia.

One possibility would be for a DTU to offer distance teaching versions of campus-based courses, paying a royalty to the providing institutions. This would give the DTU access to a wider range of courses, acquired at far less cost than would be the case if it had to develop the course itself. The Open Learning Agency's Open University programme in British Columbia, Canada, is a good example. The Agency offers a number of degree level courses drawn from three BC universities (British Columbia, Simon Fraser and Victoria) as well as some of its own courses.

Finally, there are franchising options. Agreements between the UK Open University and a number of institutions around the world for "whole course use" pave the way for full-bodied franchising agreements, in which the franchise might be given exclusive rights to teach the parent institution's courses in a particular area, and be provided with the know-how, material training and advice to enable this to happen, and a one-for-one credit transfer agreement as a mark of quality against a background of quality control.

Many of these strategies – which can of course, be used in combination, can be seen in action among DTUs, DMUs, and CBUs, as they seek competitive advantage. What this article has done is to focus on some of the strengths and vulnerabilities of DTUs, relative to DMUs and, by extension, CBUs. In "conventional", reciprocal, head-on competition, one responds to competitors' price-cuts or new products by price-cuts or new products of one's own. It seems clear that such tactics will not work for DTUs, given their competitive vulnerability. DTUs will need to seek means of protecting their positions and satisfying their users' needs, which are realistic within the resources available, imaginative and synergistic. This final section has pointed towards some of the possibilities open to DTUs. There is no formula for success. There are ways forward, for those creative enough to come up with a winning strategy.

Conclusion

This article has sought to show how many of the DTUs were set up in a competitor-less environment. Not surprisingly, in the absence of competitors, members of planning committees did not look at the potential strength of competition from CBUs which might adopt distance teaching methods. Demographic and social changes have increased the part-time student market, and increasing numbers of CBUs are seeking to exploit the opportunities. One way of doing so is to become a DMU, teaching both on- and off-campus. This may explain why countries with a long tradition of dual-mode teaching have tended not to establish DTUs.

Early studies of the cost advantages showed that DTUs could be more efficient than CBUs, provided they constrained their academic profile, kept direct student costs low, and had large markets. But DMUs, because they could exploit the advantages of marginal costs and hence develop courses cheaper, can provide more varied distance education more cheaply than DTUs. They can also use the materials to lower the costs of their on-campus teaching, thus achieving a synergy between their on- and off-campus programmes. DTUs are thus in a competitively vulnerable position.

While there are a number of strategies which DTUs can adopt, nearly all of them can also be copied by a CBU once it has adopted distance teaching. Thus the most effective response for a DTU may well be to turn itself into a DMU, either by establishing an on-campus programme, or by merging with a CBU.

References

- Campion, M. & Guiton, P. (1991). Economic instrumentalism and integration in Australian External Studies. *Open Learning*, 6 (2), pp. 12-20.
- Campion, M. and Kelly, M. (1988). Integration of external studies and campus-based education in Australian higher education: The myth and the promise. *Distance Education*, 9 (2), pp. 171-201.
- Committee for Television and Radio in Education (TRU Commission) (1975). *Distance education. An outline of the present situation and some organisational alternatives for post-secondary education. Summary of a TRU Commission report (SOU 1975-72)*. Stockholm: TRU.
- COUNA (Comisión Organizadora de la Universidad Nacional Abierta) (1977). *Universidad Nacional Abierta: Proyecto*. Caracas: Universidad Nacional Abierta.
- Daniel, J.S. & Smith, W.A.S. (1979). Opening open universities: the Canadian experience. *Canadian Journal of Higher Education*, 9 (2), pp. 63-74.
- Deakin University (1989). *Further investigations into activity costing in a mixed mode institution*. N. p.: Department of Employment, Education and Training, Commonwealth of Australia.
- de Moor, R. (1983). The planning of an Open University. The case of the Netherlands. *CRE-Information, New Series*, 64 (1983/4), pp. 57-69.
- Dodd, J. & Rumble, G. (1984). Planning new distance teaching universities. *Higher Education*, 13 (1), pp. 231-54.
- Fwu, B-J, Jamison, D., Livingston, R., Oliveira, J., Skewes-Cox, T. & Vanderkelen, B. (1992). *The National Technological University*. In Rumble, G. & Oliveira, J. (eds.), *Vocational education at a distance - international perspectives*. London: Kogan Page.
- Hall, J. W. (1991). *Access through innovation. New colleges for new students*. New York: American Council on Education and Macmillan Publishing Co.
- Hall, P., Lund, H., Parker, R. & Webb, A. (1975). *Change, choice and conflict in social policy*. London: Heinemann.
- Holmberg, B. (1986). *Growth and structure of distance education*. London: Croom Helm.
- Innes, S. (1992). The Open College. In Rumble, G. & Oliveira, J. (eds.) (1992). *Vocational education at a distance: international perspectives*. London: Kogan Page.
- Jevons, F. (1984). Distance education in mixed institutions: working towards parity. *Distance Education*, 5 (1), pp. 24-37.
- Johnson, R. (1991). The reorganisation of Australian distance education: some comments. *Open Learning*, 6 (3), pp. 52-5.
- Karmel, P. (1975). *Open tertiary education in Australia. Report of the Committee on the Future of Tertiary Education in Australia to the Australian Universities Commission*. Canberra: Commonwealth Government Printer.
- Keegan, D. (1990, 2nd edn). *Foundations of Distance Education*. London: Routledge.

- Kim, S. (1985). The role of distance teaching universities in innovations of higher education today. In Korean Council for University Education (ed.) (1985). *Development of Higher Education in Korea*. Seoul: Korean Council for University Education.
- Laidlaw, B. & Layard, R. (1974). Traditional versus Open University teaching methods: a cost comparison. *Higher Education*, 3 (4), pp. 439-68.
- Leslie, J.D. (1979). The University of Waterloo model for distance education. *Canadian Journal of University Continuing Education*, 6, pp. 33-41.
- Muta, H. & Sakamoto, T. (1989). The economics of the University of the Air of Japan revisited. *Higher Education*, 18 (5), pp. 585-611.
- Ohmae, K. (1983). *The mind of the strategist Business planning for competitive advantage*. Harmondsworth: Penguin Books.
- Open University (1972). *The Open University. Report of the Vice Chancellor, January 1969 December 1970*. Milton Keynes: The Open University Press.
- Perry, W. (1976). *Open University. A personal account by the first Vice Chancellor*. Milton Keynes: The Open University Press.
- Peters, O. (1973). *Die didaktische Struktur des Fernunterrichts, Untersuchungen zu einer industrialisierten Form des Lehrens und Lernens*. Weinheim: Beltz.
- Peters, T.J. & Waterman, R. H. (1982). *In search of excellence. Lessons from American best-run companies*. New York: Harper and Row.
- Reddy Committee (1982). *Towards an open learning system. Report of the Committee on the Establishment of an Open University*. Hyderabad: Department of Publications and Press, Osmania University.
- Rumble, G. (1986). *Costing distance education*. London: Commonwealth Secretariat.
- Rumble, G. (1987). Why distance education can be cheaper than conventional education. *Distance Education*, 8 (1), pp. 72-94.
- Rumble, G. (1988a). The economics of mass distance education, *Prospects*, 18 (1), pp. 91-101.
- Rumble, G. (1988b). *The organisation of academic work in distance teaching universities: Do we need new structures?* Hagen: FernUniversität, Zentrales Institut für Fernstudienforschung, ZIFF Papiere 72.
- Rumble, G. & Harry, K. (eds.) (1982). *The distance teaching universities*. London: Croom Helm.
- Siaciwena, R. M. (1983). Problems of managing an external degree programme at the University of Zambia. *Journal of Adult Education (University of Zambia)*, 2 (1), pp. 67-77.
- Siaciwena, R.M.C. (1988). The external degree programme at the University of Zambia. *Prospects*, 18 (2), pp. 199-206.
- Singh, B. (1979). Distance education in developing countries - with special reference to India. In Hakemulder, J.R. (ed.) (1981). *Distance education for development*. Bonn: German Foundation for International Development.

- Smith, D.M. & Saunders, M.R. (1991). *Other routes. Part-time higher education policy*. Buckingham: The Society for Research into Higher Education and the Open University Press.
- Smith, K. C. (1979). External studies at New England - a silver jubilee review, 1955-79. In Sewart, D., Keegan D. & Holmberg, B. (eds.) (1983). *Distance education. International perspectives*. London: Croom Helm.
- Smith, R.C. (n. d. but circa 1985). A comparative study of some performance indicators for a UGC funded university, a polytechnic and the Open University. Mimeo.
- Srisa-an, W. (1987). Financing and cost-effectiveness of distance education. In *Distance Education in Asia and Pacific, Vol. 1*. Manila: Asian Development Bank.
- Taylor, J.C. & White, V.J. (1991). *The evaluation of the cost effectiveness of multi-media mixed-mode teaching and leanings*. Canberra: Australian Government Publishing Service.
- Thompson, J. L. (1990). *Strategic management awareness and change*. London: Chapman and Hall.
- Tight, M. (1986). *Part-time degrees, diplomas and certificates*. Cambridge: Hobson's Choice.
- Tight, M. (1991). The reorganisation of Australian distance education: some comments. *Open Learning*, 6 (3), pp. 53-5.
- Today, M.P. (1989, 4th Edition). *Economic Development in the Third World*. New York: Longman.
- UNDP (United Nations Development Programme) (1978). Open University of Sri Lanka, Project Document. Mimeo.
- Wagner, L. (1975). Television video-tape systems for off-campus education. A cost analysis of SURGE. *Instructional Science*, 4 (2), pp. 315-32.
- Wagner, L. (1977). The economics of the Open University revisited. *Higher Education*, 6 (3), pp. 359-81.
- Wagner, L. (1982). *The economics of educational media*. London: Macmillan.
- Woodley, A. (1981). *The Open University of the United Kingdom*. Amsterdam: European Cultural Foundation.

6. Response to Greville Rumble's Article "The Competitive Vulnerability of Distance Teaching Universities"

Vernon J. White

Vernon White worked at the Distance Education Centre, University of Southern Queensland, Australia. This article was published in 1992 in Open Learning, Vol. 7, No. 3, pp. 59-60, as a response to Greville Rumble's article, "The Competitive Vulnerability of Distance Teaching Universities", Open Learning, 7 (2), 31-49. Further contributions to this debate appear in chapters 7, 8, 9 and 10.

Rumble's paper should bring satisfaction rather than anxiety to distance teaching eulogists. Overriding the concern that the campus based universities (CBUs) may push the distance teaching universities (DTUs) out of their place in the sun, is the tacit admission that the DTUs had it right all the time. The CBUs, having failed to have the DTUs declared *non grata* on the grounds that they propagated a second rate mode of teaching, now wish to put them out of business through legitimate competition. They argued distance teaching was not good enough, now they want to join with it.

Those educators who have not been blinded by the chalk in their eyes now accept that the most significant step forward in education in this half of the century has been the burgeoning of the distance education mode of teaching, and let it be noted that just as significant in this decade will be the mixing of the distance teaching mode with the face to face mode. The inhabitants of the CBUs who successively ignored the distance teaching mode, rejected it, and denigrated it, now have discovered it and embraced it with the fervour of which only the born again are capable. Even the most churlish of the distance educators would have to admit that they have no right to deny their mode of teaching to the reformed heathen for it is difficult to argue against the proposition that any academic institution must have the right to teach using whatever mode or medium it considers best for its students. However, the campus based universities will discover that if they elect to teach in the distance mode as well as face to face they will first have to overcome the hurdle of producing quality multimedia instructional materials including print based, computer based, audio and video based courseware if their efforts are to be taken seriously. If they are capable of doing this, they will then be equipped to move into the distance teaching arena, and the students will be the winners.

The DTUs for their part have little to complain about in the intrusion of the CBUs into their domain. They have had twenty years or more to develop their infrastructure, refine their materials and establish a student support structure. This cannot be done easily or cheaply. The DTUs should have already done it to quality standard and thus have some years start on the CBUs.

Rumble writes of "the potential ability for CBUs to turn conventional lectures into *basic* distance teaching materials at very low marginal cost". One would argue that the cost of turning conventional lectures into *quality* distance teaching materials would be much

higher. Thus CBUs should find it most difficult to compete successfully in the distance education market with a product which the formerly monopolist DTUs have been developing over the years. For the CBUs to compete will be so costly and time consuming on their part as to require a significant redistribution of resources. Herein lies the ultimate weapon which the DTUs can use, if they believe it necessary, to repel the advances of these distance education neophytes. It is called *quality*. Distance educators have spoken at endless conferences and written in numerous journals of their pedagogical advances. This is rightly so as it cannot be denied that distance educators have made great pedagogical progress and have finally enthused (or shamed) the chalk and talkers into moving toward enlightenment also. But now the distance educators, if they are stirred by the Rumbleian exhortation, must move to repel the attack from the CBUs who have resorted to using the very weapons developed by the DTUs. But surely with the lead which the DTUs have, there should not be much to worry about? Their infrastructure, their instructional expertise and their student support structures should be so well advanced that it will take an enormous redirection of resources by the CBUs to challenge them. The DTUs should have the quality advantage and only need to, as Rumble says, "maintain and improve the quality of their materials in terms of pedagogy, attractiveness, packaging and support networks".

Rumble mentions developments in Australia, and indeed the scene here parallels the world situation. In this country there are no DTUs but eight federal government designated dual-mode universities (DMUs). Some DMUs are using the combination of distance education instructional materials plus face to face classes to teach on-campus students, thus bringing together the best of both worlds, and indeed this is the way of the future. The more pioneering of the CBUs are now following in the footsteps of the DMUs and are likewise moving to use distance teaching techniques to support and improve their face to face teaching. Having done this, they may see it as not being a huge step to indulge in some off-campus teaching. It is to be hoped that Australian DMUs will not feel threatened by having their cartel broken up. As on the wider world scene, either the CBUs will have to divert a lot of resources to set up the necessary distance teaching infrastructure or they will market a product of inferior quality. If the latter alternative occurs this will be a sad but short term state of affairs, as the market votes with its feet, and the perpetrators lose. If it is the former, such a decision can only be applauded and (ultimately) all students will be the winners.

It matters little as a final consequence whether the CBUs which begin either to flirt with distance teaching, or enter into a serious relationship, adopt average or marginal costing. These are merely justifications, or otherwise, for funding authorities and academic papers. What matters is the actual cost, and the cost to a CBU of setting up a quality distance teaching, or mixed mode teaching programme will be high.

Rumble correctly says that the per capita student cost of distance education is generally significantly less than off-campus based universities. But distance teaching, like campus based teaching, can be as cheap or as expensive as is wished. Some DTUs in their attempts to become established or to justify their continued existence, found it possible and necessary to teach at a cheaper rate. While in particular situations it can be agreed that this should be the case, it is a mistake to argue this way as a general principle. It is a mistake the DMUs in Australia did not make. They held the line and won the battle for equal funding for on and off campus students. Education may be cheaper in some

distance education institutions than in their on-campus counterparts, but that does not prove the case that it should be. Rumble says of the University of Southern Queensland /USQ costs per (teaching a mixed mode) student could be reduced if necessary by up to 50 per cent. The rejoinder is that the cost of teaching a student totally by conventional on-campus methods could similarly be reduced, and the result in each case would be a loss in quality.

Finally, Rumble's concluding, almost throw away line, that perhaps "the most effective response for a DTU may well be to turn itself into a DMU" should be taken seriously. It will be easier for a DTU with high quality instructional materials to find tutors and teaching space for face to face support teaching, than for CBUs to find the necessary expertise and infrastructure to develop quality multimedia instructional materials and an off-campus student support structure. Rumble's paper is a timely warning for DTUs but is still somewhat disconcerting. Every educational institution should have the right to teach in whatsoever mode and using whatsoever media it wishes. If CBUs have become so enlightened they wish to teach in the distance mode using a multimedia mix, then let us give thanks. The next step forward will be their use of such instructional materials for on-campus students to replace or supplement face to face classes. All the DTUs have to fear is their inability to maintain a superior quality differential, or to find the additional resources or a partner to likewise become a DMU.

7. Response to Greville Rumble's Article "The Competitive Vulnerability of Distance Teaching Universities"

Ian Mugridge

Ian Mugridge worked at the Open Learning Agency, Vancouver, Canada. This article was published in 1992 in Open Learning, Vol. 7, No. 3, pp. 61-2, as a response to Greville Rumble's article, "The Competitive Vulnerability of Distance Teaching Universities", Open Learning, 7 (2), 31-49. Further contributions to this debate appear in chapters 6, 8, 9 and 10.

Three years ago in this journal, Greville Rumble discussed the question of the relationship between open and distance learning and argued that "educational and training systems all fall somewhere on a continuum that ranges from the purely contiguous to the purely distant"; that "many of the approaches used by distance education ... can be used to support classroom teaching"; and that "as a result the divide between contiguous and distance education has become less obvious" (Rumble, 1989). In a response to this piece, I noted that such comments were unarguable (Mugridge, 1989) and the developments that have occurred since have only confirmed this view.

The implication of these comments is that institutions that carry out contiguous education (in Rumble's terminology, campus-based universities or CBUs) and those that undertake distance education (in his term, distance teaching universities or DTUs) will also be subjected to this blurring of the boundaries between what have hitherto been regarded as separate, even competitive forms of education. Certainly, this trend away from a higher education scene¹⁹ in which two opposing or at least sharply different systems of education occupy different parts of the field is one which was clear in 1989 and has only become clearer and more marked since. It is partly this phenomenon which produces the vulnerability of DTUs which Rumble discusses. In this situation, he claims, "DTUs will need to seek means of protecting their positions and satisfying their users' needs which are realistic within the resources available, imaginative and synergistic" (p. 43).

Rumble also discusses several options for newly vulnerable DTUs in meeting the threat to their existence or at least to their place in the educational market (pp. 41-42). These range from doing nothing, the only option rejected out of hand, through concentrating "on doing better what is already being done well" to internationalising, setting up campus-based operations (becoming dual mode institutions, DMUs) or collaboration with CBUs. All of these are – with the exception of the option which he rightly rejects – reasonable choices, courses of action which are being pursued by DTUs around the world. In other words, the final four choices of Rumble's five offer ways in which DTUs may continue to provide a useful and effective service and to preserve or even

¹⁹ In note 9 [to his paper, as published in this volume] Rumble notes that he has throughout used the term university but that college or polytechnic could have been used equally well. My comments are also based on this assumption.

enhance the place which, over the last 20 years or so, they have won on the post-secondary educational scene.

It is perhaps on the first of Rumble's feasible options that one should concentrate. This is the course of working to do better what is already done well. In pursuing this course, some of the major competitive advantages of the DTUs will be brought into play. As Rumble argues, DTUs "need to maintain and improve the quality of their materials in terms of their pedagogy, attractiveness and packaging" and to compete locally where institutions like the UKOU "already have a local support network which is acknowledged to be better than that which can be provided by providers of small degree programmes" (p. 41). These comments are, of course, correct for they do summarise some of the advantages DTUs have in meeting the challenges of the future.

One might, however, question the emphasis being put on the use of such advantages for, in arguing that these advantages can be used in continuing the growing competition with CBUs, Rumble could be influenced too much by the situation of his own institution which is now faced with the entry of increasing numbers of players into a game which it has until recently regarded as its own and thus sees the problem as one of competition rather than collaboration. He could equally well contend, of course, that the argument I am about to make is influenced too much by the situation of my own institution which has never seen the problem in that light.

I would argue that the vulnerability which Rumble rightly sees many DTUs as exhibiting and for which – though he does not argue this they may be partly, even largely to blame should best be answered by abandoning the narrow definition of distance education and concentrating on the wider concept of open learning. In not doing this, it almost seems that Rumble has forgotten the argument he made in the article cited earlier about the position of distance education in the spectrum of approaches to education in general and reverted to the idea that DTUs should follow a narrow and rather exclusive definition of their task. This leads him perhaps to miss part of the point of the situation in which DTUs increasingly find themselves and to draw therefore rather mistaken lessons from it.

The point is that the boundaries between what CBUs and DTUs do really are becoming blurred, that the means available to *both types of institution* to serve different and expanded markets are changing and increasing, that this is happening at a time when demand is expanding and resources are shrinking. This may not be the case in every jurisdiction but it certainly is in every one that I am aware of. In such a situation, the answer for DTUs is to take advantage of the strengths that they have to answer the needs not merely of students and potential students but also of other institutions with whom they should be collaborating rather than competing. The emphasis which most DTUs have placed on quality – in terms of pedagogy and of support for students – and on flexibility – in terms of responding to changing needs and demands – gives them a decided advantage over most CBUs which have, on the whole, been notably unable to break out of the rigidity of the traditional system. In my own jurisdiction, both types of institution increasingly recognise the need for and, what is more important, the possibility of mutual support in meeting the needs of a growing market. This experience may be unusual but it is certainly not unique. The whole point of the exercise becomes collaboration not competition.

The result of such collaboration, proceeding, as it does, from a recognition of the varying strengths of both types of institution, will be a more integrated and effective university system. It may also lead to the increasing abandonment of distinctions between CBUs and DTUs because most institutions will be enabled to “concentrate on doing better what one is already doing well” though now with the support of others. This is presumably what those who expound the concept of open learning have been trying to achieve.

References

- Mugridge, I. (1989). The language of open and distance learning. *Journal of Distance Education*, IV (2), pp. 83-85.
- Rumble, G. (1989). ‘Open learning’, ‘distance learning’, and the misuse of language. *Open Learning*, 4 (2), pp.32-40.

8. The Competitive Advantages of Distance Teaching Universities

Desmond Keegan

This article was published in 1994 in Open Learning, Vol. 9, No. 2, pp. 36-9, as a response to Greville Rumble's article, "The Competitive Vulnerability of Distance Teaching Universities", Open Learning, 7 (2), 31-49. Further contributions to this debate appear in chapters 6, 7, 9 and 10.

At the time of writing Desmond Keegan was working on the European Virtual Classroom Project, University College, Dublin, Ireland.

It is 10 years since Rumble and Keegan analysed the competitive and strategic advantages of distance teaching universities in four chapters of the book *The Distance Teaching Universities* (Rumble and Harry 1982). These chapters served as a framework for case studies of nine of the leading distance teaching universities of the period contained in the book.

In a 1992 article in *Open Learning*, with the title *The competitive vulnerability of distance teaching universities*, Rumble has revised the positions taken up with Keegan a decade earlier and puts forward new views (Rumble, 1992). His article has now been republished for a wider audience in a 1993 volume *Key Issues in Open Learning* (Tait, 1993) and further articles in *Open Learning* by Farnes (1993) and Raggatt (1993) have advanced the discussion. The conclusions reached in Rumble's article are far-reaching, e.g. "the most effective response for a Distance Teaching University (DTU) may well be to turn itself into a Dual Mode University (DMU)".

The section headings of Rumble's article (1992) are followed in this analysis.

Distance Teaching Universities

The author starts by stating that it is surprising that there are relatively few distance teaching universities. A listing of 26 of them is then given in his Table 1. In addition to this listing, Keegan and Rumble (1982) referred to the DTUs in the former USSR, which go back to the 1920s, and to the Téléuniversité in Quebec. The Chinese TV universities of the 1960s, before they were suppressed by Mao's Cultural Revolution, should also be added and what is listed in the recent article as the "Radio and Television University of China" is really a network of 40 DTUs, many of which have enrolments of 40,000 to 50,000 students, with a DTU which does not enrol students, called the CCTVU, as the hub of the network.

Establishing Distance Teaching Universities

In his second section the author asks whether the needs distance universities were founded to meet could have been met in other ways. This is a valid question. The question has to be answered in the negative, however, as far as large distance institutions like the Sukhothai Thammathirat Open University in Thailand or a multi-level distance institution like the CNED in France are concerned. These institutions have no need for conventional

face-to-face students. Where would they put them? Their whole planning mechanisms and cost structures rest on the premise that they do not have to build and maintain buildings for students.

Many nations in the 1990s have needs for universities that can enrol tens or hundreds of thousands of students. The distance teaching university, or a combined distance university and distance training institution is an appropriate model - in many cases the only one.

The Strengths of Distance Teaching Universities

The author gives a listing of the strengths of DTUs including appropriateness for a different form of teaching, the value of focusing on the distance student, the marginalisation of small distance departments in large universities, technological expertise and economies of scale. The list could be lengthened but the query is rather why competition between open universities and distance education departments of conventional universities is set up. These are two groups of providers who need to be seen to be working together to achieve credibility for a field of education that is only just emerging from non-traditional status.

The Economic Vulnerability of DTUs in the Face of DMU Costs

This is the central part of the article and three main arguments are brought forward to support the thesis: (i) experiences in Australia, (ii) “the time and effort needed to produce one course” and (iii) “DTUs cannot provide the full range of subjects”. To these five tables are added.

Rumble correctly recounts the proliferation of small external studies departments in Australian colleges and universities in the 1970s and 1980s and their closure in 1989 by Dawkins and Johnson (Johnson, 1991). He does not, however, explain that this model, which he calls DMUs, was stopped by the Australian government because of its economic vulnerability. The position at 31 December 1988 is given in Table 1 from official Australian government sources.

Table 1: Distance education provision at higher education level in Australia 1988

Universities		
Name	State	Enrolment
Curtin University of Technology (WAIT)	WA	824
Deakin University	VIC	4087
James Cook University	QLD	399
Macquarie University	NSW	1220
Murdoch University	WA	1415
University of New England	NSW	5980
University of New South Wales	NSW	543
University of Queensland	QLD	1686
Wollongong University	NSW	637

Colleges		
Armidale CAE	NSW	1294
Brisbane CAE	QLD	1294
Capricornia LAE	QLD	2225
Darling Downs IAE	QLD	4090
Gippsland IAE	VIC	2391
Hawkesbury Agricultural College	NSW	366
Hunter IHE	NSW	675
Mitchell CAE	NSW	3337
Orange Agricultural College	NSW	540
Riverina Murray LAE	VIC	3842
Royal Melbourne Institute of Technology	VIC	491
South Australian CAE	SA	3161
Tasmanian State IT	TAS	597
Western Australian CAE	WA	1530
Warmambool CAE	VIC	1575

22 other universities or colleges are listed with external enrolments.

Source: Higher Education Statistical Collection, DEET, Canberra, 1989.

There are 46 colleges or universities listed but for the sake of brevity the last 22, with enrolments of 300 or less in 1988, are omitted here. The problem is that there is a danger of either providing shoestring distance education services, and the author notes the “ability for a university to turn conventional lectures into basic distance teaching materials at very low marginal costs” (Rumble, 1992: 38), or the costs of DMUs to the taxpayer becomes unacceptable. How does one provide 46 instructional design teams of quality, 46 distance education management teams, graphic artists, pre-printing facilities, studio facilities for audio or video and student support systems, even if funding is made available for some of these services to be contracted out? Dawkins’ decisions led to some institutions like the University of Queensland, which has just closed its external studies provision, opting out of distance education and he amalgamated the rest into eight Distance Education Centres (DECs), a system which is also now in review.

The second argument “the time and effort needed to produce a course” has also been taken up by Farnes (1993) and Raggatt (1993). Rumble has written elsewhere (Rumble, 1988) of problems of productivity with full-time tenured academics at open universities. This, however, is a management problem, not a reason for challenging the concept of an open university. What needs to be done is to set up a desktop publishing system, give each academic a Mac, remind them of their reputation for the design of successful distance education courses and the expertise available within the institution in everything from the design of computer-based assignments to multi-media production solutions. *Per se* there is no reason why an open university cannot produce a course as quickly as a consultancy structure.

The final argument proposes that an open university cannot provide a full range of subjects. This conclusion also needs to be reconsidered. Ilyin of the USSR Economics DTU (Ilyin, 1983) pointed out that his university and the other USSR DTUs had been

providing specialised honours degrees and doctorates at a distance for decades. It can be one of the *strengths* of a DTU that the expertise is available within the institution to produce courses at different levels and that, for example, the science department can develop a Physics course at high-school graduation level or at teacher training level or a BSc or an MSc or a doctoral course in Physics. Another of the strengths of a DTU is that the same instructional designers, graphic artists, media specialists and study centre organisers can work on a full range of subjects at different levels.

Conclusion

In 1982 Keegan and Rumble came to the following conclusions on the feasibility of founding a DTU or of giving preference to a distance education department of a conventional university (DMU):

- The costs associated with the establishment of an infrastructure for a DTU and the preparation of sufficient course materials to support a degree programme are high, and require a guaranteed annual volume of student enrolments if the system is to be cost efficient.
- If sufficient numbers of students cannot be guaranteed, a mixed system is preferable.
- The number of students at which an autonomous DTU becomes more efficient than a mixed-mode institution depends on the choice of media, the extent of student support services, and the number of courses on offer, as well as the costs of conventional university education in the country concerned. It lies at least in the range of 9,000 to 22,000 enrolments a year (Keegan and Rumble, 1982: 245-246).

The 1982 conclusions gave practical guidelines to government planners and distance education administrators in the developed and developing world, especially those who need to provide for many tens of thousands of students and appear to be still valid and unaffected by the recent article.

Reduced to their simplest terms the guidelines of a decade ago read: if one is setting up a distance system which is forecast to enrol less than 9,000 students a year one opts for a distance education department of an existing university (termed a DMU by Rumble). If an enrolment of over 22,000 students a year can be guaranteed one opts for a specialist distance education institution at which the staff will be able to concentrate on developing distance education courses, teaching students at a distance and their research – without having the complexity of having to try to cope with a fourth area of activity: lecturing face-to-face students at the same time. The best presentation of how difficult it can be for lecturers to do all the four academic functions of conventional and distance teaching at a high level at the same time is probably that provided by Shott (1983). Only one production and student support facility is set up, not a series of mini-production and mini-student support services. The figures provided by Keegan and Rumble are clearly approximate, and there is an ample area in between the guidelines chosen, in which the planning decision can go either way.

Co-operation between open universities and distance education departments of conventional universities in the pursuit of excellence and in the elimination of under-resourced programmes is the way forward for this field rather than insistence on competition. For over 100 years before the founding of the Open University of the

United Kingdom at Milton Keynes in 1970 and the series of other open universities which followed, the status of distance education, both at correspondence schools and in university departments, was fragile and often the subject of harsh criticism. Few nations allowed a university degree to be gained completely at a distance. The achievements of the open universities brought new status to this field and in the years since 1970 academic credibility for university degrees at a distance has been won, or nearly won, with vast benefits for correspondence schools, university distance education providers, open learning structures and globalised distance programmes. The range of technologies that are already developed and are coming on stream in the period 1995-2000 (universal mobile telephony, universal personal telephony, satellite virtual classrooms, fibre-to-the-local-loop or to the curb or to the home, two-way video codec systems, computer designed individualised courses) will require a professionalism from the distance educator that it would be unfair to expect from those whose focus is the students who come to study at universities.

A quick glance at the world of educational provision shows further examples of the competitive advantages of DTUs. The Spanish DTU, for example, is forecasting an enrolment of 130,000 for next year after an enrolment of 122,781 last year. The German DTU is grappling with 60,000 students in 1993, due to rising German unemployment, after an enrolment in the 40,000s in recent years. Rumble does not indicate which DMUs are meant to be threatening them.

It should not be imagined that what is said here puts forward the open university or the DTU as an ideal model. Clearly below a certain annual volume of students one would not found a DTU. Even when the annual figure is achievable, education planners should look rather to the French CNED model. Now in its 54th year and with 350,000 students in 107 countries in 1993 it is a well-tried model and probably Europe's largest educational provision by a government. Among the strengths of this model are the government commitment to distance education and training at all levels, the professional skills of production staff available for courses at all levels, full-time distance education specialists who concentrate on the development of courses and teaching of students at a distance over a range of levels: children's schooling, high school graduation, technical and professional qualifications of all kinds, teaching training, university level courses and post-graduate courses. Most of the world's DTUs recognise this by providing distance training courses in addition to degrees at a distance.

References

- Farnes, N. (1993). Modes of production: Fordism and distance education, *Open Learning*, 8 (1), pp. 10-20.
- Ilyn, V. (1983). The USSR Financial and Economic Institute for Distance Education and its role in the provision of economic and finance education in the USSR today. *Distance Education*, 4 (1), pp. 142-151.
- Johnson, R. (1991). Where do we go from here? In R. Atkinson et al. (eds.), *Quality in distance education*. Bathhurst: ASPESA.
- Keegan, D., & Rumble, G. (1982). The DTUs: an appraisal. In G. Rumble & K. Harry (eds.). *The Distance Teaching Universities*. London: Croom Helm.

- Raggatt, P. (1993). Post-Fordism and distance education - a flexible strategy for change. *Open Learning*, 8 (1), pp. 21-31.
- Rumble, G. (1988). The organisation of academic work in distance teaching universities: Do we need new structures? *ZIFF Papiere 72*. Hagen: FernUniversität.
- Rumble, G. (1992). The competitive vulnerability of distance teaching universities. *Open Learning*, June, pp.31-45.
- Rumble, G., & Harry, K. (1982). *The Distance Teaching Universities*. London: Croorn Helm.
- Shott, M. (1983). External studies in Australia at the crossroads? *ASPESA Newsletter*, 9(2), 2-9.
- Tait, A. (1993). Key Issues. In A. Tait (ed.), *Open Learning - a reader*. London: Longman.

9. The Competitive Vulnerability of Distance Teaching Universities: A Reply

This article was published in 1994 in Open Learning, Vol. 9, No. 3, pp. 47-9, as a response to the debate engendered by my article, "The Competitive Vulnerability of Distance Teaching Universities", Open Learning, 7 (2), 31-49. The original article appears in Chapter 5. Further contributions to this debate appear in chapters 6, 7, 8 and 10.

In my article (Rumble, 1992) I sought to draw attention to the vulnerability of distance teaching universities (DTUs) to competition from campus-based universities (CBUs) which were beginning to use distance teaching methods. Here I respond to those who have commented on it (Keegan, 1994; Mugridge, 1992; White, 1992), identifying both common ground and continued disagreement.

First, one imperative for change is the search for improved productivity, consequent upon the adoption of revised working methods and technologies. Hamilton (1989: 98-109) and Sewart (1992: 230-4) have pointed to the improved productivity in 19th century schools and 20th century universities arising from the change from individualised instruction to batch (i.e. class) teaching. There is a limit to the productivity gains that can be achieved by increasing class size, but the adoption of resource-based and open learning methods by schools and universities has enabled further productivity gains. DTUs, by showing what can be achieved by independent learners, have been a major catalyst for these developments. Their methods are being adopted (and adapted) by campus-based universities in response to the imperative to achieve greater efficiency, as the recent report of the Committee of Scottish University Principals (1993) makes clear. This is eroding the differences between distance and traditional institutions (White, 1992: 59; Mugridge, 1992: 61). Once an institution has developed learning materials to support its on-campus teaching, it makes sense to use them to teach off-campus students. Many institutions are now doing this. Because they are developing the materials anyway, to lower their on-campus costs, the marginal additional costs of adding on a few distance education students is not so great, and can be covered by increased income. In the process, of course, these institutions become dual-mode institutions and direct competitors to DTUs.

Second, although DTUs start from a strong position (White, 1992: 59-60), their position can quickly be eroded. It is true that they have an expertise which CBUs seeking to enter the field find it hard to match, but there are signs that this lead is being eroded. The University of Sunderland has recently advertised for a Learning Development Services Manager who will inspire academic staff to use resource-based learning to support autonomous learners. Professor Jack Stockman (Stockman, 1993) at California State University talks of emerging teams of academics at universities who are able to exploit the new media effectively. Although CBUs often find it difficult to finance the development of distance teaching and open learning materials, many institutions entering this field manage to produce open learning materials at a fraction of the cost of DTUs.

Third, while the quantity of what CBUs are doing may not match that of the best DTUs, many would-be students choose courses on the basis of price and the credentialing

power of an institution's name, rather than on the quality of their materials. Funding agencies may also look at the unit cost rather than the quality of programmes, so I disagree with White (p. 60) that *all* the DTUs have to fear is their inability to maintain a superior quality.

These developments have opened up the possibility of competition. I accept Mugridge's contention (p. 61) that my article was informed by the position the UK Open University finds itself in, but it is surely foolhardy to suggest that just because some institutions (Keegan refers to the German and Spanish DTUs) currently do not face competition, they will not be vulnerable to competition should it arise. Ten years ago nobody in the UK Open University thought that there was a serious threat to its hegemony. Now we know better. Equally, while DTUs operating in societies where demand exceeds the number of places at traditional universities (Keegan mentions the Thai DTU) are in a strong position at present, their markets could be eroded if traditional universities begin to offer distance programmes.

In Australia, of course, the government stepped in to curb competition. Keegan (p. 37) argues that this was because the proliferation of small distance teaching programmes did not make economic sense – but from whose point of view? The individual institutions found that they could develop off-campus programmes relatively cheaply. They were competitors to the larger off-campus programmes and, by attracting students away from those programmes, effectively weakened them too. From the viewpoint of a central planning authority, this was clearly undesirable – hence the attempts to regulate competition. But from the point of view of the individual institutions developing these programmes, curbing their right to enter the distance education market prevents them from making the best use of learning resources which they need to develop in any case in order to improve the productivity of their on-campus businesses – a point also recognised by Campion and Guiton (1991: 19). From such a point of view, the Australian policy is extremely short sighted. It is not even necessarily the most cost-efficient policy, as I pointed out (Rumble, 1992: 38-40).

Both Mugridge (p. 62) and Keegan (p. 38) make a plea for collaboration rather than competition. Intuitively collaboration is intensely attractive, and there are aspects of collaboration – for example, mutual recognition of credit, that are highly desirable from the students' point of view. The really interesting question is whether campus-based institutions should not buy-in courses from DTUs, rather than develop their own materials. Robertshaw (1993: 11) reports that the overall costs of imported courses at the Hong Kong Open Learning Institute is no more expensive than the cost of developing courses in-house – but it is not cheaper either. Curran (1994: 3) has reported that at the National Distance Education Centre in Ireland, it is more cost-effective to develop a course in-house than to buy it in if more than 123 students (a relatively low number) are likely to take it. Buying in materials under a license which prevents the importing institution from using the materials to develop an off-campus programme in direct competition to the providing institution prevents any benefit from diversifying into new markets. In addition, institutions which do buy-in courses often find that the courses are not always tailored to their needs.

We also know that it can cost very little to develop an open or distance-based version of a traditional campus-based course, as the experience of the National Technological University in the USA shows (Fwu et al, 1992). Sharratt (1993: 119) also reports that

the cost of developing open learning courses is less for mixed-mode than for wholly distance teaching institutions.

Given these factors, collaboration may not be seen to be desirable. The advantages may well lie with competition. Experience in the UK suggests that this is the case. The number of distance education programmes is proliferating, and with it the competitive threat to the Open University.

Indeed, we can stand Keegan's statement (p. 38) that it makes sense to develop a DTU where there are more than from 9,000 to 22,000 students on its head. It seems reasonable to say that it makes no sense at all to develop a DTU where the total market is very small²⁰ – but it does not follow that the reverse is true. If most CBUs have developed open learning and resource based learning to teach on-campus students, then it may make no sense at all to develop a DTU. This does not mean that there are no circumstances where DTUs are worth developing. However, DTUs that find CBUs beginning to compete will find themselves in a vulnerable position, and their best defence is, in my view, to convert themselves into mixed-mode institutions which use open and resource-based learning methods to teach students on- and off-campus.

References

- Campion, M. & Guiton, P. (1991). Economic instrumentalism and integration in Australian External Studies. *Open Learning*, 6 (2), pp. 12-20.
- Committee of Scottish University Principals (1992). *Teaching and learning in an expanding higher education system*. Edinburgh: CSUP.
- Curran, C. (1993). Scale, cost and quality in small distance teaching universities. In Siggard Jensen, H. & Siggard Jensen, S. (eds.), *Organization, technology and economics of education. Proceedings of the COSTEL Workshop, Copenhagen, 11-12 January 1993*. Copenhagen: n.p..
- Fwu, B.-j., Jamison, D., Livingston, R., Oliveira, J., Skewes-Cox, T., & VanderKelen, B. (1992). The National Technological University. In Rumble, G. and Oliveira, J. (eds.), *Vocational education at a distance: International perspectives*. London: Kogan Page.
- Hamilton, D. (1989). *Towards a theory of schooling*. London: The Falmer Press.
- Keegan, D. (1994). The competitive advantages of distance teaching universities. *Open Learning*, 9 (2), pp. 36-9.
- Mugridge, I. (1992). Response to Greville Rumble's article 'The competitive vulnerability of distance teaching universities'. *Open Learning*, 7 (3), pp. 61-2.
- Robertshaw, M. (1993). The importation and adaptation of distance education courses: is it an expensive option? In Asian Association of Open Universities, *Economics of distance education. AAOU VIIth Annual Conference 1993*. Hong Kong: Open Learning Institute of Hong Kong.

²⁰ Though of course it might be sensible to develop a single programme aimed at a niche market – and it is the proliferation of such programmes aimed at profitable niche markets that undermines the viability of DTUs in the long term, by eroding the efficiency of their money-making subjects and hence making it increasingly difficult for them to cross-subsidise less popular subjects. [GR 2003]

- Rumble, G. (1992). The competitive vulnerability of distance teaching universities. *Open Learning*, 7 (2), pp. 31-49.
- Sewart, D. (1992). Mass higher education. Where are we going? In G. E. Ortner, Graff, K. & Wilmersdoerfer, H. (eds.). *Distance education as two-way communication*. Frankfurt-am-Main: Peter Lang.
- Sharratt, R. (1993). Costing of open and distance learning (ODL) – is it worth it? In Asian Association of Open Universities, *Economics of distance education. AAOU VIIth Annual Conference 1993*. Hong Kong: Open Learning Institute.
- Stockman, J. (1993). Cited in MacLeod, D. (1993). Meet my professor, the movie star. *The Independent*, 28 January 1993, p. 16.
- White, V. J. (1992). Response to Greville Rumble's article 'The competitive vulnerability of distance teaching universities'. *Open Learning*, 7 (3), pp. 59-60.

10. Competitive Vulnerability: An Addendum to the Debate

This chapter is extracted from Greville Rumble, "The Costs and Economics of Open and Distance Learning: Methodological and Policy Issues: Volume 1: Introduction to the Published Work", submitted for the degree of Doctor of Philosophy by Published Work, The Open University, July 1998, pp. 96-108.

For policy makers intent on reducing the costs of education, the question most frequently asked is whether distance education is cheaper than traditional forms of education. Given the question, it is perhaps not surprising that the normal comparison in the literature is that between the costs of distance learning systems and those of traditional institutions (c.f. Wagner, 1972, 1977; Laidlaw and Layard, 1974; Rumble, 1981; Muta and Sakamoto, 1989; Muta and Saito, 1993, 1994). However, is this the only comparison that should be made? Over the years I have come to the conclusion that those looking at the costs of distance education relative to other approaches have generally failed to address the costs of "hybrid" systems - that is, "mixed-mode" or "dual-mode" systems that teach both by distance and traditional means.

A difficulty in making comparisons between the costs of "pure" distance education systems (often referred to as "single-mode institutions") and the costs of technology- and distance-education-based systems embedded in traditional institutions is the lack of cost data. MacKenzie, Postgate and Scupham (1975: 80) identified this issue in the early 1970s without seeing it as problematic:

"Some systems preclude separate costing. Institutions like the Chicago Junior College and the distance-teaching centres of Eastern France aim primarily at the extension to an extramural audience in a largely unmodified form of courses already prepared for their internal students. In such instances it is not customary, and would be largely arbitrary, to apportion part of the cost of course development and maintenance to the external operation.

Institutions like the Australian universities, which exist primarily to serve their internal students but which offer external degrees and devote some of the energies of their staffs to the preparation of correspondence courses, also find it impracticable to arrive at a realistic division of costs between the two overlapping activities."

I believe that such a view is short-sighted because management can neither cost nor price courses adequately. Over the years, however, a relatively small number of studies have appeared which compare the costs of distance and lecture-based provision *within* mixed-mode provision (for example, Wagner, 1975; Sharma, 1983; Deakin University, 1989; Taylor and White, 1991; Ansari, 1992; Makau, 1993; Cumming and Olaloku, 1993). These suggest that mixed-mode institutions may in fact achieve even lower costs per students than do distance teaching institutions (see Rumble, 1997: 152-9) - a point also suggested by Hallak (1990: 200) who commented that while "data concerning costs in dual-mode institutions are insufficient to draw valid conclusions ... this would appear to be a promising solution [to the problem of educational costs]", and by Renwick (1996: 59-60) who suggests that traditional universities adopting dual-mode approaches may have an edge on single-mode distance education because "they already offer a wide range of degrees and qualifications that rival open universities, could diversify at less cost, would

not necessarily have to rely on large numbers of enrolments to be viable as providers of distance programmes, and could offer a wider range of options to potential students". Whether this is actually the case or not is as yet unclear. The Committee of Scottish University Principals (1992: 34-9, 41) found it impossible to come to a conclusion, as did Scott (1997) in his review of cost studies of the use of information technology assisted teaching and learning. However, it was the conviction that traditional institutions within the United Kingdom were not only adopting distance education methods but also undercutting the Open University's prices (as reflected in the level of fees charged to students) that led me to write an article (Rumble, 1992) that focused on the competitive vulnerability of institutions such as the Open University when faced by such developments.

In the mid-1970s Wagner (1975) had shown that campus-based universities could teach courses at a distance very cheaply by re-engineering their lecture courses into video-based formats (in effect, a by-product) suitable for off-campus teaching. However, the idea that re-engineering traditional higher education and making it more flexible might provide an even cheaper way of expanding higher education than by setting up single-mode distance education systems was not explored until quite recently. Partly this was because all Wagner had shown was that the additional costs of creating off-campus video-based teaching materials were very low. The cost of on-campus provision remained high. It seemed clear, though, that *if* traditional institutions could teach off-campus students more cheaply than could a distance teaching university, then they could also use similar resource-based teaching methods to teach their on-campus students, thus reducing their overall costs.

The massification of higher education and the reduction in the unit of funding were the catalysts that forced higher education institutions to bring down their costs by re-engineering their teaching processes. Evidence of the effect of this on costs emerged in a study by Taylor and White (1991), who compared the costs of (a) traditional on-campus lecture courses, (b) off-campus distance-based courses, and (c) on-campus re-engineered flexible learning courses at the University College of Southern Queensland. They provided enough information to suggest how institutions adopting flexible learning for on- and off-campus students might teach a wider curriculum more cheaply than a single-mode distance teaching institution. I explored this idea in Rumble (1992) where I defined three kinds of universities:

- those that teach only on-campus by traditional face-to-face means (which I referred to as *campus-based universities* or CBUs)
- those that teach only by distance means to students wherever they live (called *distance teaching universities* or DTUs)
- those that teach both on-campus by traditional means and off-campus by distance means (called *dual-mode universities* or DMUs).

In this article I sought to show that one of the strengths of DMUs is that they have distinct but often unrecognised economic advantages over DTUs. This contention was based on experience in Australia (Taylor and White, 1991) that suggested that DMUs can provide a broad curriculum comparatively cheaply to both on-campus students using traditional means of study, and to off-campus students studying by distance means. In this they differ from DTUs, which can find it very difficult to provide a wide curriculum without jeopardising their cost advantage (c.f. Rumble, 1982: 136-7; 1987: 82-4; 1988a: 97-8).

Some of the advantages of DMUs derive from accounting practices that allow costs to be allocated to the different on- and off-campus courses (products) in different ways - thus enabling the price charged to students to be modified at will (c.f. also, Rumble, 1997: 72-3). However, their real advantage stems from the fact that campus-based courses can be adapted for distance teaching purposes very cheaply, so that DMUs can often offer a wider choice of cheaper courses in distance format than can a DTU.

Furthermore, in order to contain the costs of their on-campus teaching, more and more CBUs are beginning to develop flexible and resource based learning materials to teach their normal on-campus students. Once they have done this, they recognise that they can use the materials off-campus to gain a share of the distant-student market. They are becoming new competitors to the DTUs by, in effect, turning themselves into DMUs. DTUs are thus facing very significant competition for the first time. If widespread, this could put DTUs in a very vulnerable position. Although they appear monolithic, none of them is as large as the combined strength of the CBUs. If a large number of CBUs decide to enter the distance market, DTUs will face multiple competitors competing in their own secondary (off-campus) market for the DTU's primary off-campus business. Ohmae (1983: 52) had shown how vulnerable such a position could be. DTUs can be undercut by the newly emergent DMUs using marginal costing as a basis of pricing, and outsold by the DMUs ability to offer a wider range of courses through a wide range of teaching strategies.

DTUs faced by such competition have several options: (1) to do nothing; (2) to concentrate on doing what they do well - "sticking to the knitting" and focusing on quality, in the knowledge that the newly emergent DMUs will find it hard to fund entry into the market (which requires diverting staff to new tasks while maintaining the old ones) and to match quality; and (3) to internationalise, seeking markets abroad. However, DTUs may also find it difficult to develop new products and to change their products rapidly, so another option (4) might be to buy the right to teach CBU courses in off-campus distance mode (through a licensing or franchise arrangement). What DTUs will find it hard to do is (5) to respond to competition head on, by developing new products (lead-in times for material development are too long) and by price-cutting. While there are a number of strategies, the best, though, might be (6) to turn themselves into a DMU by establishing an on-campus programme or by merging with a CBU.

The Editor of *Open Learning* invited formal responses to the article from White (1992), Mugridge (1992) and Keegan (1994), and, subsequently, I was invited to reply to my critics (Rumble, 1994a). In his response to the article, White (1992: 59) held that the most significant step forward in teaching has been the growth of distance education - so much so that CBUs are now embracing it. However, CBUs will have to learn how to produce quality material. Indeed they should find it difficult to compete successfully in the distance education market because it is costly and time consuming to develop quality learning materials. The DTUs main strength is the quality of their products and, given their lead, they should have little to worry about, particularly as distance teaching methods can be as cheap or as expensive as one wishes to make them. However, it would be a mistake to cheapen methods at the expense of quality (p. 60). Rumble's comment that one way forward for DTUs is to turn themselves into DMUs should be taken seriously. What DTUs must most fear is their inability to maintain "a superior

quality differential, or to find the additional resources or a partner to likewise become a DMU” (p. 60).

Mugridge (1992: 61) says the divide between distance and face-to-face teaching has become less sharp. He agreed that the emergence of DMUs has made DTUs vulnerable. Of all the feasible options presented by Rumble (1), doing nothing, is rightly rejected. The option of doing what they do well, better, is perhaps the one to concentrate on. But DTUs should not be too narrow in their definition of what distance education is: instead of competing with CBUs, they should use their strengths to collaborate. Their quality gives them a decided advantage over many CBUs - and they could bring this to a collaborative partnership with CBUs.

Keegan (1994: 36) perceives the radicalism of some of Rumble’s suggestions (for example, that DTUs should become DMUs). Why is the model a competitive one, however? CBUs and DTUs need to work together. He argues that the free market development of DMUs was stopped in Australia on economic grounds, and because there are dangers in providing shoestring distance education services. The cost of improving the quality of such provision would have been too great, hence the Australian decision to concentrate distance education in a few institutions (p. 37). Some of the weaknesses of distance teaching universities referred to by Rumble (e.g. their ability to produce courses quickly) can be solved (p. 38). Equally, there are distance teaching universities with a full range of subjects. A decade ago Keegan and Rumble (1982: 246) suggested that the number of students at which a DTU would become more cost-efficient than a CBU was somewhere between 9,000 and 22,000 students - so that where a system is likely to enrol under 9000 students, a CBU is the cheapest option; where the enrolment is likely to be more than 22,000, a DTU is the cheapest option. The DMU option is difficult - because staff find it hard to work in traditional and distance modes at the same time. This 1982 guideline gave practical advice to government planners and distance education administrators. The most fruitful way forward is for DTUs and CBUs to co-operate.

In my response to White, Mugridge and Keegan, I argued that the imperative for change is the search for improved productivity (Rumble, 1994a). The DTUs have acted as a catalyst and their methods are now being adopted by CBUs. Although DTUs start from a strong position (as White suggests), their position can be eroded rapidly as more and more CBUs enter their market. The fact that DMUs may not match the DTUs’ quality is not necessarily the point: students will follow the credentialling power of a university’s name, and funding will follow students. Quality is not the only factor of importance. These developments have opened up the possibility of competition. The fact that competition does not exist now for some DTUs does not mean that it will not in the future. True, the Australian government stepped in to curb competition because they saw it as unacceptable - but this was the government’s view. Individual institutions saw every reason to enter the distance education market, both to gain a share of that market and to develop materials that would allow them to reduce their on-campus costs. [Interestingly, this suggestion is borne out by the fact that by 1998 the attempt to curb entry into the distance market had clearly failed.] Collaboration, which Mugridge and Keegan urge, is inherently attractive, but many CBUs/DMUs have found it costly to buy-in materials, and indeed cheaper to develop their own (Curran, 1993: 21; Robertshaw, 1993), so collaboration may not be that attractive to CBUs. The advantage may well lie with

competition. So while it makes no sense at all to develop a DTU where enrolments are likely to be low, it does not follow that it is sensible to do so just because enrolments are likely to be high. This does not mean that it is never a sensible option. DTUs faced by competition from DMUs would do best to convert themselves into DMUs.

Commenting on Rumble (1992), Bell and Tight (1993: 138) pointed out that:

“Innovation is, of course, far from easy and inevitably constrained by circumstances. It would have been unreasonable, therefore, to have expected a greater move away from the then conventional patterns at the time when the Open University was established. Yet it has been disappointing to observe how little the University has developed from its original structure, and to note how restrictive this has become.

It is reassuring, then, to see that some senior staff at the Open University are beginning to appreciate the competitive vulnerability of their position in the market (Rumble, 1992). This has become particularly apparent as alternative, cheaper and more flexible models of distance education and open learning have been developed; and as conventional institutions have increasingly moved into the market sector which had hitherto been occupied in the United Kingdom by the Open University alone.”

Evans and Nation (1993: 211, 214 *passim*) also discussed the article and concluded:

“Despite their capacity to develop and deliver high quality courses in a cost-effective manner and to concentrate exclusively upon the needs of part-time students, distance teaching universities (DTUs) cannot compete effectively against dual-mode universities (DMUs). The latter have advantages in the flexibility of their teaching strategies and the wider range of courses they can offer (Rumble, 1992: 33-5). To the surprise of some, no doubt, Rumble’s detailed economic analysis suggests that the DMUs can achieve more cost-efficiencies than their distance teaching counterparts (pp. 35 - 40). His conclusions have stark implications for the latter: ‘... the most effective response for a DTU may well be to turn itself into a DMU, either by establishing an on-campus programme, or by merging with a CBU [campus-based university]’ (Rumble, 1992: 43). ...

If Rumble is right, there may be many distance teaching universities throughout the world looking for collaborative business with dual-mode and campus-based universities (1992: 40-43).”

Moore and Kearsley (1996: 235) summarise the article’s impact as follows:

“Rumble (1992) ... explains that dedicated distance learning institutions are the most cost-effective way to provide distance education as long as they offer relatively few courses to large numbers of students. However, as the number of courses offered increases and the student enrolment per course becomes smaller, the economy of scale that favoured the [single mode] institutional model breaks down. ... What Rumble suggests is likely to happen is an increasing convergence (and perhaps some actual mergers) between distance education and traditional ‘classroom-based’ institutions.”

Daniel (1996: 32) poses the challenge of the article as follows:

“Now that all universities are exploring the possibility of teaching at a distance some argue that large institutions dedicated solely to distance teaching are no longer necessary. Others argue that because of their size and their commitment to industrial methods the mega-universities will not be nimble enough to survive in a post industrial age. Since this claim has been made by people with direct experience of mega-universities (Bates, 1995: 242; Raggatt, 1993; Rumble, 1992) some people now expect the eventual demise of the mega-universities. This chapter may assist judgements about their likely longevity.”

Elsewhere Daniel (1996: 68) approvingly cites Keegan’s (1994) defence of the competitive advantages of distance teaching universities and in particular his view that their size is a competitive advantage, and he then goes on himself to analyse where size will be an asset to the mega-universities as they adapt to a new generation of technologies. Daniel’s contention is that the eleven mega-universities, as a group, enrol 2.8 million students at an average institutional cost per student that is at most half that of the combined 182 higher education institutions in the UK (about \$10,000 per student with 1.6 million students) or the 3,500 institution US higher education system (about \$12,500 with some 14 million students) (Daniel, 1996: 32; 1998). This, however, compares the “mega-university” system with systems that are still, in the main, highly traditional in their teaching methods. If the traditional system were to be fully re-engineered, adopting open and flexible learning methods to teach off-campus and on-campus students in significant numbers by these means, the comparison might be somewhat different. Until such times as proper cost studies are undertaken, all we have is opinion. In the absence of proper research to inform decision makers, the better option is scepticism.

Two questions remain: the first is why there have not been more comparisons between the costs of distance teaching institutions and the costs achievable in mixed-mode institutions. One reason is hinted at the beginning of this section, and borne out by my own research into the costing of mixed-mode provision (c.f. Rumble, 1997: 66-70), and that is the difficulty institutions have had in separating out their costs (see MacKenzie, Postgate and Scupham, 1975: 80). This difficulty arises not least because of the absence of activity based costing in mixed-mode institutions. Over and beyond this, I suggest that those working in distance education consciously or unconsciously have set up a dualism between distance education and traditional forms of education that precludes consideration of mixed-mode provision. There are a number of reasons for this dualism (Rumble, 1994b):

- First, in the 1970s and 1980s, when distance educators were beginning to articulate a theory of teaching at a distance, it was fairly easy to draw a sharp distinction between distance education and traditional face-to-face teaching. Distance education was “mediated” in a way that traditional education was not. The growth of resource-based learning and independent study has tended to remove this division.
- Second, there was a search for a theoretical basis for the separation between distance education and face-to-face teaching. Keegan (1986: 6), one of the seminal thinkers in the field, argued that “distance education is a coherent and distinct field of educational endeavour”. He called for the development of a “firmly-based theory of distance education. something that ... gives the foundation on which structures of need, purpose and administration can be erected which can provide the touchstone

against which decisions - political, financial, educational, social - can be taken with confidence"; Holmberg (1986; 1989: 205-9; 1995: 207-13) suggested that distance education is a discipline in its own right - a view that I and others have criticised (Rumble, 1988b; Bell and Tight, 1993: 6). I also suggested that the search for a theoretical basis for separation was the result of deep insecurity about the status of distance education (Rumble, 1994b). Keegan (1986: 3), for example, refers to the long "Cinderella" status of distance education which had set distance education apart from traditional education. The growth in confidence among distance educators, and the search for a theory that would set distance education apart from traditional education, ultimately reinforced the tendency to separatism. Several reasons might be adduced for this: for example, that distance educators continue to occupy a "laager" position, in which they feel themselves to be isolated from other disciplines and subject areas, including mainstream educational thinking. The creation of a separate disciplinary position would act as an antidote to such isolationism, providing distance educators with a status they feel they otherwise lack. Alternatively, distance educators might perceive themselves as a highly organised group of "revolutionaries" with their own journals, associations, and theoretical structures, who are engaged "in the process of formulating a radical conceptual reorganisation within their field [of education]" (Griffith and Mullins [1972], cited in Becher [1989]). Or, as another alternative, distance educators might perceive separatism as a means to power - to the creation of chairs in distance education and departments of distance education. Any one of these scenarios might be supported by drawing on and emphasising different facts.

- Third, that there was a structural basis for separatism, in part derived from the use of media to teach, in part from the emphasis on a different target population, that was reinforced by the belief that distance education needed both separate administrative structures and different approaches to funding. From this position, it was not too great a step to suggest that distance education was best separated from traditional forms of education. This view was articulated by a number of distance education leaders in the 1970s (Peters, 1973: 310; Perry, 1976: 55; Daniel and Smith, 1979: 64), and was reinforced by the view that the very different cost structures of distance education warranted separate financing (Snowden and Daniel, 1980: 76; Swinerton and Hogan, 1981: 1).

The second question is why, if there is such an advantage in mixed-mode provision, there has been relatively little collaboration between distance teaching and campus-based institutions. Various kinds of collaboration are possible including, for example:

- provision of technical advice, consultancy, and information to conventional universities interested in developing flexible and distance learning. This raises few problems.
- making use of the materials that a distance education system has available in order to provide distance-based options within a conventional setting. In theory both simple and desirable, Rumble (1994a: 48) refers to empirical evidence that campus-based institutions have found it more expensive to buy-in materials than to create their own, except where student numbers are very low (Robertshaw, 1993: 111; Curran, 1994: 3), and that they can create their own distance teaching materials very cheaply (Fwu et al., 1992; Sharratt, 1993: 119). More widely, Neil (1981: 172-6) and Moran and Mugridge (1993: xiii, 5, 9-10, 152-7) have identified a range of factors inhibiting collaboration. These include the existence of cultural differences

between institutions; traditions of institutional autonomy; the “Not Invented Here” syndrome; poorly constituted collaborative objectives; a failure to articulate mutual benefits; lack of clarity in specifying the terms of an agreement; incompatible organisational structures and administrative procedures; inadequate funds to implement an agreement; poor interpersonal relations between those involved in collaboration; weak leadership; lack of any real commitment on the part of one or more of the parties to making the agreement work; and lack of trust.

- credit transfer agreements enabling students to use credits gained at participating traditional and distance institutions towards the qualifications offered by these institutions. Experience suggests that such agreements are easy to articulate, but much harder to turn into practical outcomes, given a reluctance to recognise studies taken elsewhere.
- the creation of new management structures between a group of collaborating institutions, designed to facilitate collaboration. The National Technological University (NTU) in the USA is a good example, linking as it does the NTU functioning as an administrative and co-ordinating unit with the engineering departments of over thirty traditional universities, to teach graduate engineers in their workplaces. In the case of the NTU, success flows from the fact that the participating engineering departments located in conventional institutions, and the individual lecturers in those departments, gained from their collaboration with NTU (Fwu et al., 1992: 128). On the other hand Fwu and his colleagues suggest that “attempting to replicate NTU in other countries may be impossible, as it is a unique US product. The past experience of universities working independently with distance learning, and later working together in [a consortium] may be lacking” (p.128).

Perhaps the greatest impediment to collaboration is the fact that any conventional institution adopting distance education has to revolutionise its teaching. This includes focusing its academic staff on supporting learners rather than teaching students, and replacing lecture theatres with help desks and individual consultation rooms. Significantly, evidence from those working within traditional institutions suggests that it can be extremely difficult to interest “traditional” academics in open and distance learning (Lewis, 1994; Bashir, 1998; Lueddeke, 1998), and this would presumably extend to collaboration with distance education providers. For distance education providers, especially at university level where autonomy is important, there is the fear that they will become “junior” partners in a relationship - the ‘materials production wing’ of the collaboration, focusing at most on the teaching of high-enrolment, lower-level courses, while leaving the more academically challenging specialist courses to be taught by their on-campus colleagues.

References

- Ansari, M. M. (1992). *Economics of distance higher education*. New Delhi: Concept Publishing Company.
- Bashir, T. H. (1998). Dangerous liaison: Academics’ attitude towards open learning in higher education. *Open Learning*, 13 (1), pp. 43-45.
- Bates, A. W. (1995). *Technology, Open Learning and Distance Education*. London: Routledge.

- Becher, T. (1989). *Academic tribes and territories. Intellectual enquiry and the culture of disciplines*. Milton Keynes: Open University Press.
- Bell, R. & Tight, M. (1993). *Open universities: a British tradition?* Buckingham: The Open University Press.
- Committee of Scottish University Principals (1992). *Teaching and learning in an expanding higher education system*. Edinburgh: CSUP.
- Cumming, C. & Olaloku, F. A. (1993). The Correspondence and Open Studies Institute, University of Lagos. In H. Perraton, (ed.), *Distance education for teacher training*. London: Routledge.
- Curran, C. (1993). Scale, cost and quality in small distance teaching universities. In H. Siggard Jensen & S. Siggard Jensen (eds.), *Organization, technology and economics of education. Proceedings of the COSTEL Workshop, Copenhagen, 11-12 January 1993*, Copenhagen: n.p.
- Daniel, J. S. (1996). *Mega-universities and knowledge media. Technology strategies for higher education*. London: Kogan Page.
- Daniel, J. S. & Smith, W. A. S. (1979). Opening open universities: the Canadian experience. *Canadian Journal of Higher Education*, 9 (2), pp. 63-74.
- Deakin University (1989). *Further investigations into activity costing in a mixed mode institution*. Department of Employment, Education and Training, Commonwealth of Australia.
- Evans, T. & Nation, D. (eds.) (1993). *Reforming open and distance education. Critical reflections from practice*. London: Kogan Page.
- Fwu, B.-j., Jamison, D., Livingston, R., Oliveira, J., Skewes-Cox, T., & Van der Kelen, B. (1992). The National Technological University. In G. Rumble & J. Oliveira. (eds.). *Vocational education at a distance: International perspectives*. London: Kogan Page.
- Hallak, J. (1990). *Investing in the future. Setting educational priorities in the Developing World*. Paris, UNESCO: International Institute for Educational Planning and Pergamon Press.
- Holmberg, B. (1986). A discipline of distance education. *Journal of Distance Education*, 1 (1), pp. 25-40.
- Holmberg, B. (1989, 1st. edn.). *Theory and practice of distance education*. London: Routledge.
- Holmberg, B. (1995, 2nd. edn.). *Theory and practice of distance education*. London: Routledge.
- Keegan, D. (1986, 1st. edn.). *Foundations of distance education*. London: Croom Helm.
- Keegan, D. (1994). The competitive advantages of distance teaching universities. *Open Learning*, 9 (2), pp. 36-9.
- Keegan, D. & Rumble, G. (1982). The DTUs: an appraisal. In G. Rumble & K. Harry (eds.). *The distance teaching universities*. London: Croom Helm.
- Laidlaw, B. & Layard, R. (1974). Traditional versus Open University teaching methods: a cost comparison. *Higher Education*, 3 (4), pp. 439-68.

- Lewis, R. (1994). Embedding open learning in higher education. In M. Thorpe & D. Grugeon, (eds.). *Open learning in the mainstream*. London: Longman.
- Lueddeke, G. (1998). The management of change towards an open learning framework: A higher education inquiry. *Open Learning*, 13 (3), 3-17.
- MacKenzie, N., Postgate, R. & Scupham, J. (1975). *Open learning. Systems and problems in post-secondary education*. Paris: The UNESCO Press.
- Makau, B. (1993). The external degree programme at the University of Nairobi. In H. Perraton (ed.). *Distance education for teacher training*. London: Routledge.
- Moore, M. G. & Kearsley, G. (1996). *Distance education. A systems view*. Belmont, Calif.: Wadsworth Publishing Company.
- Moran, L., & Mugridge, I. (1993). *Collaboration in distance education. International case studies*. London: Routledge.
- Mugridge, I. (1992). Responses to Greville Rumble's article 'The competitive vulnerability of distance teaching universities'. *Open Learning*, 7 (3), pp. 61-2.
- Muta, H. & Sakamoto, T. (1989). The economics of the University of the Air of Japan revisited. *Higher Education*, 18 (5), pp. 585-611.
- Muta, H. & Saito, T. (1993) Economics of the expansion of the University of the Air of Japan. In Asian Association of Open Universities. *Economics of distance education. AAOU VIIth Annual Conference 1993*, Hong Kong, Open Learning Institute of Hong Kong.
- Muta, H. & Saito, T. (1994). Comprehensive cost-analysis of the University of the Air of Japan. *Higher Education*, 28 (3), pp. 325-353.
- Neil, M. (1981) *Education of adults at a distance. A report of the Open University's tenth anniversary conference*. London: Kogan Page.
- Perry, W. (1976). *Open University. A personal account by the first Vice-Chancellor*. Milton Keynes: Open University Press.
- Peters, O. (1973). *Die didaktische Struktur des Fernunterrichts Untersuchungen zu einer industrialisierten Form des Lehrens und Lernens*. Weinheim: Beltz.
- Raggatt, P. (1993). Post-Fordism and distance education - a flexible strategy for change. *Open Learning*, 8 (1), pp. 21-31.
- Renwick, W. (1996). The future of face-to-face and distance teaching in post-secondary education. In OECD. *Information Technology and the future of post-secondary education*. Paris: OECD.
- Robertshaw, M. (1993). The importation and adaptation of distance education courses: is it an expensive option? In Asian Association of Open Universities. *Economics of distance education. AAOU VIIth Annual Conference 1993*, Hong Kong, Open Learning Institute of Hong Kong.
- Rumble, G. (1981). The cost analysis of distance teaching. Costa Rica's Universidad Estatal a Distancia. *Higher Education*, 10, pp. 375-401.
- Rumble, G. (1982). The cost analysis of learning at a distance: Venezuela's Universidad Nacional Abierta. *Distance Education*, 3 (1), pp. 116-40.

- Rumble, G. (1987). Why distance education can be cheaper than conventional education. *Distance Education*, 8 (1), pp. 72 - 94.
- Rumble, G. (1988a). The economics of mass distance education. *Prospects*, XVIII (1), pp. 91-102.
- Rumble, G. (1988b). Animadversions upon the concept of distance education as a discipline. *Journal of Distance Education*, 3 (1), pp. 39-56.
- Rumble, G. (1992). The competitive vulnerability of distance teaching universities. *Open Learning* 7 (2), pp. 31-49.
- Rumble, G. (1994a). The competitive vulnerability of distance teaching universities: a reply. *Open Learning*, 9 (3), pp. 47-9.
- Rumble, G. (1994b). Mixed modes of teaching and learning: structures, resources, and developments. In M. Thorpe, M. & D. Grugeon (eds.), *Open Learning in the Mainstream*. London: Longman.
- Rumble, G. (1997). *The Costs and Economics of Open and Distance Learning*. London: Kogan Page.
- Scott, P. (1997). The economic costs and benefits of Information Technology assisted teaching and learning: A literature overview. In Higher Education Funding Council for England. *Information Technology assisted teaching and learning in higher education*. Bristol: HEFCE.
- Sharma, R. D. (1983). The economics of distance education in an integrated tertiary education system. In Australian and South Pacific External Studies Association. *Papers of the ASPESA Sixth Biennial Forum, Toowoomba, 11-15 July 1983*, ASPESA, pp. 163-75.
- Sharratt, R. (1997). Innovation in a traditional setting at Sheffield University. In S. Brown (ed.). *Open and distance learning: Case studies from industry and education*. London: Kogan Page.
- Snowden, B. L. & Daniel, J. S. (1980). The economics and management of small post-secondary distance education systems. *Distance Education*, 1 (1), pp. 68-91.
- Swinerton, E. N. & Hogan, T. P. (1981). A tested budget model for a nontraditional degree program. Madison: Wisconsin: University of Wisconsin, mimeo.
- Taylor, J. C. & White, V. J. (1991). *The evaluation of the cost-effectiveness of multi-media mixed-mode teaching and learning*. Canberra: Australian Government Publishing Service.
- Wagner, L. (1972). The economics of the Open University. *Higher Education*, 1 (2), pp. 159-83.
- Wagner, L. (1975). Television video-tape systems for off-campus education: A cost analysis of SURGE. *Instructional Science*, 4 (2), pp. 315-32.
- Wagner, L. (1977). The economics of the Open University revisited. *Higher Education*, 6 (3), pp. 359-81.
- White, V. J. (1992). Responses to Greville Rumble's article 'The competitive vulnerability of distance teaching universities'. *Open Learning*, 7 (3), pp. 59-60.

11. E-Education - Whose Benefits, Whose Costs?

This chapter was originally delivered as an Inaugural Lecture on taking up a Personal Chair in Distance Education Management at the Open University, UK, and was delivered on Wednesday, 28 February 2001.

It is some 40 years since the Open University was first conceived, 32 since it was legally established, and 30 since it began teaching. This period has seen great changes but arguably the greatest is one still in the making. I refer, of course, to the Internet. Many argue that we are in a period of paradigm shift, from the industrial to the information age. In such circumstances all organisations have to rethink, but who will benefit from the changes, and who will bear the costs? In this lecture I shall seek to answer these questions. I shall do this, first, by defining what we mean by e-education; second, by identifying some of the benefits that have led to the pressures to adopt e-education; third, by looking at the cost implications of change; and finally, by looking at some of the structural implications of change.

Defining the Field: What Exactly Is an E-Education System?

It is worth starting by trying to establish exactly what we mean by an e-education system. Interpretations differ, but a fully ‘e’ education system would, I suggest:

- make learning materials available to students in electronic form,
- teach and support students online,
- provide on-line administrative services, e.g. enrolment, billing, information and advice.

This may seem obvious, but there is enough evidence to support the view that a fully rounded vision of e-education does not always exist. To begin with, academics tend quite reasonably to focus on the development of Web-based course materials and the use of the Web to support students’ learning within a course – and forget the e-administrative aspects of the system. More crucially, however, distance education, and particularly large-scale distance education, is based on a division of labour between those academics and support staff who design and develop learning materials, and those who focus on student support. These divisions are strong enough for quite distinct cultures to be observable in distance teaching organisations (Costello, 1993). They can be detected within the online learning community – between those who tend to focus on the Web as a means of getting materials into electronic format, and those who see online learning as a means of enhancing communication. The first approach is evidenced strongly in the *Business Model for the e-University*, which talks about “an e-version of programmed learning books”(PricewaterhouseCoopers, 2000, para. 52). The latter is the focus of those who advocate Computer Mediated Communications (CMC) and Asynchronous Learning Networks (ALNs).

Pressures to Move Towards E-Education

There are widespread pressures to move towards e-education – from distance educators, from those working in campus settings, from trainers, and from new entrant firms such as Merrill Lynch, Banc One, and a host of venture capital groups who see Internet

education and training as the next 'Killer App' (Peterson, Marostica, and Callahan, 1999). In this lecture, however, I shall focus mostly on e-education's impact on universities.

(a) Pressures within distance education

Distance education had its origins in commercial correspondence colleges. While there were some excellent providers, many more were interested in the economics of the diploma mill and 'drop-out money' (see, for example, Noble, 1999). This maximised profit at the expense of teaching quality, student success, and ultimately of reputation.

By the 1970s this shady past was being put behind us. The best providers, both public and private, wanted to offer accessible educational opportunities, based on quality materials, leading to reputable qualifications. Additionally, many wanted to do this at a cost to the student that would enable those from disadvantaged backgrounds to participate. It is to their credit that institutions such as The Open University and the National Extension College, both in the UK, had a lot to do with the establishment of this ethos.

Notwithstanding this, distance education continued to be seen as second best because, at the expense of dialogue, it separates the teacher and the learner. The argument that it provides opportunities for 'guided didactic conversation' (Holmberg, 1995: 47-50) is clearly unconvincing, but even those systems such as the Open University that built in some face-to-face tuition weaken its impact, firstly, by making participation voluntary, and secondly, by getting tutors to more or less restrict themselves to the content defined by the materials. As a direct result distance education, at least at the higher education level, is seen to be deficient because it fails to provide an environment within which social and cultural learning can take place (Escotet, 1980: 11-19), and within which democratic discussion and argument could flourish (Harris, 1987: 142).

Of course, neither of these criticisms is wholly fair. Campus-based universities are often far from perfect (c.f. Harris, 1987: 142) given the prevalence of overcrowded lectures and the lack of opportunities in large institutions for students to know and hence to discuss their ideas with either their teachers or even their peers (Ritzer, 1993: 141-2).

Still, it is this perceived deficiency in earlier forms of distance education that led to the interest in computer-mediated communications and asynchronous learning networks, whose defining characteristic is to provide "substantial, rapid, asynchronous activity with others" (Mayadas, n.d.), in contrast to other, inferior, distance teaching models, such as the predominantly American models of synchronous audio or video presentations and conferences, and videotaped courses, and the basically European model of teacher-driven, mail-based correspondence courses (ibid.). Harasim sees CMC as providing "a new learning domain which enables us as educators and as learners to engage in learning interactions more easily, more often and perhaps more effectively, but also to develop qualitatively new and different forms of educational interactions" (Harasim, 1989: 62).

Note that within the context of these views, those who merely place the emphasis on getting material up on the Web have not made any progress at all.

(b) Pressures within the campus environment

What is interesting, though, is that the advantages of CMC are seen to accrue not just within distance education, but also for traditional students. Working out of the Ontario Institute for Studies in Education, Linda Harasim argued that CMC would enable

traditional students not only to control the time, place, pace, and nature of interaction, but also to access a great deal more class time since this would no longer be confined by the finite time allocated to *face-to-face* classes (Harasim, 1989: 60).

Why exactly is CMC interesting to traditional educators? There are, I think, two strands of argument. The first, exemplified by Harasim's comment, believes that online interaction with your teacher and peers gets round the increasing irrationality of large campus universities where education can be "a de-humanising experience", in which it is difficult for students to get to know other students, and virtually impossible for them to know their professors (Ritzer, 1993: 141-2). In these circumstances, and as ALNs increasingly move beyond textual messaging to audio and video messaging, they can actually provide an experience that is better because it is both more immediate and more personalised.

The second strand is the increasing trend for higher education to be seen as just one more consumer good. To understand this we need to look at what has been happening in traditional higher education where, according to one US report, students "are bringing to higher education exactly the same consumer expectations that they have for every other commercial enterprise with which they deal" (Levine, 1993: 4). What students want, the report suggests, is "a stripped-down version of college without student affairs, extracurricular activity, residence life, varsity sport, campus chaplains...", one that provides "high-quality products but ... low costs", and one where education is close to home and operates "during convenient hours – preferably round the clock" (*ibid.*: 4).

The American sociologist George Ritzer argues that, to satisfy these students, universities will embrace technology because students are attracted to high-tech environments; because technology promises to lower university costs (Ritzer, 1998: 154); and because technology promises to deliver programmes both to satellite campuses near where they live, and, like Domino's pizzas, into their homes (*ibid.*: 11). Convenience education, like convenience foods, is with us. Indeed, officials at the University of Northern Arizona specifically claim that their university is "designed around the concept of convenience for the student" (Howard, 1996: 7). Integral to this is the delivery of distance and online education courses for home consumption. What is delivered is content and, possibly, interaction.

A Summary of the Argument to Date

Let me just summarise briefly where I think we have got to. There seem to be two quite different interpretations of what is meant by online education. Whether their background is in traditional or distance education, some are talking about interactivity and dialogue; and some are talking about putting materials up on the Web. Those who want to put material up on the Web believe that such material can provide high quality, interactive (as in intelligent tutoring), and accessible, learning. Those who believe in CMC/ALNs think that it will overcome, on the one hand, the lack of dialogue in distance education, and on the other, the increasing anonymity and loneliness of a dehumanised campus. The pressures to go electronic are clear – but what will it cost?

The Costs of Distance Education

Over the last 40 years the distance education market has grown enormously, but with 135 million children of primary school age currently not attending school, 1 billion adolescents and adults under-literate or illiterate, and 2 billion individuals requiring

some kind of retraining and re-skilling in their lives (Dhanarajan, 2001: 67), there is still plenty to do. Indeed, distance education can only increase in importance as the world population moves beyond its current estimated 6.1 billion (US Bureau of the Census, 1.1.2001) towards perhaps 9.5 billion by 2050 (US Bureau of the Census, 10.5.2000). Given the size of the challenge we face, it seems likely that the cost of meeting demand will be high on government agendas.

Traditional education is a labour intensive business. However, world-wide, the public sector's ability to pay for education is severely tested. Generally governments are looking for ways to reduce or at least contain the cost. One way is, of course, to pass the cost on to the consumer. Another is to find ways of reducing the unit cost of education.

In the 1960s the application of mass communications technology came to be seen as a way of lowering the unit costs of education by substituting capital (in the form of course materials) for labour (Jamison, Suppes and Wells, 1974: 57). The result was a flurry of interest by economists who set out to do two things. First, to study the costs of particular systems – but most notably educational television (ETV) and open university systems, and second, to develop methodologies for studying the costs of educational technology (see Rumble, 1999).

As a result of this work it was agreed that distance education *could* be more cost efficient than face-to-face education, but also that this was not always the case given the range of factors that influence costs. In brief, if you want to lower institutional costs in distance education, not only do you need to:

- go for high population courses,
- restrict the number of course options,
- go for long course lives, and
- choose low cost media and technologies;

but you will also have to:

- avoid cost-inducing actions, for example, the use of copyrighted materials, and
- pass costs on to the student, either as charges, or by moving the system boundaries so that activities you might have paid for are now paid for by them.

In addition, and surprisingly given its crucial impact on costs, which has hardly been acknowledged in the literature (see Rumble, 1997: 78-91), you will have to adopt structures and labour policies that minimise costs. In other words, you will need to:

- employ people on contracts *for* service to develop courses and teach students, rather than on contracts *of* service (i.e. hire them as casual labour),
- establish working practices that reduce the costs of labour by, for example, designing courses to be wrapped-around existing textbooks rather than developing new materials, and using author-editor models of course design, rather than big course team models,
- use technology to increase the student load per academic or administrator,
- increase the teaching load of academic staff at the expense of other functions – for example, research and public service, and ...

- reduce the cost of labour through ‘labour for labour’ substitution – the replacement of expensive academic labour by student and adjunct labour, which is cheaper.

Technology can help here by facilitating new structures, thus enabling managers working in distance education to choose those structures, work roles, and patterns of employment that reduce costs. I have no doubt that we will be told that the structural changes are the outcome of technological choices that are themselves driven by the market, but don’t you believe it. It is not technology that drives structural change, but management – and management will be driven by competitive pressures to reduce costs²¹.

As one would expect, the development of e-education is changing the costs of education. Online education is clearly different to earlier generations of distance education²² and, of course, to traditional models of education. It involves different technologies, and it enables different structures and labour policies to be deployed. Both traditional and distance education institutions are now adopting online education – and this is affecting their costs.

Costs of E-Education

I will structure my discussion of the costs of e-education as follows: first I will look briefly at the current concern with how one should cost e-education, and in essence dismiss it as a fairly unimportant detail. Second, I shall look at the costs of the technologies, distinguishing between the costs of putting e-materials online, the costs of e-teaching, and the costs of e-administration. Finally, I shall look at how the costs of e-education seem to compare with the costs of face-to-face education, and with the costs of alternative approaches to distance education.

Costing E-Education

There is currently a fair amount of discussion about how one should cost online education (see Bacsich et al., 1999; Boucher, 1998; and Whalen and Wright, 1998). Technically, I don’t think this is a real issue, though there is some uncertainty about what ought to be included in the costs. In my view cost studies ought to cover the costs of:

1. developing e-materials,
2. teaching students on-line,
3. administering students online,
4. providing the infrastructure and support within which e-education can operate,
5. planning and managing e-education.

²¹ The emphasis here is on technology opening up possibilities, rather than determining them. In the 1960s and early 1970s it was thought that the most important single factor that gives an industry its distinctive character is its technology, which thus generated specific forms of work organisation and worker experience (c.f. Blauner, 1964: 6, 8; Bell, 1960; Bell, 1973; Kerr, Dunlop, Harbinson, and Myers, 1964). This is technological determinism, it was widely held in the 1960s and early 1970s, and it has been comprehensively discredited (Grint and Woolgar, 1997: 11-14). Far from espousing technological determinism, I believe that a range of structural and labour market solutions are available, and it is for distance education managers to choose from among the many options available.

²² Conventionally, following Nipper, 1989, three generations of distance education systems have been identified: (1) correspondence education systems; (2) multi-media systems, and (3) online systems. I favour a four generational model, viz. (1) correspondence education, (2) educational broadcasting, (3) multi-media approaches, and (4) e-education approaches.

How do current cost studies measure up against this list? The few cost studies that exist focus on the costs of providing e-materials and e-teaching. There are no studies, to my knowledge, of the costs of e-administration within education. None of the studies comprehensively identify overhead costs. One has to go outside the literature on distance education to begin to get an idea of the costs of e-business, and even then what literature there is, is generally unsatisfactory.

Costing the Technologies of E-Education

Setting aside the question of overhead costs for the moment, the major operating costs of e-education can be usefully considered under three heads: the costs of developing and distributing Web-based materials, the costs of Web-based communications, and the costs of Web-based administration. I shall take these in order.

(i) Costs of developing and distributing Web-based materials

Most of the technologies involved in Web-based courses have been around for a long time. They include the preparation of text, audio, video, computer-based tutoring, intelligent tutoring, exploratory learning, simulations, etc (see Van der Brande, 1993: 18 ff.). What is distinctive is that these materials are now being put up on a web site that can then be accessed by students.

Cost studies show that while there is a very wide range in the reported costs of developing CBT and CD-ROMs (NBEET, 1994: 37; Hülsmann, 2000: 14), the technology is generally marked by its high fixed costs (Bates, 1995: 6). There are attempts to quantify these costs. Thomas Hülsmann's recent book on *The Costs of Open Learning*, for example, studies the costs of 11 courses offered by 9 different European distance teaching organisations, and attempts to use the results to identify the cost of developing and delivering the equivalent of one student learning hour through a range of different media and technologies. Hülsmann suggests that for every £1.00 you spend developing a Student Learning Hour of printed material, you will spend twice as much for print on the internet, 5 times as much on audio, 40 times as much on a CD-ROM, 100 times as much on video, and 350 times as much on TV (Hülsmann, 2000: 17). Print is the cheapest medium to develop at £350 per student learning hour. Putting text up on the internet costs at least twice that, and possibly more. After that costs escalate through audio, CD-ROM, video and TV (see Table 1).

Table 1: The costs of developing one student learning hour in different media (UK£)
(Based on Hülsmann, 2000: 17)

Print	350
Internet	700
Audio	1,700
CD-ROM	13,000
Video	35,000
TV	121,000

I personally take Hülsmann's figures with a pinch of salt: Firstly, only one of his case study institutions uses TV – the Open University, but we know that Open University costs in this area are very much at the high end of the range, and his cost of £121,000

for a one hour programme is unrepresentative of the range of costs that can exist. In an Australian study, the cost of making educational videotapes for use by distance education students ranged from Aus\$1,000 to Aus\$39,400 per 30 minutes, with the higher level cost being for broadcast quality material made in association with the Australian Broadcasting Corporation (NBEET, 1994: 13-14). Secondly, his assumption that the playing time for video and audio programmes is equivalent to the time students spend studying them is questionable. Thirdly, in giving rather exact summary figures on the relative costs of these media, he ignores the fact that even within the confines of the 11 courses he studied, there were considerable variations in cost per Student Learning Hour for print, audio, and video, with a range of costs per Student Learning Hour for print (£139 – £1,500), audio (£1,000 - £16,000), and video (£3,159 - £80,000) (ibid.: 147).

Nevertheless, Hülsmann's belief that computer-based materials are more expensive than print and audio (ibid.:14) is one that I am happy to accept provided that one also takes account of the differential costs of the media built into the computer-based materials. After all, Arizona Learning Systems found a wide variation in the costs of developing a course, of from US\$6,000 to \$1,000,000 for a three unit internet course, depending on the approach used. Much of this is the cost of academic and technical labour. The cheapest approach involved the presentation of simple course outlines and assignments; the most expensive, at \$1,000,000, involved virtual reality (see Table 2). There is also some evidence that the lower levels of cost are more likely to be found on synchronous online course, with asynchronous courses costing more. Certainly Whalen and Wright found significant differences between synchronous and asynchronous course development costs. The former required much less development time because they involved less media (Whalen and Wright, 1999: 32).

Table 2: Cost of developing a three unit internet course (US\$)

(Arizona Learning Systems, 1998: 13-14)

Course outlines and assignments	6,000
Text	12,000
Text with reference material	18,000
Text with reference material and images	37,500
Audio and video	120,000
Simulations	250,000
Virtual Reality	1,000,000

As I mentioned, a fairly high proportion of the costs of developing materials are labour costs. They can be reduced or at least kept in check by adopting cheaper approaches to course development based on an editor working with a consultant author, instead of hiring permanent staff – and this surely is the route many commercial providers are likely to take. But even if for-profit organisations do not go down this route, and continue to hire academics on contracts of service, it seems likely that many will not wish to support a research function. Such organisations may not attract the best teaching staff, but their costs will come down markedly. With commercial competitors going down these routes, you can bet that public sector institutions will follow.

Although the development costs of even relatively simple online materials may be higher than paper-based print, and even much higher depending on the media mix one

uses, it seems fairly clear that there are considerable institutional savings on delivery costs. The Library of Virginia has digitalised the state's colonial records. This has drastically reduced the costs of fulfilling requests from readers. The costs to the library of providing a single copy of a four page report in digital format is just 90 US cents, compared with \$18.56 to supply a surface-mail customer, and \$12.15 to supply an on-site user (Roderick, 1998). Applied to course materials, online delivery to order could cut inventory, packing, and postage costs enormously. Online library services like those offered or under development by XanEdu and Questia are likely to be invaluable – provided the subscription rates are not unreasonably high. However, students used to their course materials plopping through their letterboxes are likely to see their study costs rise as they access materials online and print them off themselves.

(ii) The costs of online communication

What about the costs of computer-mediated communications? Here we get into the costs of labour and the problems of student load. Bates has suggested that in comparison with face-to-face teaching, online education will lower the costs of tuition because a good deal of the students' time is spent studying the material, and so the teacher needs to spend less time per student overall in class (Bates, 2000: 126-7). Other analysts argue that students will also spend a great deal more time learning from their peers, and that this too will reduce the demands they make of their tutors. Certainly DiBiase, teaching for Penn State University's World Campus, found that he and his Teaching Assistant were spending less time supporting students on an online course (1.6 hours per student against 2.6 hours on a regular course) (DiBiase, 2000: 15-16).

However, the general consensus seems to be that online tutoring adds to traditional faculty workload (Arizona Learning Systems, 1998: 20; Arvan et al., 1998) given the enormous volume of messaging (Moonen, 1997) arising from increased interaction with students (Jewitt, 1999: 37), with each message requiring more time to compose than is the case in verbal interactions (Inglis, 1999: 223). Moonen (1997) thinks that the increased load would be of the order of 5 to 10 hours a week for a class of 60 to 120 students. Jewett (1999: 41) thinks tutors could well spend twice as much time tutoring on-line as they do face-to-face. This raises the question of how many students an online instructor can handle. In classroom courses in the USA it looks as if people think they can handle from 25 to 30 students, working perhaps 10 to 12 hours a week. Boettcher (1999) suggests that experience indicates that a member of faculty can handle more students on a web course – in the range 25 to 65, but that this will require more time – so that although there are courses with 50 – 60 students on them, there are many courses where student numbers are deliberately kept down, somewhere in the range of from 12 to 20 students.

One way of coping with an academic's increased work load is to hire more staff but this, of course, costs more. However, the impact on labour costs can be reduced through 'labour-for-labour' substitution – that is, the substitution of cheap labour for expensive faculty labour. This cheap labour might be students (Arvan et al., 1998), teaching assistants, or clerks covering help desks (Arizona Learning Systems, 1998: 24). These options are much discussed in the US literature. However, hiring cheaper labour is not possible in small classes run by just one academic; it only works in large classes (Arvan et al., 1998). Also, labour-for-labour substitution has its critics. Traditionally PhD students have helped teach courses but student labour is not the cheapest labour on offer. Adjunct staff hired by the class is even less expensive – so much so that there is concern

that their employment could damage graduate programmes by reducing the employment opportunities for PhD students (Turoff, 1998).

Up to now I have been talking about the impact of CMC on the costs of traditional institutions. What about its impact on the costs of distance education delivery? Firstly, there is evidence that tutors spend more time moderating and tutoring e-courses. Tolley, drawing on her experience as an Open University tutor, found that she spent more than twice as many hours tutoring the on-line version of *What is Europe?* as she did the 'traditional' version – 120 hours against 48 (Tolley, 2000: 263). She was not paid for the additional work, which also had a dramatic effect on her phone bill. Annand, from his perspective at Athabasca University, suggests that it is these costs that may in the end constrain the extent to which large-scale distance teaching universities can adopt on-line technologies (Annand, 1999: 20). Some institutions are trying to find ways of containing demands on tutor time by controlling student expectations and limiting the time for engagement on a particular topic; others, like the e-University, seem to be talking about putting the task of tutoring out to commercial ventures like Tutor.com, which will charge students for use (PricewaterhouseCoopers, 2000, paras. 79-80).

Secondly, there are the costs of reception. Cost analysis tends to be bounded by the institutional budget. The costs students incur in acquiring and operating equipment is not generally taken into account – yet from the would-be student's point of view, these costs can have a major impact on affordability, and hence on access. In the USA the distribution of computers is highly graduated by income, race/ethnicity, and educational attainment. Gladieux and Swail (1999) showed that in the USA, three out of four households with incomes over \$75,000 have a computer, but only one in three of households with incomes between \$25,000 and \$35,000, and one in six of those with incomes under \$15,000. White households are twice as likely as black or Hispanic households to have access to a computer. Graduates are four times as likely to have online services as those with only high school education. If owning the equipment is a necessary condition for participation, then expect to see more disadvantaged people being excluded on cost grounds.

Local centres may, of course, mitigate student costs by providing access to machines, but they cost a fair amount in rent, equipment, furniture and staffing to set up – and generally accommodate very few students at any one time. This is not a solution to mass access – which is why the African Virtual University is such a limited project. Internet cafés cost money to use and are not necessarily ideal environments for study. In any case, in a country like Uganda, anything that uses a telephone line is extremely expensive.

(iii) The costs of e-administration

We know very little about the costs of e-administration, but on the whole this may be the area where savings are most likely to occur. Service costs in a range of industries are being brought down as institutions invert traditional processes, such as student services, to focus more on Web-based, self-service models (Oblinger, 2001: 17). A paper-based order costs about \$65 to fulfil – but it only costs around \$5 to fulfil an online order (Naughton, 2000: 23). A paper-based invoice may cost US\$0.90 to produce and distribute; online services can reduce this to something like \$0.40 - \$0.60 (PwC, 1998), and speed the whole process up. Perhaps 75% to 90% of transactions currently done manually and

on paper should be done electronically (Oblinger, 2001: 17). This trend will impact on all educational institutions, including ODL ones.

E-commerce practices are also invading education to provide income streams. Many US campuses are now allowing advertising on their web-sites – with the income from advertising offsetting the cost of the site (Oblinger, 2001: 15). Some universities – such as Georgetown University – have auctioned spare course capacity on the Internet, with bidders hoping, of course, to get a place on an expensive course at a discount (*ibid.*: 15). We can expect eduCommerce to proliferate (*ibid.*: 15). Certainly the e-University Business Model assumes that this kind of activity will occur (PricewaterhouseCoopers, 2000, para 194-5).

Comparing the Costs of Online Education With Other Forms of Education

Having looked at the costs of the media/technology, let us look at how the costs of e-education courses compare firstly with those of class-based education, and secondly with other forms of distance education.

(i) Comparing e-education costs with the costs of face-to-face education

Whether one system is more or less expensive than another will depend upon a range of factors such as those I discussed earlier. One approach is to substitute CMC for classroom teaching – leaving everything else unchanged. A study conducted at the University of Illinois found that unit costs came down on all nine courses in which asynchronous learning networks were substituted for face-to-face instruction (Arvan et al., 1998). Bates also thinks that online university courses using just CMC, and involving no real e-materials development, will be cheaper than face-to-face courses (Bates, 2000: 126-7). However, most online courses involve some materials, so that cost-efficiency depends on the number of students enrolled:

“We are fairly confident that a standard Web-based course, with a mix of pre-prepared Web materials, on-line discussion forums, and print in the form of required texts, becomes increasingly more cost-effective than face-to-face teaching as numbers per class increase beyond forty per year over a four-year period. This assumes that interaction between students and teachers remain high. Conversely, we tend to avoid developing distributed learning courses for fewer than twenty students per year. Between twenty and forty students per year per course, any cost differences are likely to be less significant than differences in benefits.” (Bates, 2000: 128-9).

If we widen the argument to take into account training costs that fall on employers, then we find that there are stronger reasons to believe in savings. There is general agreement that online training courses are less expensive than face-to-face ones provided the development costs are spread across sufficient numbers of students (possibly over several years), and provided that one takes into account both savings on travel and accommodation costs, and the fact that less of an employee’s productive time is lost (employees now train in their own time rather than in the firm’s time) (Ravet and Layte, 1997: 142-3; Phelps, Wells, Ashworth, and Hahn, 1991: 12-14; Whalen and Wright, 1998: 40).

However, things don’t look so good once purpose-built materials are added in: Bates (2000: 128) says that if as well as having CMC, one also develops purpose-built

materials, then the unit costs will be more expensive than face-to-face tuition. Arizona Learning Systems (1998: 24) found that the cost per course enrolment of an ‘average’ Internet course (US\$571) is higher than that of traditional classroom instruction (\$474), though labour-for-labour substitution might bring this down to \$447. However, much depends on the nature of the materials and their associated development costs which, as we saw, they estimated to vary from US\$6,000 to \$1,000,000 for a three unit Internet course (ibid.: 13-14).

(ii) Comparing e-education costs with the costs of other forms of distance education

What about the cost comparison with other forms of distance education? We have very few studies go on. In an Australian study, Inglis (1999: 233) found the online version of a course was less cost efficient at all levels of enrolment than a print-based distance education course (Table 3). Elsewhere, Jung (2000: 228-9) compared the costs of presenting standard three credit courses at the Korea National Open University. The course involving textbooks, CD-ROM and electronic tuition was more expensive than the courses using either textbooks, radio and face-to-face tuition, or those using textbooks, television and face-to-face tuition. However, dropout was only 10% on the e-course, compared with 60% on the other two types (Table 4).

Table 3: Average cost per student of print and online versions of a course

(Inglis, 1999, p. 231)

Volume of students	Average cost per student: 1999 Aus\$	
	Print version	Online
50	169.84	217.71
100	125.38	171.63
150	110.56	156.27
200	103.15	148.59

Table 4: Costs of distance education at the Korea National Open University

(Jung, 2000: 229)

	TV-based course	Radio-based course	Web-based course
Rating	16 week, 3 credit	16 week, 3 credit	16 week, 3 credit
Media	Textbook, TV programmes and face-to-face tuition	Textbook, radio programmes and face-to-face tuition	Textbook, video-and audio-clips, electronic tuition
Number of students	1000	1000	30
Cost to produce and deliver US\$	80000	35000	13000
Cost per student US\$	80	35	434
Drop-out rate (%)	60	60	10
Cost per completed student US\$	200	87.5	482

Summarising Progress to Date

Before we jump to any conclusions about the relative costs of e-education, traditional education, and other forms of distance education, there are some caveats to make.

- None of the studies factor in the costs of overheads.
- Generally operating budgets don't reflect the full costs of maintaining networked services (Leach and Smallen, 1998). Cost studies based on such budgets don't do this either. This is something that the US COSTS project is tackling (ibid.). However, the costs of putting in equipment directly associated with the projects (e.g., servers) are usually taken into account, as are the costs of software licenses.
- In the cost studies, equipment is generally annualised over five years (e.g. Arizona Learning Systems, 1998; Whalen and Wright, 1998), but in the US in 1998/99 the typical replacement cycle for computers was 3 to 5 years; for central servers 3 to 4 years; and for network electronics, 5 to 6 years (Leach and Smallen, 2000). This may seem like insignificant detail – but it impacts on costs significantly, and even more so when the opportunity cost of capital is taken into account.
- Finally, any tentative conclusions one might wish to draw are complicated by the fact that nobody yet seems to know what constitutes a reasonable online workload for academic staff.

Nevertheless, let me try to summarise where I think we are on costs. For the institution, there is evidence that delivering content online is driving costs up. There is mixed evidence about the costs of online tutoring though I tend to believe that suggestions that this is leading to savings are illusory – and will be shown to be so when tutors begin to demand to be paid for the hours they put in, or have their student numbers capped, or walk away from the job. I also suspect that there are significant administrative savings to be made and that these will, in the end, pay for the increased costs of teaching online²³. Linked eduCommerce activities may also generate income to offset some of the costs. Against this, though, there is the unknown burden of overheads, which analysts like to ignore.

As far as students are concerned, they will have to provide their own equipment and fund their own use of the web. Students will also have to pay for many of the services they use either on a subscription basis, or as they use them. The e-University Business Report makes it clear that students will have to pay for library access offered by firms such as XanEdu, and for tutorial and guidance support, and for their examinations (PricewaterhouseCoopers, 2000, paras. 79-80, 87-89, 91-99, 107). No doubt the costs of the technology will come down, but those who are not able to afford e-education are being written out of the game. This is true within developed countries, at least in respect of some sectors of the population, but much more widely the case in developing countries (Perraton, 2000: 150).

²³ Administrative colleagues disagree! And on reflection I suspect they may be right. There will be savings of the sort indicated, but there will also be significant additional system costs. [GR, 2003]

Structural Changes

One of the themes of this lecture is that technological change can facilitate structural changes to make savings. It is impossible to predict exactly how much impact e-education will have on educational structures, but I think we can begin to make some educated guesses.

IT and e-business make it possible for the value chain to be broken up, so that instead of a single integrated firm (Oblinger, 2001: 12-13), we get a number of specialist organisations and individuals operating within a 'value net' to provide services at lower cost (ibid.: 14). We have seen this happen in the OU with the outsourcing of a number of functions – if not in whole, then at least in part. Disaggregation of this kind finds enormous favour in the e-University report, where it is suggested that courses will be provided by a range of institutions; subsidiary operating companies will both develop and deliver materials and services; organisations like SmartForce and Tutor.com might provide tutorial support for those not content with online interactive tutorial support; organisations like Questia and XanEdu will provide online library facilities; and examining bodies will award qualifications (PricewaterhouseCoopers, 2000, paras 70-80, 87-89, 91-99, 149). A fair amount of this disaggregation is aimed not at drawing in the best, but at driving down the cost.

Partnership models are also currently popular, as evidenced by Scottish Knowledge²⁴, Universitas 21²⁵, UNEXT.com²⁶, the American Distance Education Consortium²⁷, and the National Universities Degree Consortium²⁸. Partnerships are fragile entities, though I am sure that they can work where partners bring something concrete to the partnership, in the form of intellectual capital and reputation, and everyone gets something out of it. However, partnerships built around something as fragile as the e-University with its offer of an administrative platform seem to me to be really fragile because, in the end, I suspect that any half-competent provider is going to ask why they need a middleman.

My money is on big universities created by growth and mergers. Coase's theory of transaction costs within the firm (Coase, 1937) supports the case that, whenever it is cheaper to do things within a larger organisation, rather than in a smaller organisation or as an individual, organisations will grow bigger (Downes and Mui, 1998). Of the 100

²⁴ Scottish Knowledge is a global higher education consortium that brings together Scotland's 14 universities, Edith Cowan University in Australia, and other providers, plus News International plc.

²⁵ This is a consortium led by the University of Melbourne, which plans to establish itself as a global player in international distance education.

²⁶ Illinois-based Internet university UNEXT.com and its newly-created Cardean University which is partnering with leading academic institutions such as Columbia Business School, Stanford University, University of Chicago Graduate School of Business, Carnegie Mellon University, the London School of Economics and Political Science, and other high-profile universities to sell business-oriented online MBA courses to multinational and overseas corporations

²⁷ The American Distance Education Consortium (ADEC) with sixty institutional and affiliate members sharing in providing specialised courses and programmes, internationalising their offerings and purchasing expensive satellite time – c.f. Poley, J. (2001) 'The American Distance Education Consortium: From rural provision to virtual organization' in C. Latchem and D. Hanna (eds.) *Leadership and Management in Open and Flexible Learning*, London: Kogan Page.

²⁸ The National Universities Degree Consortium (NUDC) which enables 11 accredited US universities to collaborate in offering well over 1,000 certificate, baccalaureate degree and graduate degree programmes, and facilitates substantial cooperation in marketing and student support.

biggest economic entities in the world, 48 are countries, and 52 are multi-nationals (Elliott, 2001: 23). Currently, mergers are the order of the day, and it is often big companies that are merging with each other. *The Economist* (13 December, 1997) celebrated the BP-Amoco merger with the headline “Big Oil is Dead. Long Live Enormous Oil” (cited in Brown and Duguid, 2000: 24). ‘Third wave’ information sector businesses are as prone to mergers as any other (ibid.: 25). Scale could also be important in higher education. One recent book cites John Daniel’s *Mega-universities and Knowledge Media* as evidence of the search for scale in the university sector (ibid.: 25), and mergers are an obvious way to move this process forward. Indeed, companies from other industries – including publishing – are using mergers and acquisitions to enter the education and training market (Moe, Bailey and Lau, 1999). Having said that, I do not discount small-scale operations either – a point I made in an article (Rumble, 1998) written some three years ago where I argued that just as the origins of universities lay in the twelfth century development of an intellectual class whose profession was “to think and share their thoughts” (Le Goff, 1993: 1), and who initially operated in “workshops out of which ideas, like merchandise, were exported” (ibid.: 62), and who were paid directly by their customers (a practice that continued at the University of Bologna where academics were paid by the students who attended their lectures), so there will be those modern academics who use the internet to set themselves up as the contemporary equivalent of the twelfth century knowledge artisan. The problems such global, internet-based knowledge artisans will face are twofold – getting known, and getting validation so that their courses can count towards some kind of recognised qualification. In my article I suggested how loosely federated groups of academics, operating in the manner of a law chamber, might work together in a post-bureaucratic organisational structure (Heckscher, 1994). That such organisations are possible and might exist, however, does not take away from the fact that the advantage lies with bigness, and the cost of entry is now so high that it is difficult for small ventures to enter the global market.

Whatever the outcome – disaggregation, partnerships, or mergers – the prime motivation is to survive in a competitive world, and competition is going to increase. With an Internet education market that was worth US\$200 million in 1997 expected to be worth over \$7 billion in 2002, it is not surprising that people see this as a sector for investment (Giegerich, 2000). The new entrants to the game – whether they are new partnerships, corporate universities operating as profit centres, for-profit educational institutions, or virtual universities, will provide existing ODL providers, including publicly-funded ones such as the Open University, with stiff competition²⁹. There will be plenty of scope for comparative shopping – something that the net facilitates enormously. As cost, convenience, quality and reputation come to drive students’ decisions, so comparative shopping will become more and more important. In this game organisations with high costs could lose out, especially if they are not among the top global brand names.

The drive to reduce costs in order to compete will also lead to internal changes – many driven by the need to cut costs in the face of competition. I draw these together in my conclusions.

²⁹ Two years later things look a little different – but that could be a temporary blip rather than a definite conclusion. My instinct tells me that competition will increase. [GR, 2003]

Conclusions

A Canadian scientist, Ursula Franklin, wisely observed: “Whenever someone talks to you about the benefits and costs of a particular project, don’t ask ‘*What* benefits?’, ask ‘*Whose* benefits and *whose* costs?’ At times it helps to rephrase an observation in line with a perspective from the receiving end of technology.” (Franklin, 1992: 124).

In conclusion, then, I want to address Franklin’s questions – whose benefits, and whose costs? David Noble, currently perhaps the most vehement critic of distance education, is wrong to see the battle lines solely in terms of a struggle between “on the one side university administrations and their myriad commercial partners, on the other those who constitute the core relation of education: students and teachers” (Noble, 1997). For some academics, online education has opened up all sorts of exciting possibilities to do research, publish, go to conferences, establish reputations, and so on – and I do not blame colleagues for making the most of these opportunities. Things have not been this good since the heady days of the last great technological leap forward to influence our field – Educational Television – and there are those who quite legitimately are on the roll.

For those who develop the materials, the situation is mixed. Many will find the art of designing multi-media courses for delivery over the Web an exhilarating challenge. Others, working in traditional institutions where they are also required to deliver face-to-face classes, may feel that there is more than a hint of exploitation. Personally I think that academics working on the course development side of the business are particularly vulnerable to the erosion of their current contractual benefits, and to labour-for-labour substitution as consultant authors replace permanent staff. It is not surprising that Noble sees the “spectre of faculty resistance” stalking the land (Noble, 1997).

What of the academics who teach on-line? It all depends where one comes from. If one already teaches in a campus environment, then teaching online will almost certainly add to one’s working hours, unless, of course, student loads are reduced. However, the introduction of distance teaching methods into a campus setting is also likely to accelerate the tendency to divide labour between those who develop materials and those who teach. The latter in particular are likely to be hired on a casual basis. For some academics, the costs will show up in the degradation of their jobs, in increased insecurity, even in loss of permanent status. Changes in an industry have always resulted in changes that affect labour, and the present case is no exception.

For those who already teach in a distance education setting, the real problem is one of increased workload. Of course, teaching online can be exhilarating but how about paying tutors for their additional work?

I have suggested that e-education is pushing costs up. There is little doubt that online teaching is more expensive than print and audio-based forms of distance education, while the savings on-campus – if any – seem to me to result more from the degradation of academic labour than from anything else. However, if we broaden the definition of online teaching to encompass a fully fledged e-education system, then there are savings to be achieved, both within campus-based and within existing distance teaching institutions. These savings will be made in administration³⁰. E-business practices should bring down

³⁰ But note the qualifications I am now making – c.f. footnote 3. [GR, 2003]

the costs of administering education. This will only happen in existing institutions, of course, if managers are prepared to make structural changes. However, new entrants, operating without prior constraints, will force the pace of competition, making structural change in existing distance providers such as the Open University – and in traditional universities – inevitable. Layoffs, labour for labour substitution, and degradation of work will follow. Just as an example, in my view the whole push for devolved admissions, student records, and advisory systems based in regional centres, which so preoccupied OU regional staff in the 1990s, has been overtaken by the march of technology: the processes should be online and on-telephone. Savings here are needed so that we can afford CMC within the e-education package offered by the OU.

This does not mean that some individuals will not make a virtue of, and indeed flourish, as freelance, portfolio workers – authoring for, designing, editing, and tutoring for, organisations such as the Open University, the National Extension College, and the e-University, but many others will, I suspect, loose out as they are shed from the permanent staff of changing bureaucratic organisations.

Let me move away from the people to the institutions themselves. E-education is here to stay. Half-baked dot.coms may have gone to the wall, but e-education is in my view an assured ‘killer-app’, just as much as the Web is a transformative technology³¹. From an institutional point of view, e-education is a game distance educators cannot avoid, and the game is about organisational survival. It is possible, of course, to survive as a small fish, but it will be easier to do so if one is big, where economies of scope come into play. To be big, organisations should think about mergers. These may embrace other educational organisations. They should embrace organisations in associated industries – for example, publishers and media groups. Venture capital is worth going for. Reputation will be a key asset. Educational organisations with strong international brand names will be powerful competitors. Mergers designed to protect or enhance the brand will be important. Strategic partnerships are less robust, which is why I think the e-University has a problem.

What about the students? Their studies will potentially be enriched. However, because online teaching pushes up the costs of distance education, and because these additional costs will be passed on to students, this will make access more difficult for some. Nevertheless, e-education is going to grow, partly because it meets some customer/student expectations for convenience, and partly because, in its fully-fledged form, it has pedagogic advantages over other forms of distance education.

Nevertheless, finding a satisfactory answer to Franklin’s question seems a lot harder now as societies and nations fracture across ever widening gaps in wealth. The Open University was born with a highly developed sense that it was committed to ironing out some of the inequalities that resulted from an elite educational system. It led the way towards mass education in this country, and it exported its system in the belief that this would help developing countries expand their education systems. Given where we are, the Open University may well not have a choice in what it does, but increasingly I think that the choices it is being forced to make are at the expense of the ideals that led to its birth. That may not be a price too high for survival and development, but it is a significant cost.

³¹ A statement I continue to believe. [GR, 2003]

References

- Annand, D. (1999). The problem of computer conferencing for distance-based universities. *Open Learning*, 14 (3), pp. 47-52.
- Arizona Learning Systems (1998). *Preliminary cost methodology for distance learning*. Arizona Learning Systems and the State Board of Directors for Community Colleges of Arizona.
- Arvan, L., Ory, J. C., Bullock, C. D., Burnaska, K. K., & Hanson, M. (1998). The SCALE Efficiency Projects. *Journal of Asynchronous Learning Networks*, 2 (2). Available at http://www.aln.org/alnweb/journal/vol2_issue2/arvan2.htm
- Bacsich, P., Ash, C., Boniwell, K., Kaplan, L. with Mardell, J. & Caven-Atack, A. (1999). *The cost of networked learning*. Sheffield: Sheffield Hallam University, Telematics in Education Research Group.
- Bates, A. W. (1995). *Technology, open learning and distance education*. London: Routledge.
- Bates, A. W. (2000). *Managing technological change. Strategies for college and university leaders*. San Francisco: Jossey-Bass Publishers.
- Blauner, R. (1964). *Alienation and freedom*. Chicago: Chicago University Press.
- Boettcher, J. V. (1999). *How many students are just right in a web course?* Available at <http://www.designingforlearning.info/services/writing/number.htm>
- Boucher, A. (1998). Information technology-based teaching and learning in higher education: A view of the economic issues. *Journal of Information Technology for Teacher Education*, 7 (1), pp. 87-111.
- Bell, D. (1960). *The end of ideology*. Glencoe, Ill.: The Free Press.
- Bell, D. (1973). *The coming of Post-industrial Society*. New York: Basic Books.
- Brown, J. S., & Duguid, P. (2000). *The social life of information*. Boston, Mass.: Harvard Business School Press.
- Coase, R. H. (1937). The nature of the firm. *Economica NS*, 4 (16), pp. 386-405.
- Costello, N. (1993). Organisational cultures and distance learning. *Open Learning*, 8 (3), pp. 3-11.
- Dhanarajan, R. (2001). Distance education: Promise, performance and potential. *Open Learning*, 16 (1), pp. 61-8.
- DiBiase, D. (2000). Is distance teaching more work or less? *American Journal of Distance Education*, 14 (3), pp. 6-20.
- Downes, L. & Mui, C. (1998). *Unleashing the killer app: Digital strategies for market dominance*. Boston: Harvard Business School Press.
- Elliott, L. (2001). Novelists tell fact from fiction. *The Guardian*, January 15 2001, p. 23.
- Escotet, M. (1980). *Tendencias de la Educación Superior a Distancia*. San José, Costa Rica: Editorial Universidad Estatal a Distancia.
- Franklin, U. (1992). *The real world of technology*. Concord, Ontario: House of Anani Press Ltd.

- Giegerich, A. (2000). *Corporate strategies: the benefits of education*. *Business Journal of Portland Online*, 27 March, available at <http://www.bizjournals.com/portland/>
- Gladieux, L. E., & Swail, W. S. (1999). *The Internet: New engine of inequality?* Paper presented to the EDUCAUSE'99 Conference. Available at <http://net.educause.edu/ir/library/html/edu9949/edu9949.html>
- Grint, K., & Woolgar, S. (1997). *The machine at work. Technology, work and organization*. Cambridge: Polity Press.
- Harasim, L. (1989). On-line education: a new domain. In R. Mason & A. Kaye (eds.), *Mindweave. Communication, computers and distance education*. Oxford: Pergamon Press.
- Harris, D. (1987). *Openness and closure in distance education*. Barcombe: The Farmer Press.
- Heckscher, C. (1994). Defining the post-bureaucratic type. In C. Heckscher, & A. Donnellon (eds.), *The Post-bureaucratic Organization: New perspectives on organizational change*. Thousand Oaks: Sage Publications.
- Holmberg, B. (1995, 2nd edn.). *Theory and practice of distance education*. London: Routledge.
- Howard, E. G. (1996). Satellite Solution: Popping up like Dandelions, Satellite Campuses tighten Bond of Learning, Students. *Kansas City Business Journal*, 14, sec. 1, p. 7.
- Hülsmann, T. (2000). *The costs of open learning: A handbook*. Oldenburg: Bibliotheks- und Informationssystem der Carl von Ossietzky Universität Oldenburg.
- Inglis, A. (1999). Is online delivery less costly than print and is it meaningful to ask? *Distance Education*, 20 (2), pp. 220-39.
- Jamison, D. T., Suppes, P., & Wells, S. (1974). The effectiveness of alternative media: A survey. *Review of Educational Research*, 44 (1), pp. 1-67.
- Jewitt, F. (1999). *A Framework for the comparative analysis of the costs of classroom instruction vis-à-vis distributed instruction*. Study undertaken for the New Jersey Institute for Collegiate Teaching and Learning. California State University, March 1999.
- Jung, I. (2000). Technology innovations and the development of distance education: Korean experience. *Open Learning*, 15 (3), pp. 217-32.
- Kerr, C., Dunlop, J. T., Harbinson, F. H., & Myers, C. A. (1964). *Industrialism and Industrial Man*. London: Oxford University Press.
- Leach, K., & Smallen, D. (1998). What do Information Technology support services really cost? *CAUSE/EFFECT*, 21 (2), 38-45. Available at <http://www.educause.edu/ir/library/html>
- Leach, K., & Smallen, D. (2000). *What do we really understand about the cost of IT support services?* Presentation to the EDUCAUSE 2000 Conference. Available at <http://net.educause.edu/ir/library/html/cem/cem98/cem9829.html>
- Le Goff, J. (1993). *Intellectuals in the Middle Ages*. Blackwell: Oxford.
- Levine, A. (1993). Student expectations of college. *Change*, September/October, p. 4.

- Mayadas, A. F. (n.d.). *How the term "ALN" came about?* Available at <http://www.alnorg/alnweb/aln.htm>
- Moe, M., Bailey, K., & Lau, R. (1999). *The book of knowledge: Investing in the growing education and training industry*. San Francisco: Merrill Lynch.
- Moonen, J. (1997). The efficiency of telelearning. *Journal of Asynchronous Networked Learning*, 1 (2). Available at <http://www.sloan-c.org/publications/jaln/index.asp>
- Naughton, J. (2000). Much more than a bubble. *The Observer*, 31 December 2000, p. 23.
- NBEET (National Board of Employment, Education and Training) (1994). *Costs and quality in resource-based learning on- and off-campus. Commissioned Report no. 33*. Canberra: Australian Government Publishing Service.
- Nipper, S. (1989). Third generation distance learning and computer conferencing. In R. Mason, & A. Kaye (eds.). *Mindweave: Communication, computers and distance education*. Oxford: Pergamon Press.
- Noble, D. (1997). *Digital diploma mills, Part I: The automation of higher education*. Available at <http://communication.ucsd.edu/dl/ddm1.html>
- Noble, D. (1999). *Digital diploma mills. Part IV, Rehearsal for the revolution*. At <http://communication.ucsd.edu/dl/ddm4.html>
- Oblinger, D. (2001). Will e-business shape the future of open and distance learning? *Open Learning*, 16 (1), pp. 9-24.
- Perraton, H. (2000). *Open and distance learning in the developing world*. London: Routledge.
- Peterson, R. W., Marostica, M. A., & Callahan, L. M. (1999). *E-Learning: Helping investors climb the e-learning curve*. Minneapolis: US Bancorp Piper Jaffray.
- Phelps, R. H., Wells, R. A., Ashworth jr., R. L., & Hahn, H. A. (1991). Effectiveness and costs of distance education using computer-mediated communication. *The American Journal of Distance Education*, (3), pp. 7-19.
- PricewaterhouseCoopers (2000). *Business model for the e-University, Main report*. Available through http://www.hefce.ac.uk/pubs/HEFCE/2000/00_44.htm
- PwC (1998). *Technology Forecast: 1999*. Menlo Park, CA: PricewaterhouseCoopers Technology Center.
- Ravet, S., & Layte, M. (1997). *Technology-based Training. A comprehensive guide to choosing, implementing, Managing and developing. New technologies in training*. London: Kogan Page.
- Ritzer, G. (1993). *The McDonaldization of society*. Pine Forge Press: Thousand Oaks, CA.
- Ritzer, G. (1998). *The McDonaldization thesis*. London: Sage Publications.
- Roderick, E (1998). *More than just pretty pictures: A cost/benefit analysis of digital library holdings*. A paper presented to the CAUSE98 Conference, Seattle, December 1998. Available at <http://net.educause.edu/ir/library/html/cnc9804/cnc9804.html>
- Rumble, G. (1997). *The costs and economics of open and distance learning*. London: Kogan Page.

- Rumble, G. (1998). Academic work in the Information Age: A speculative essay. *Journal of Information Technology in Teacher Education*, 7 (2), pp. 129-45.
- Rumble, G. (1999). Cost analysis of distance learning. *Performance Improvement Quarterly*, 12 (2), pp. 122-37.
- Tolley, S. (2000). How electronic conferencing affects the way we teach. *Open Learning*, 15 (3), pp. 253-65.
- Turoff, M. (1998). Alternative futures for distance learning: The Force and the Darkside. *Online Journal of Distance Learning Administration*, 1 (1). Available at <http://www.westga.edu/~distance/turoff11.html>
- U.S. Bureau of the Census, International Data Base. Estimate as at 10. 5. 2000: [http://
http://www.census.gov/ipc/www/idb/](http://http://www.census.gov/ipc/www/idb/)
- U.S. Bureau of the Census. International Data Base, as at 1 January 2001. <http://www.census.gov/ipc/www/idb/>
- Van der Brande, L. (1993). *Flexible and distance learning*. Chichester: John Wiley & Sons.
- Whalen, T. & Wright, D. (1998). *Cost-benefit analysis of web-based tele-learning: Case study of the Bell Online Institute Pilot Project*. University of Ottawa: Faculty of Administration.
- Whalen, T. & Wright, D (1999). Methodology for cost-benefit analysis of web-based tele-learning: Case study of the Bell Online Institute. *American Journal of Distance Education*, 13(1), pp. 24-44.

12. The Costs and Costing of Networked Learning

This paper was originally published in Journal of Asynchronous Learning Networks, Vol. 5, No. 2, September 2001. It is accessible in its original form at www.aln.web

Introduction

Until the late 1950s there was relatively little interest in the costs of education, and virtually none in the costs of educational technology. This failure reflected the fact that innovation in teaching methods was a largely marginal activity: as one early analyst put it, “education’s technology, by and large, has made surprisingly little progress beyond the handicraft stage” (Coombs, 1968: 7). However, the rising demand for and escalating costs of education led to attempts within the newly developing sub-discipline of the economics of education to quantify both the efficiency of public expenditure on education, and the economic benefits of providing it (Vaizey, 1958; Schultz, 1961). Educational technology came to be seen as a way of improving the efficiency of education through productivity increases. As a result analysts began to research into the costing of educational technology and the actual costs of distance education systems (for a fuller account of this work, see Rumble, 1999).

Much of the early work undertaken under the auspices of the World Bank, UNESCO and USAID focused on the costs and cost structures of educational broadcasting projects (Jamison, Klees and Wells, 1978; Eicher, 1980; Eicher et al., 1982; Orivel, 1992). Within the UK other experts focused on the costs of using educational technology either for distance teaching or as a substitute for classroom teaching on campus (Fielden and Pearson, 1978; Crabb, 1990; Rumble, 1986a, 1988). Some of this work was developed further in Australia within the context of universities mixing traditional and distance education approaches (Rumble, 1986b; Deakin University, 1989).

The development of networked learning has once again raised similar questions as policy makers and analysts ask both whether networked learning is cheaper or more expensive than other approaches to education, and what needs to be taken into account in costing such systems.

Frameworks for Costing

The key to much of the early work lies in the attempt to identify clearly the nature of the costs involved, and what drives them, so that not only can all the relevant costs be taken into account, but also their behavior within planned or actual systems can be modelled.

So far as the nature of the costs are concerned, most studies adopt the conventional distinction between capital costs (buildings, equipment and furniture) which are annualized over their expected life, and revenue costs. The latter are normally categorized as staffing costs (including on-costs) and non-staffing costs (covering revenue expenditures on premises, stocks, supplies, consumables, and expenses). Generally capital costs have been regarded as non-recurrent costs - though the short life of some capital items, particularly in the IT area, means that institutions are increasingly treating such budgets as a recurrent item that is treated in much the same way as revenue budgets are. On the

other hand, revenue expenditure on the development of course materials (which involves considerable expenditure on labor) in fact behaves very much like capital expenditure, incurred when the course is designed but expected to retain some value over the expected life of the course. While annualisation of traditional capital costs is commonplace, the annualisation of course development costs is less so. The failure to annualise course development costs is problematic given that the length of life over which courses last is a major factor in the overall efficiency of technology-based education.

At the macro-level the costs of any system are driven by a combination of the following factors, all of which are susceptible to management control:

- Course populations
- The number of courses offered
- The lengths of course lifetimes
- The media and technologies chosen
- The extent to which cost-inducing actions, for example, the use of copyrighted materials, are avoided
- The extent to which costs are placed on students, either as tuition, or by moving the system boundaries so that activities the institution might once have paid for are now paid for by students (e.g. access to tutorial and library services)
- The extent to which the institution employs people on contracts *for* service (i.e. salaried posts) to develop courses and teach students, rather than on contracts *of* service (i.e. hired as casual labor, to be paid by the manuscript/script/tutorial hour/test marked, etc.)
- The extent to which the institution adopts working practices that reduce the costs of labor by, for example, designing courses to be wrapped-around existing textbooks rather than developing new materials, and using author-editor models of course design, rather than big course team models
- The use of technology to increase the student load per academic or administrator
- Increases in the teaching load of academic staff at the expense of other functions - for example, research and public service, and ...
- ‘Labor for labor’ substitution - the replacement of expensive academic labor by student and adjunct labor, in order to reduce staff costs.

An important element in costing is to understand the system being costed so that cost elements are not missed. Far too many analysts restrict their analysis to their own budget. Of course, understanding one’s own budget and controlling it is important. The answers one obtains to questions such as “How much will this cost me?” and “Will doing it this way cost more or less than doing it that way?” will help one decide whether, from a purely parochial interest, one should or should not proceed with a given course of action. However, the wider one’s span of interest, the more one will want to look at the macro-picture. Individual teachers may be content to find out whether teaching online, for example, takes them more or less time than teaching face-to-face, but departmental heads will want to know whether they can teach more courses and/or more students per course, and what the effect will be on their expenditure and their income. Institutional heads will be concerned with all the above questions, but will also

want to know what the impact is on administrative costs, while institutional heads and national educational planners may want to know whether teaching online is cheaper or more expensive than teaching face-to-face or by some other distance teaching methodology. Students will want to know whether taking a course online adds to their costs, or saves them money and/or time - and actually academics, course leaders, and institutional leaders should care deeply about student costs, since student decisions on whether or not to study with a particular institution will be driven in part by cost considerations. These considerations will go beyond the cost of tuition to cover the costs of engaging with the course ('Do I need a computer to study this course? What travel costs might I incur? How much will the materials I need cost me? Will I spend significant amounts of money online? What are the opportunity costs if I take this course?' etc.). This argues for a whole systems approach to the costing of projects that moves beyond the immediate concerns of individual course and departmental budgets to take account of the cost implications of the system as a whole on overhead functions and the customer.

The use of learning materials has already resulted in a sharp temporal differentiation between the design and delivery phases of the activity of teaching, with the design and production of complex multi-media courses beginning many months before they are taught, thus separating these activities in time (and often across budget years). Once created, the materials can be packaged in various ways and used, often for a number of years, on a range of different courses. They can also be used by very large numbers of students. All this makes it less likely that a single member of faculty will control the whole teaching-learning process from materials design through to delivery. On large population courses the chances are that not only will most of the actual interaction and assessment of students have to be farmed out to auxiliary teachers, but much of the administration of the teaching-learning-assessment process will also be handed to professionals whose task it will be to seek economies of scale and process. Division of labor between those who design the materials, those who teach the courses, and those who administer and support student progress, follows. Indeed, the capital nature of the costs expended on course development, the division of labor that occurs in many systems, and the fact that materials once developed may be repackaged for use on a number of courses, argue for a clear distinction to be made between materials development and course delivery.

To date issues around the division of labor have been seen most clearly in distance education - most notably in large-scale 'first generation' correspondence systems, and in 'second generation' educational broadcasting and 'third generation' multi-media systems. This 'Fordist' tendency has been greatly criticized by those who see it as a reflection of the increasing degradation of academic work. It has been suggested that just as cottage-industry correspondence systems can be run by faculty who retain control over the whole teaching-learning process, so the development of online education allows faculty to teach at a distance without losing control of their course - and indeed this is true in some cases. However, a division of labor is likely to occur because in the long run any system that limits control of design and delivery to a single person limits both the range and sophistication of the materials that can be developed, and the number of students that can be supported, and is thus inherently cost-inefficient given the much greater economies of scale and process achievable in systems designed around the division of labor.

In addition, a range of more immediately personal issues arises for faculty involved in the development of materials. For example, will such an academic have to continue to teach traditional students in class at the same time as he or she develops the internet course? Will he/she be given time off to compensate them for the time spent developing the course, and if so who will help teach the traditional course? Will he/she be given no immediate help in the development of the course, but then be allowed - as happens in the French system - to substitute resource-based learning for personal teaching in the delivery phase, thus freeing up time that can then be spent on other more personal objectives (such as research and public service)?

To these issues must be added issues around the actual teaching of online courses, including such issues as the evolution of new academic roles such as e-moderating (Salmon, 2000), and the extent to which teaching online requires more or less time of academics.

So far we have focused on the use of the network for academic purposes - in essence as the location through which ethereal (i.e. non-physical) course materials can be accessed, and as the site through which electronic dialogue and discourse takes place. But a fully developed e-education system would use the network and website as the location for the administration of the learners' progress through the institution - that is, as the site through which students would electronically enroll, pay for their courses, change their records, and seek general counseling and advise. The development and maintenance of a web site to support academic and administrative functions must therefore be seen as an integral part of the provision of an e-education system, and hence of part of the costs of the system.

Those working within the teaching institution will of course be able to access the web site easily through the institution's own network - but remote tutors and students also need access to the web site. This generally means providing their own computing equipment and connections to the web - though occasionally an institution may help by setting up tele-learning centers where students (and tutors) can make use of institutional equipment to access the site. Either way, the costs of access/reception are an integral part of the system as a whole, and need to be taken into account, if not for budgeting purposes, then at least for purposes of cost analysis.

On top of these elements are the costs of managing an e-education system. In virtual education institutions these overhead costs will be obvious, but in dual mode systems there is the possibility that these costs can be set aside, at least for a while, in order to give the e-education system a 'free' ride. Such free rides will not survive expansion, nor can they be ignored in cases where comparative costings between online and other systems are being attempted.

Thus the institutional costs of a fully developed e-education systems would include:

1. Developing e-materials
2. Teaching (and assessing) students online
3. Accessing the web site
4. Administering students online
5. Providing the infrastructure and support within which e-education can operate
6. Planning and managing e-education at the macro-level.

However, one is likely to find that the range of costs is very great. This arises in part because there are very different ideas as to what online learning actually is - varying from those who see it in terms of access to materials and to assessment schemes that favor multiple choice formats, to those who stress the communicative and constructivist nature of the dialogue that can occur between teacher and students, and among students. These different expectations of online learning are reflected in the costs of systems, making it hard to come to any concrete conclusions about their costs.

Costing Online Learning

In the light of the development of networked learning, a new generation of academics, interested in the impact of online learning on the costs of education, has begun to evolve a methodology by which to approach the task of costing such systems (Boucher, 1998; Whalen and Wright, 1998, Bacsich et al., 1999; Webb and Cilesio, 1998, 1999). None of these studies provides a wholly comprehensive approach to the costs of networked learning. Such an approach would require an analysis that looked at the costs of a system:

- (a) by expenditure category (using the traditional distinctions between human resource or staff costs, premises and accommodation costs, equipment and furniture costs, and the costs of stocks, supplies, consumables and expenses), and
- (b) by contributor (e.g. the institution's own budget, partner institutions' inputs, direct government inputs, aid agency inputs, staff inputs, and student inputs), while
- (c) distinguishing between capital and revenue costs, with the former, including the investment in course materials, annualized over their expected life, and
- (d) where this seems sensible to the analyst, using an appropriate systems framework for the analysis of costs.

If this provides a framework for the analysis of the costs of online learning, the next issue must be, exactly what kinds of costs are being identified, and how should they be treated? The first thing to say is that all the relevant costs should be identified. Secondly, costs should not be netted off from income since this hides the full costs involved. In fact, examination of the work done to date shows that the different analysts:

- Lack agreement on the costs that should be taken into account. This is particularly the case with regards to overhead costs (i.e. the costs analyzed here within the regulatory and logistics sub-systems) that are, in general, ignored.
- Employ very different labels or terms to describe what they are costing. This reflects jurisdictional and linguistic differences in terminology, local institutional practice, and personal preferences.
- Aggregate or disaggregate costs in different ways.
- Employ a variety of frameworks to give coherence to their work.

Appendices 1-3 look at the costs of online learning, using a functional approach as the primary thrust of the analysis to distinguish between the costs of online materials development (Appendix 1), e-education delivery costs including teaching, assessment, and web access (Appendix 2), and overhead costs (Appendix 3). Within each of the tables that make up these appendices, column 1 of the table provides a brief description of the kind of expenditure involved, and this is then categorized (column 2) by

expenditure type, viz. human resource (staff), buildings and accommodation, equipment and furniture, stocks, supplies, consumables and expenses. Finally, in column 3, there is a series of notes on the treatment of these costs.

While I have tried to be inclusive in my approach, I am conscious that there may be areas of cost that have not been identified either in sufficient detail, or at all. The items of expenditure identified should be regarded as illustrative rather than definitive. Analysts can, of course, adopt a different schema if they feel that this will be helpful.

However, the attempt to be inclusive does raise important issues about the scope of any costing project - that is, just how wide a range of costs should be included? Within an institution, this revolves largely around issues to do with the treatment of overhead costs, but there are wider ramifications - notably, the contributions made by other stakeholders including students and staff (particularly pertinent if time and expenses are not fully reimbursed). Any study that seeks to compare the costs of one system with another (say, the costs of networked learning with traditional teaching, whether within a single institution or across institutions) should take a full-cost approach. Where this is not done, the comparison risks being misleading.

The Costs of Online Learning

What do we know about the costs of networked learning? The major costs of e-education can be usefully considered under the three heads identified above - viz. the costs of developing web-based materials, the costs of e-education delivery, and the overhead costs of embarking on e-education. I shall take these in order.

A. Costs of developing online learning materials

Most of the technologies involved in Web-based courses have been around for a long time. They include the preparation of text, audio, video, computer-based tutoring, intelligent tutoring, exploratory learning, simulations, etc. What is distinctive is that these materials are now being put on a web site that can then be accessed by students. For many years distance educators have known that not only do media and technologies have their own cost structures, but also that some media are more expensive than others. Bates's analysis of the costs of various media concluded that print, audio-cassettes, and pre-recorded Instructional Television are the only media that are relatively low cost for courses with populations of from under 250 students a year to over 1000 student a year. In addition, radio is also likely to be low cost on courses with populations of 1000 or more students (Bates, 1995: 5). Hülsmann (2000: 17), on the basis of his study of the costs of 11 courses offered by 9 different European distance teaching organizations, argues that at £350 per student learning hour print is the cheapest medium to develop. Putting text up on the internet costs at least twice that, and possibly more. After that costs escalate through audio (£1,700), CD-ROM (£13,000), video (£35,000) and TV (£121,000).

These figures are based on averages across eleven courses in nine institutions, and hence need to be treated with care, given the wide variations in costs encountered in practice. However, the broad differences in media costs are carried through into the development of internet-based courses. Arizona Learning Systems (1998: 13-14) found a wide variation in the costs of developing a course, of from US\$6000 to \$1,000,000 for a three unit internet course, depending on the approach used. Much of this is the cost of academic and technical labor. The cheapest approach involved the presentation of simple

course outlines and assignments; the most expensive, at \$1,000,000, involved virtual reality (see Table 1).

Table 1: Cost of developing a three-unit internet course (US\$)

(Arizona Learning Systems, 1998)

Course outlines and assignments	6,000
Text	12,000
Text with reference material	18,000
Text with reference material and images	37,500
Audio and video	120,000
Simulations	250,000
Virtual Reality	1,000,000

The high costs of developing internet courses are confirmed by Saba, who suggests that commercial software companies developing courses for online instruction or publishers are spending at least \$500,000 to fully develop a multimedia course (Saba, 1999).

There is some evidence that the lower levels of cost are more likely to be found on synchronous online courses, with asynchronous courses costing more. Certainly Whalen and Wright found significant differences between synchronous and asynchronous course development costs. The former required much less development time because they involved fewer media (Whalen and Wright, 1999: 32).

A high proportion of the costs of developing materials is labor costs. All the research shows that it takes more academic time to develop media that will occupy a student for one hour, than it takes to develop a one hour lecture - although how much more time is difficult to quantify. Sparkes (1984: 219) reckoned that it took from 2 to 10 hours to prepare a lecture, from 1 to 10 hours to prepare a small group session, and from 3 to 10 hours to prepare a video-tape lecture; however, it took at least 50 to 100 academic hours to prepare a teaching text, 100 hours to prepare a television broadcast, 200 hours to develop computer-aided learning, and 300 hours to develop interactive materials - to which in all cases one needed to add the time of technical support staff. Boettcher (1999a) suggests that it takes an average of about 18 hours faculty time to create an hour of instruction online. Academic development costs can be reduced or at least kept in check by adopting cheaper approaches to course development - for example, author-editor models based on an editor working with consultant authors, instead of hiring permanent staff.

One of the problems with many of the studies now available is that they report the broad results, not the detail. It is therefore difficult to know what has been included and what excluded, and so whether the costings undertaken are comprehensive. Experience suggests, however, that all figures need to be treated with care. What does seem clear is that the costs of developing a course are being pushed up - and significantly so whenever media are used in a sophisticated way. If so, and if cost efficiency is an important consideration, then savings may need to be looked for in delivery.

B. The costs of e-delivery

Although the development costs of even relatively simple online materials may be higher than paper-based print, it seems fairly clear that there are considerable institutional savings on delivery costs. The Library of Virginia has digitized the state's colonial

records. This has drastically reduced the costs of fulfilling requests from readers. The costs to the library of providing a single copy of a four page report in digital format is just 90 US cents, compared with \$19 to supply a surface-mail customer, and \$12 to supply an on-site user (Roderick, 1998). Applied to course materials, online delivery to order could cut inventory, packing, and postage costs enormously. Online library services like those offered or under development by XanEdu and Questia are likely to be invaluable - provided the subscription rates that users are to be charged are not unreasonably high. However, students used to their course materials dropping through their letterboxes are likely to see their study costs rise as they access and perhaps pay for materials online, and print them off themselves.

What about the costs of computer-mediated communications and assessment? Here we get into the costs of labor and the problems of student load. Bates has suggested that in comparison with face-to-face teaching, CMC will lower the costs of tuition because a good deal of the students' time is spent studying the material, and so the teacher needs to spend less time per student overall in class (Bates, 2000: 126-7). Other analysts argue that students will also spend a great deal more time learning from their peers, and that this too will reduce the demands they make of their tutors. Certainly DiBiase (2000: 15-16), teaching for Penn State University's World Campus, found that he and his Teaching Assistant were spending less time supporting students on an online course (1.6 hours per student against 2.6 hours on a regular course).

However, the general consensus seems to be that online tutoring adds to traditional faculty workload (Arizona Learning Systems, 1998: 30) given the enormous volume of messaging (Moonen, 1997) arising from increased interaction with students (Jewitt, 1999: 37), with each message requiring more time to compose than is the case in verbal interactions (Inglis, 1999: 223). For faculty, teaching online opens up the possibility that they are always in session - which translates into 'taking more time' (Schifter, 2000). Moonen (1997) thinks that the increased load would be of the order of 5 to 10 hours a week for a class of 60 to 120 students. Jewett (1999: 41) thinks tutors could well spend twice as much time tutoring online as they do face-to-face. This raises the question of how many students an online instructor can handle. In classroom courses in the USA it looks as if people think they can handle from 25 to 30 students, working perhaps 10 to 12 hours a week. Boettcher (1999b) suggests that experience indicates that a member of faculty can handle more students on a web course - in the range 25 to 65, but that this will require more time - so that although there are courses with 50 - 60 students on them, there are many courses where student numbers are deliberately kept down, somewhere in the range of from 12 to 20 students.

One way of coping with an academic's increased workload is to hire more staff but this, of course, costs more. However, the impact on labor costs can be reduced through 'labor-for-labor' substitution - that is, the substitution of cheap labor for expensive faculty labor. This cheap labor might be students (Arvan et al., 1998), teaching assistants, or clerks covering help desks (Arizona Learning Systems, 1998: 24). These options are much discussed in the US literature. However, hiring cheaper labor is not possible in small classes run by just one academic; it only works in large classes (Arvan et al., 1998). Also, labor-for-labor substitution has its critics. Traditionally PhD students have helped teach courses but student labor is not the cheapest labor on offer. Adjunct staff hired by the class is even less expensive - so much so that there is concern that their

employment could damage graduate programs by reducing the employment opportunities for PhD students (Turoff, 1997).

Up to now I have been talking about the impact of CMC on the costs of traditional institutions. What about its impact on the costs of distance education delivery? Firstly, there is evidence that distance tutors spend more time moderating and tutoring e-courses. Tolley, drawing on her experience as a UK Open University tutor, found that she spent more than twice as many hours tutoring the online version of *What is Europe?* as she did the 'traditional' version - 120 hours against 48 (Tolley, 2000: 263). She was not paid for the additional work, which also had a dramatic effect on her phone bill. Annand, from his perspective at Athabasca University, suggests that it is these costs that may in the end constrain the extent to which large-scale distance teaching universities can adopt online technologies (Annand, 1999: 20). Some institutions are trying to find ways of containing demands on tutor time by controlling student expectations and limiting the time for engagement on a particular topic; others, like the e-University, might subcontract tutoring to commercial ventures like Tutor.com, which will charge students for the service (PricewaterhouseCoopers, 2000, paragraphs 79-80).

Secondly, there are the costs of reception. Cost analysis tends to be bounded by the institutional budget. The costs students incur in acquiring and operating equipment is not generally taken into account - yet from the would-be student's point of view, these costs can have a major impact on affordability, and hence on access. In the USA the distribution of computers is highly graduated by income, race/ethnicity, and educational attainment (Gladieux and Swail, 1999). In the Third World, the situation is much worse. If owning the equipment is a necessary condition for participation, then expect to see more disadvantaged people being excluded on cost grounds.

Local centers may, of course, mitigate student costs by providing access to machines, but they cost a fair amount in rent, equipment, furniture and staffing to set up - and generally accommodate very few students at any one time. This is not a solution to mass access - which is why the African Virtual University is such a limited project. Internet cafés cost money to use and are not necessarily ideal environments for study. In any case, in a country like Uganda, anything that uses a telephone line is extremely expensive.

The assumption behind many of the cases put forward to support the development of e-teaching is that the technology will substitute for the labor costs of teaching. Students will, it is assumed, spend a lot more of their time studying independently from the materials, and much less time in formal classes. One potential advantage is that this will make more faculty time available for students to discuss with their teachers what they have learnt independently (Massy and Zemsky, 1995) - but if so, any savings in faculty time disappear and are likely to be at most modest (Arvan, 1997). If there are no savings on faculty time, then the argument begins to focus on balancing the additional technology costs against sometimes more tenuous accommodation savings - which is not to say that some projects such as the Florida Gulf Coast University do not hope to make substantial savings on building costs. In any case, as Massy and Zemsky (1995) comment, actually achieving capital for labor substitutions may prove difficult for many colleges.

One other factor is the extent to which faculty are properly reimbursed for the costs they incur when teaching online. Schifter (2000) reports the very wide range of practice that occurs. Her analysis suggests that many distance teachers do not have their costs reimbursed.

Generally speaking, there are powerful incentives to bring the costs of teaching down. In a situation where the technology, far from reducing contact hours, may be actually increasing faculty hours spent in contact with students, there are powerful pressures to reduce faculty labor costs by substituting cheaper for more expensive labor. This does not always replace experienced by inexperienced staff; some systems go out of their way to hire recently retired faculty who are looking to supplement their incomes. Nevertheless, the fact remains that the pressure is on to reduce costs. Mass education distance teaching universities such as Britain's Open University, with some courses having over 10,000 students enrolled at the same time, have had to employ models based on a division of labor between those who develop the course materials, those who teach/tutor, and those who mark examination scripts. Not surprisingly the Open University employs its tutors and script markers on contracts of service. Institutions that restrict the number of students taking distance courses do not have the same problem. Certainly with the exception of a few institutions such as the non-traditional University of Phoenix, practice in America has generally not led to any systematic restructuring of academic labor force (Berg, 2000). Nevertheless, a general increase in the use of adjunct and part-time faculty has been noted (Finkelstein, Seal and Schuster, 1998), while the pressures to massify and reduce costs must give managers an incentive to hire casual labor.

Another factor at play here is the extent to which costs that used to be met by the teaching institution - or at least were wrapped up in the tuition fees charged - are now being pushed on to students quite overtly.

C. The costs of e-administration

We know very little about the costs of e-administration, but on the whole this may be the area where savings are most likely to occur. Service costs in a range of industries are being brought down as institutions invert traditional processes, such as student services, to focus more on Web-based, self-service models (Oblinger, 2001: 17). A paper-based order costs about \$65 to fulfill - but it only costs around \$5 to fulfil an online order (Naughton, 2000: 23). A paper-based invoice may cost US\$0.90 to produce and distribute; online services can reduce this to something like \$0.40 - \$0.60 (Farmer, 1999), and speed the whole process up. Perhaps 75% to 90% of transactions currently done manually and on paper should be done electronically (Oblinger, 2001: 17). This trend will impact on all educational institutions.

E-commerce practices are also invading education to provide income streams. Many US campuses are now allowing advertising on their web sites - with the income from advertising offsetting the cost of the site (Oblinger, 2001: 15). Some universities - such as Georgetown University - have auctioned spare course capacity on the Internet, with bidders hoping, of course, to get a place on an expensive course at a discount (*ibid.*: 15). We can expect eduCommerce to proliferate (*ibid.*: 15). Certainly the e-University Business Model assumes that this kind of activity will occur (PricewaterhouseCoopers, 2000, paragraphs 194-5).

Nevertheless, entering the e-commerce market has its costs. A Gartner Group report suggests that e-commerce web sites are harder than expected to build, with costs of US\$ 1 million on average - and that this cost is likely to increase by 25% per annum over the next 2 years. Of this cost, 79% is labor-related, 11% hardware, and 10% software (Leach and Smallen, 1998). Few cost studies of online learning appear to cost the development of

the web site at anything like this level of expenditure. This must be a cost in the development of a virtual university. In mixed mode institutions, only part of these costs would now generally relate to the development of an online learning capability. However, the costs of a web site supporting a sophisticated online administrative function are likely to be high.

In general none of the studies undertaken to date adequately factor in the costs of overheads. Although, the costs of putting in equipment directly associated with the projects (e.g., servers) are usually taken into account, as are the costs of software licenses, college operating budgets do not usually reflect the full costs of maintaining networked services (Leach and Smallen, 2000). This is something that the US COSTS project is tackling (Leach and Smallen, 2000; Ritschard and Spencer, 1999). The annualisation of equipment also causes problems. Most of the cost studies annualize equipment over five years (Whalen and Wright, 1998; Arizona Learning Systems, 1998), but in the US in 1998/99 the typical replacement cycle for computers was 3 to 5 years; for central servers 3 to 4 years; and for network electronics, 5 to 6 years (Ritschard and Spencer, 1999). This may seem insignificant - but it impacts on costs significantly, and even more so when the opportunity cost of capital is taken into account. Replacement costs, which tend to rise, are often under-estimated: Ritschard and Spencer (1999) argue that the theoretical replacement cost is the average cost per machine times the number of machines to be replaced. They suggest that annual provision for replacement of computers needs to run at 61% of the theoretical replacement cost. Provision for upgrades of equipment that will not be replaced like-for-like requires an additional 8% of the theoretical budget. Another 6% needs to be set aside for unplanned replacements and unforeseen contingencies; a further 20% budgeted for new staff positions; and another 5% for 'out-of-cycle' changes and upgrades.

Finally, higher-level management costs, including planning and evaluation, are rarely taken into account. Overhead management time is often hard to identify. Much depends on the context- the time spent agreeing that a group of enthusiasts can develop a project will be very different to that required to change an institution's direction. Indeed, developing an IT strategy is likely to be expensive (Bates, 2000; Ravet and Layte, 1997).

These omissions are not always obvious from the cost studies. As this section of the paper makes clear, there are both significant costs involved, and the potential for significant savings in administration. The fact that overhead costs and savings are not built into comparative studies of the costs of online, traditional, and other forms of distance education, must mean that any conclusions drawn from such comparative studies have to be treated with care.

Comparing the Costs of E-Education With Other Forms of Education

Having looked at the costs involved in online education, let us look at how the costs of e-education courses compare firstly with those of class-based education, and secondly with other forms of distance education.

A. Comparing e-education costs with the costs of face-to-face education

Whether one system is more or less expensive than another will depend upon a range of factors such as those I discussed earlier. One approach is to substitute CMC for face-to-face tuition - leaving everything else unchanged. A study conducted at the University of

Illinois found that unit costs came down on all nine courses in which asynchronous learning networks were substituted for face-to-face instruction (Arvan et al., 1998). Bates (2000: 126-7) also thinks that online university courses using just CMC, and involving no real e-materials development, will be cheaper than face-to-face courses. However, most online courses involve some materials, so that cost-efficiency depends on the number of students enrolled. Bates suggests that a standard Web-based course, with a mix of pre-prepared Web materials, online discussion forums, and print in the form of required texts, is increasingly more cost-effective than face-to-face teaching as numbers per class increase beyond 40 per year over a four-year period. Under 20 students, it is not economically worth doing. Between 20 and 40 students per year per course, any cost differences are likely to be less significant than differences in benefits (ibid.: 128-9).

If we widen the argument to take into account training costs that fall on employers, then we find that there are stronger reasons to believe in savings. There is general agreement that online training courses are less expensive than face-to-face ones provided the development costs are spread across sufficient numbers of students (possibly over several years), and provided that one takes into account both savings on travel and accommodation costs, and the fact that less of an employee's productive time is lost (employees now train in their own time rather than in the firm's time) (Phelps et al., 1991: 142-3; Inglis, 1999: 12-14; Whalen and Wright, 1998: 40).

However, things do not look so good once purpose-built materials are added in: Bates (2000: 128) says that if as well as having CMC, one also develops purpose-built materials, then the unit costs will be more expensive than face-to-face tuition. Arizona Learning Systems (1998: 24) found that the cost per course enrollment of an 'average' Internet course (US\$571) is higher than that of traditional classroom instruction (\$474), though labor-for-labor substitution might bring this down to \$447. However, much depends on the nature of the materials and their associated development costs which, as we saw, they estimated to vary from US\$6000 to \$1,000,000 for a three unit Internet course (ibid.: 13-14).

B. Comparing e-education costs with the costs of other forms of distance education

What about the cost comparison with other forms of distance education? We have very few studies go on. In an Australian study, Inglis found the online version of a course was less cost efficient at all levels of enrolment than a print-based distance education course (Inglis, 1999: 233) (Table 2).

Table 2: Average cost per student of print and online versions of a course

Volume of students	Average cost per student: 1999 Aus \$	
	Print version	Online
50	169.84	217.71
100	125.38	171.63
150	110.56	156.27
200	103.15	148.59

Source: Inglis (1999: 231)

Elsewhere, Jung compared the costs of presenting standard three credit courses at the Korea National Open University. The course involving textbooks, CD-ROM and electronic tuition was more expensive than the courses using textbooks, radio and face-to-face tuition, or those using textbooks, television and face-to-face tuition. However, dropout was only 10% on the e-course, compared with 60% on the other two types (Jung, 2000: 228-9) (Table 3).

	TV-based course	Radio-based course	Web-based course
Rating	16 week, 3 credit	16 week, 3 credit	16 week, 3 credit
Media	Textbook, TV programs and face-to-face tuition	Textbook, radio programs and face-to-face tuition	Textbook, video- and audio-clips, electronic tuition
Number of students	1000	1000	30
Cost to produce and deliver US\$	80000	35000	13000
Cost per student US\$	80	35	434
Dropout rate (%)	60	60	10
Cost per completed student US\$	200	87.5	482

Overall, then, these studies suggest that e-education is pushing the costs of distance education up. Some of these additional costs are being passed onto the students, but not all of them. And while no doubt the costs of the technology will come down, the fact remains that those who are not able to afford e-education are being written out of the game. This is true within developed countries, at least in respect of some sectors of the population, but much more widely the case in developing countries (Perraton, 2000: 150).

What Output Is Being Costed?

The output measures used in cost studies vary from study to study. Some studies are based on the cost per student and/or the cost per graduate, but while this may be a suitable measure of output on which to make cost comparisons between educational systems and institutions, for most purposes a better measure is the cost per student per course. Courses are not, however, standard entities - and hence many studies seek to qualify this measure by defining the kind of course that is being costed in terms of a 'standard' course measured in credit points or credit hours. Unfortunately this also has its problems because internationally the credit weighting of a course may relate to a different things:

- (a) the total expected number of hours that the average student will spend studying the course. This measure applies in the UK, for example, where there is an assumption that a standard three year Bachelor's degree will require 120 credit points of study per year, with each credit point being equivalent to something like 10 hours study.
- (b) the total timetabled weekly contact hours - which is the system found in the USA - and which of course does not reflect the actual hours study put in by students.

Distance education courses by definition do away with or at least sharply reduce the amount of contact between teachers and students, replacing this with independent study. The latter may be based upon reading, listening to, watching, or otherwise engaging with learning materials; doing assignments and tests; or general reflection. This means

that the actual time spent studying the materials may have little relation with the total study time theoretically assigned to the course. For example, Hülsmann (2000: 42) found that the faculty who developed a British Open University course on mathematical modeling estimated that the course would require some 448 hours study over the year - but that the actual time spent studying the various mediated elements of the course (text, CD-ROM, video) was estimated to be 336 hours - so that the course study hours were 1.5 times the media study hours. On the other hand, a course for teachers and social workers offered by NKS Norway required 700 hours study, but only 106 hours of this study arose from the studying the print and video materials provided. Here course hours were 6.8 times the media study hours. These differences leads Hülsmann (2000: 17) to suggest that the most appropriate approach to costing media is separately to divide the cost of developing and delivering a given medium by the number of student study hours the medium gives rise to. Thus, for example, a 50 page text that cost £17,500 to develop and that takes an estimated (and average) 5 hours to study has a development cost per student study hour of £350, while a one-hour audiotape that cost £1700 to develop, and takes one hour to study, has a cost per student study hour of £1700. Although there is an element of subjectivity in estimating how long an (average) student will spend studying a particular element of course material, this does give an easy guide to the relative costs of different media. In practice, however, there is a range of factors that impinge on the costs of developing and delivering media - not least questions related to the quality of the materials and the organizational structure and labor market conditions that underpin its development/delivery - and these differences are almost certainly behind the range of costs per student study hour that Hülsmann (2000: 145) found in practice across the 11 courses that he studied. Having said that, the approach enabled him to show the rough order of costs involved, and to establish beyond reasonable doubt that Internet-based text is more expensive than printed text (by a factor of 2), with the cheaper media being print and audio. Certainly Hülsmann's approach to the measurement of outputs has a great deal to commend it.

Conclusions

This paper has sought to do two things: firstly, to review the current approaches to costing e-education and to suggest how this might be best approached, having regard to the issues that have been identified, and in the light of the methodological considerations identified, to look at some of the current range of cost comparisons available. Hopefully it will stimulate others to undertake more cost studies - if only to ensure that we know the costs of the direction upon which we now seem to be embarked.

References

- Annand, D. (1999). The problem of computer conferencing for distance-based universities. *Open Learning*, 14 (3), pp. 47-52.
- Arizona Learning Systems (1998). *Preliminary cost methodology for distance learning*. Arizona Learning Systems and the State Board of Directors for Community Colleges of Arizona.

- Arvan, L. (1997). The economics of ALN: Some issues. *Journal of Asynchronous Learning Networks*, 1 (1). Available at http://www.sloan-c.org/publications/jaln/v1n1/v1n1_arvan.asp
- Arvan, L., Ory, J. C., Bullock, C. D., Burnaska, K. K., & Hanson, M. (1998). The SCALE Efficiency Projects. *Journal of Asynchronous Learning Networks*, 2 (2). Available at http://www.sloan-c.org/publications/jaln/v2n2/v2n2_arvan.asp
- Bacsich, P., Ash, C., Boniwell, K., Kaplan, L., with Mardell, J., & Caven-Atack, A. (1999). *The cost of networked learning*. Sheffield: Sheffield Hallam University, Telematics in Education Research Group.
- Bates, A. W. (1995). *Technology, Open Learning and Distance Education*. London: Routledge.
- Bates, A. W. (2000). *Managing technological change. Strategies for college and university leaders*. San Francisco, Jossey-Bass Publishers.
- Berg, G. A. (2000). Early patterns of faculty compensation for developing and teaching distance learning courses. *Journal of Asynchronous Learning Networks*, 4 (1). Available at http://www.sloanconsortium.org/publications/jaln/v4n1/v4n1_berg.asp
- Boettcher, J. V. (1999a). *How much time does it cost to develop a distance learning course? It all depends* Available at <http://www.designingforlearning.info/services/writing/dlmay.htm>
- Boettcher, J. V. (1999b). *How many students are just right in a web course?* Available at <http://www.designingforlearning.info/services/writing/number.htm>
- Boucher, A. (1998). Information technology-based teaching and learning in Higher Education: A view of the economic issues. *Journal of Information Technology for Teacher Education*, 7 (1), pp. 87-111.
- Crabb, G. (ed.) (1990). *Costing open and flexible learning. A practical guide*. London: National Council for Educational Technology
- Coombs, P. H. (1968). *The world educational crisis: A systems analysis*. Oxford: Oxford University Press.
- Daniel, J. S. (1996). *Mega-universities and Knowledge Media. Technology Strategies for Higher Education*. London, Kogan Page.
- Deakin University (1989). *Further investigations into activity costing in a mixed mode institution*. Department of Employment, Education and Training, Commonwealth of Australia.
- DiBiase, D. (2000). Is distance teaching more work or less? *American Journal of Distance Education*, 14 (3), pp.6-20.
- Eicher, J.-C. (1980). Some thoughts on the economic analysis of new educational media. In UNESCO, *The economics of new educational media. Vol. 2: Cost and effectiveness*. Paris: The UNESCO Press.
- Eicher, J.-C., Hawkrigde, D., McAnany, E., Mariet, F., & Orivel, F. (1982). *The economics of new educational media. Volume 3: Cost and effectiveness overview and synthesis*. Paris: The UNESCO Press.

- Farmer, M. A. (1999). Study: E-commerce sites pricey to build, CNET News.com. Available at http://news.cnet.com/Study-E-commerce-sites-pricey-to-build/2100-1017_3-226442.html?tag=mncol
- Fielden, J., & Pearson, P. K. (1978). *Costing educational practice*. London: Council for Educational Technology.
- Finkelstein, M. J., Seal, R. K., & Schuster, J. H. (1998). *The new academic generation: A profession in transformation*. Baltimore, John Hopkins University.
- Gladieux, L. E., & Swail, W. S. (1999). *The Internet: New engine of inequality?* Paper presented to the EDUCAUSE'99 Conference, 1999. Available at <http://net.educause.edu/ir/library/html/edu9949/edu9949.html>
- Hülsmann, T. (2000). *The costs of open learning: A handbook*. Oldenburg: Bibliotheks- und Informationssystem der Carl von Ossietzky Universität Oldenburg.
- Inglis, A. (1999). Is online delivery less costly than print and is it meaningful to ask? *Distance Education*, 20 (2), pp. 220-39.
- Jamison, D. T., Klees, S. J., & Wells, S. J. (1978). *The costs of educational media. Guidelines for planning and evaluation*. Beverly Hills: Sage Publications, 1978. Published earlier as Jamison, D. T., Klees, S. J., & Wells, S. J., *Cost analysis for educational planning and evaluation: Methodology and application to instructional television*. Washington, D. C.: U.S. Agency for International Development, 1976.
- Jewitt, F. (1999). *A Framework for the comparative analysis of the costs of classroom instruction vis-a-vis distributed instruction*. Study undertaken for the New Jersey Institute for Collegiate Teaching and Learning. California State University, March 1999.
- Jung, I. (2000). Technology innovations and the development of distance education: Korean experience, *Open Learning*, 15 (3), pp. 217-32.
- Leach, K., & Smallen, D. (1998) What do Information Technology support services really cost? *CAUSE/EFFECT*, 21 (2), pp. 38-45. Available at <http://net.educause.edu/ir/library/html/cem/cem98/cem9829.html>
- Leach, K., & Smallen, D. (2000). *What do we really understand about the cost of IT support services?* Presentation to the EDUCAUSE 2000 Conference. Available at <http://www.costproject.org/>
- Massy, W. F., & Zemsky, R. (1995). *Using Information Technology to enhance academic productivity*. Wingspread Enhancing Academic Productivity Conference, June 1995. Available at <http://net.educause.edu/ir/library/html/nli0004.html>
- Moonen, J. (1997). The efficiency of telelearning, *Journal of Asynchronous Networked Learning*, 1 (2). Available at http://www.sloan-c.org/publications/jaln/v1n2/v1n2_moonen.asp
- Moran, L. (1996). *Distance education, copyright and communication in the Information Society*. Report prepared for UNESCO meeting of the Committee of Experts on Copyright in the Information Society, New Delhi, India, November 1996.
- Naughton, J. (2000). Much more than a bubble, *The Observer* [London], 31 December.

- Oblinger, D. (2001). Will e-business shape the future of open and distance learning?, *Open Learning*, 16 (1), pp. 9-24.
- Orivel, F. (1992). Analysing costs in distance education systems: A methodological approach. Dijon, Université de Bourgogne, IREDU, mimeo, 1987. Reprinted in J. B. Oliveira, & G. Rumble (eds.), *Educación a Distancia en América Latina: Análisis de costo-efectividad*. Washington, D.C.: World Bank.
- Perraton, H. (2000). *Open and Distance Learning in the Developing World*. London: Routledge.
- Phelps, R. H., Wells, R. A., Ashworth Jr., R. L., & Hahn, H. A. (1991). Effectiveness and costs of distance education using computer-mediated communication, *American Journal of Distance Education*, 5 (3), pp. 7-19.
- PricewaterhouseCoopers, *Business model for the e-University*. Main report, 2000. Available at http://www.hefce.ac.uk/pubs/HEFCE/2000/00_44.htm
- Ravet, S., & Layte, M. (1997). *Technology-based training. A comprehensive guide to choosing, implementing, managing and developing new technologies in training*. London: Kogan Page.
- Ritschard, M. R., & Spencer, E. L. (1999). *Planning for technology replacement: Is it possible?* Paper presented to the College and University Information Services Conference CUMREC'99. Available at <http://net.educause.edu/ir/library/html/cmr9933/cmr9933.html>
- Roderick, E. (1998). *More than just pretty pictures: A cost/benefit analysis of digital library holdings*. A paper presented to the CAUSE98 Conference, Seattle, December 1998. Available at <http://net.educause.edu/ir/library/html/cnc9804/cnc9804.html>
- Rumble G. (1986a). *Costing distance education*. London: Commonwealth Secretariat.
- Rumble, G. (1986b). *Activity costing in mixed-mode institutions: A report based on a study of Deakin University*. Geelong, Victoria: Deakin University, Distance Education Unit.
- Rumble, G. (1988). The costs and costing of distance/open education. In J. Jenkins (Ed.), *Commonwealth co-operation in open learning: background papers*. London: Commonwealth Secretariat
- Rumble, G. (1999). Cost analysis of distance learning. *Performance Improvement Quarterly*, 12 (2), pp. 122-37.
- Saba, F. (1999). *Software systems in distance teaching and learning, Distance Education Report*. Available at <http://magnapubs.com/Newsletters/Der/software3.7.htm>
- Salmon, G. (2000). *E-moderating: The key to teaching and learning online*. London: Kogan Page.
- Schifter, C. C. (2000). Compensation models in distance education. *Journal of Distance Education Administration*, 3 (1). Available at <http://www.westga.edu/~distance/schifter31.html>
- Schultz, T. (1961). Investment in human capital. *American Economic Review*, 51, pp. 1-17.
- Sparkes, J. (1984). Pedagogic differences in course design. In A. Bates (ed.). *The role of technology in distance education*. London: Croom Helm.

- Tolley, S. (2000). How electronic conferencing affects the way we teach. *Open Learning*, 15 (3), pp. 253-65.
- Turoff, M. (1997). Costs for the development of a Virtual University. *Journal of Asynchronous Learning Networks*, 1 (1). Available at http://www.sloanconsortium.org/publications/jaln/v1n1/v1n1_turoff.asp
- Vaizey, J. (1958). *The costs of education*. London: Allen & Unwin
- Webb, G., & Cilesio, C. (1998). *An investigation into the costs and benefits of Internet-based delivery*. Paper delivered to the Open Learning Conference, Brisbane, Australia, December 1998. Available at <http://www.caudit.edu.au/educauseaustralasia/1999/papers/pdf/GregWebbCeceliaCilesio.pdf>
- Webb, G., & Cilesio, C. (1999). *The costs and benefits of online delivery*. Paper presented to the ODLAA Conference, Geelong, Victoria, Australia, August 1999. Available at <http://vc/tafensw.edu.au/site/it/library/99wecio3/99weci03.htm>
- Whalen, T., & Wright, D. (1998) Cost-benefit analysis of web-based tele-learning: Case Study of the Bell Online Institute Pilot Project. University of Ottawa, Faculty of Administration, July 1998.
- Whalen, T., & Wright, D. (1999). Methodology for cost-benefit analysis of web-based tele-learning: Case Study of the Bell Online Institute. *American Journal of Distance Education*, 13 (1), pp. 24-44.

Appendices

Appendix 1: Developing E-Materials

Expenditure descriptor	Expenditure category	Comments
Materials	General comment	<p>Internet courses may involve a range of media ranging from a brief course outline linked to existing textbooks; texts (content) online; texts + reference materials; images; audio; video; simulations; and virtual reality (Arizona Learning Systems, 1998; Hülsmann, 2000). Media choice has a considerable impact on development and production costs.</p> <p>Materials are usually developed to last several years, so there is an argument for annualizing their costs over the life of the course.</p> <p>Most materials relate to the subject being studied. However, some are of a more administrative nature – information on rules and regulations relating to the course, information on examination arrangements, etc. Such materials properly constitute a cost of a particular given course.</p> <p>Yet other materials may be sent to all the students registered on a group of courses – in which case the cost of these materials would need to be apportioned across the courses (or course enrolments).</p> <p>Not all materials need be supplied direct by the institution. In some cases students will be asked to buy commercially available textbooks, videos, software, etc. These costs are properly a cost of the course – but incurred by the student. Any full-costs study would need to recognize such costs.</p>
Staffing		
Cost of staff time spent on developing materials - instructional design - content development - text authoring - software development - multimedia design and production - course specific software development - content integration and testing - post-test modification costs - training	Human Resources	<p>The actual amount of time involved in developing courseware varies significantly depending on media (Sparkes, 1984)</p> <p>How jobs are packaged varies considerably. Many large-scale distance teaching institutions divide the labor between those who develop materials, those who teach, and those who mark examinations. Development roles may also be distinct, with divisions between, for example instructional design, content development, content editing, graphic design, etc.</p> <p>Some systems use core staff on full-time salaries with benefits; others use consultants paid by output.</p> <p>In dual mode systems, the preparation of online materials may be regarded as an extra duty, attracting additional payments/compensation (overload pay). Or staff may be relieved of other duties (release time) This may well represent an additional cost to the employer if this time has to be replaced. On this see Schifter, 2000.</p>
Staff equipment	Equipment	Some systems may purchase computers and software to enable staff to develop courses; others expect staff (particularly consultants) to provide their own (Schifter, 2000).
Staff expenses arising during development of materials	Expenses	The extent to which development staff have their ISP costs met varies (Schifter, 2000).

Copyright clearance	Expenses	Third party copyright can be a significant expense – so much so that some systems may decide not to use any third party material at all (Moran, 1996)
Materials production		
Production costs - text production - audio production - video production - graphics production - software production	Staff costs, Stocks, Supplies, Consumables	e.g. costs of producing a CD-ROM for delivery to each student on a course
Materials – annual revision (maintenance function)		
	Staff costs Expenses	As for original production costs. The degree of remake may vary, but some revisions – for example, the development of new assignment and examination questions, may be a regular feature of course maintenance.
Developmental testing of course	Staff costs Expenses	Payments to course testers; general running costs of developmental testing

Appendix 2: E-Delivery Costs

Expenditure descriptor	Expenditure category	Comments
Materials delivery		
Distribution of courseware (e.g. CD-ROMs, user manual, electronic materials, etc) to students	Expense	Postage, courier, etc costs arising from the distribution of physical goods. On-line delivery costs of 'ethereal' goods.
Materials reception expenses		
Any expenses incurred by those receiving the materials	Expense	This might include incidental costs of reception, costs of purchasing materials, etc.
Student/tutor equipment		
Network/computers/ printer	Equipment (capital)	Few institutions now provide students with computers and most analysts (e.g. Hülsmann, 2000) assume that students will provide their own equipment (though tutors may be given help – see Schifter, 2000). Institutionally this is a non-cost, but it remains a 'full-system' cost and should be taken into account for comparative costing purposes. Student and tutor equipment needs to be annualized (perhaps over 5 years, though this may be optimistic) (Leach and Smallen, 1998) Some systems require non-core staff to provide their own equipment (see assumptions built into Turoff, 1997)
	Software (capital)	The initial cost of common software is bundled in with machine purchase – but 'specialist' software may need to be purchased. This is a capital cost but it would be unwise to assume that the software will last as long as the computer. Students may well need to budget to upgrade software.

Student/tutor expenses	Expense	Includes any payments to an ISP and/or connection charges for time online; also needs to cover increased energy costs. Tutors may have their ISP costs refunded (Schifter, 2000) Insurance costs (for equipment) Equipment repair costs
Opportunity costs		
Cost of student time	Opportunity cost for all students, but staff cost for firms	This is a real opportunity cost to employers, and also to the self-employed, who could be doing productive work rather than spending time in training. There is an argument in any cost comparison exercise for placing a value on every student's time (c.f. Whalen and Wright, 1999). It has been suggested that online courses compress the time required to undertake training,
Tuition		
Tuition	Staff Expenses	Payment for teaching students online varies. In some systems permanent full-time staff may do the teaching; in other cases staff may be hired by the hour to teach online. Casual labor and labor substitution is commonplace. There is a debate as to whether online teaching takes more or less time (see article). In a dual mode system, teaching online may be regarded as part of normal duties; or it may be regarded as an additional (new) duty which releases staff from other teaching duties (release time) (Schifter, 2000) or it may be regarded as an additional duty for which staff are paid overtime (overload pay) (ibid.). Institutions may restrict enrolments on online course in order to contain the impact of online teaching on staff time (which has implications for costing exercises looking at the impact on costs of expansion).
Student/Tutor Helpdesk		
Staffing	Staff costs	Leach and Smallen (2000) estimate that staffing the typical Helpdesk represents between 7 – 12% of the total central IT staff. Call centers may well have less expensive front-line staff to handle routine queries, together with a referral system to faculty where this is necessary.
Call costs	Expenses	Some help desks provide students with toll free access.

Appendix 3: Overhead and Infrastructure Costs

Expenditure descriptor	Expenditure category	Comments
High level decision making to embark on online learning		
Decision-making	Staff	Overhead management time – often difficult to identify. Much depends on the context and whether the activity is marginal or central to management concerns. Development of an IT strategy requires considerable time and effort (Bates, 2000; Ritschard and Spencer, 1999).
Expenses related to high level decision-making	Expenses/ consumables	E.g. costs of study tour to existing virtual universities; costs of consultants brought in to advise. These costs are difficult to trace where the decision is marginal to the ongoing concerns of an institution, but easier to trace if one is setting up a new institution or department.
Institutional evaluation/ quality assurance		
Expenses	Staff cost Expenses/ consumables	E.g. survey costs, report production and dissemination costs, etc.
Web-site development costs		
Overall web site costs	General comment	Likely to be expensive (Farmer, 1999)
Web site development staffing costs (e.g.) - Internet specialists - Graphics/Internet designer	Staff cost	As suggested in (Farmer, 1999) staff costs put into web site development can be significant.
Staff computers purchase Software purchase	Capital	Annualize: most commentators use a 5 year life but this may be optimistic. Typical replacement cycles in US colleges are between 3 and 5 years (Leach and Smallen, 1998). Software may well have an even shorter life.
Staff computers repair	Expense	
Web site implementation		
General comment	All cost categories	Generally the full costs of networked services are not as yet reflected in the annual operating budgets of organizations, nor are the costs of maintaining services
Domain name registration	Expense	
Learning Platform Software License Fees, and Upgrade costs	Capital Expense	Initial cost Annual update at 10% (Whalen and Wright, 1999). Wide variation in the cost of licenses from Canadian \$3000-175,000 (ibid.).
Network server	Equipment	Annualize over lifetime. Many commentators suggest a 5 year life but the typical replacement cycle is between 3 and 5 years (Leach and Smallen, 1998). Actual system cost studies suggest wide variation in costs allowed for this.
Network costs – access to Internet	Expense	

Buildings and accommodation (main offices etc.)		
A range of costs involved here including: Purchase of land Construction of a new building Purchase of an existing building Refurbishment cost of an existing building Rental of office accommodation	Capital or expense	Capital costs need to be annualized. The actual construction cost of a building may be known (but if in the past, should be brought up to present day values), or may be estimated (using the average building cost per square meter/foot for that type of building). The life-time of buildings is debatable but probably ranges from 5-10 years (temporary buildings) to 50 (permanent buildings). Smaller projects utilizing a few rooms within an organization might be charged a proportion of the total building costs, based on floor space as a proportion of all space. Alternatively a shadow rental cost could be used, based on commercial rents payable in the area. Generally space costs are driven by the number of staff working from an office complex, together with space for consultants' workstations; home-based workers will use their own space and in that sense not be part of the space calculation. However, any comparative study should put a cost on home office space.
Buildings and accommodation: running costs including rates (i.e. tax levied on the occupation or ownership of land); buildings and contents insurance; utilities (heat, light, water, power, waste disposal); telephone, fax, etc (rental and usage); repairs and maintenance (direct labour plus materials, or outside contractor charges plus management and supervision costs); grounds and gardens; porters; security; cleaning; management and supervision of all these activities.	Stocks, Supplies, Consumables and Expenses	These items are either treated as a general overhead expense, or they are charged to particular departments and treated as a departmental expense. Where they are treated as a general overhead expense, some proxy measure may be used to allocate these costs out to departments (e.g. floor space measures, staffing levels) In systems where online learning is only part of the activity some kind of measure will need to be used to allocate a proportion of the general expenses to the online operation.
Intranet cost (main offices)		
Start-up capital costs (new PCs, network connections for PCs not currently networked, servers and server software, and software applications whether developed in-house or purchased)	Capital	An intranet may exist but if not capital equipment costs will be incurred establishing it. Capital costs will need to be annualized. Leach and Smallen (2000) found the typical annualization period to be 5 to 6 years. However, some of the equipment will be subject to annual upgrading, repair, etc. Software applications are likely to have a shorter life and require upgrading more regularly.
Start-up costs (e.g. design consultancy costs, costs of in-house designers and technical support staff, training costs)	Revenue expenses and staff costs	
On-going revenue costs (e.g. editorial and design staff, technical personnel, etc., on-going consultancy, promotion, training, maintenance of bespoke applications)	Revenue staffing costs and expenses	

Furniture (main offices)		
Furniture	Capital	Distinguish between the cost of dedicated staff workstations (linked to staff numbers) and the costs of shared workstations/ common furniture – spread across staff.
Local center/ training center		
Accommodation	Expense (conceivably a capital cost)	Systems that provide telelearning centers will incur accommodation costs – with the accommodation usually rented, though purchase is a possibility. There will also be the associated running and maintenance costs of each center in the system.
Equipment and furnishing	Capital cost (equipment and furniture)	A telecenter will need desks, chairs, storage cupboards, shelving (for a small library) as well as equipment (server, several PCs, printer(s), fax, photocopier, telephone, etc.) – together with the associated wiring.
Staffing	Staff cost	Technical and security staff
Consumables and expenses	Consumables and expenses	
Equipment replacement		
Insurance of equipment	Capital (funded from revenue)	Simple depreciation does not allow sufficient money for replacement of equipment.
	Expense	
<i>Digitized courseware/ general library – development and running costs</i>		See Roderick, 1998, for a case study
Equipment – initial purchase and replacement	Capital	e.g. computer, scanner, software. Costs need to be annualized.
Maintenance of equipment	Expense	
Technical staff to create and maintain record – document scanning, indexation, etc., and to maintain system/equipment	Staff costs	Salary and on-costs (benefits)
Marketing costs		
Marketing staff	Staff costs	Salary and on-costs (benefits)
Non-staff costs	Expenses/ consumables	
Shared central costs		
E.g. costs of personnel, purchasing, financial management, accounting, and audit, etc.	All revenue cost types	In dual mode systems, a proportion of these overhead costs would need to be apportioned to the networked learning ‘enterprise’, and the rest to other business objectives.

13. The Costs of Providing Online Student Support Services

This chapter was originally prepared as one of the papers presented by the Open University UK's Student Services to the 20th World Conference of the International Council for Open and Distance Education, held in Düsseldorf, Germany, 1- 5 April, 2001. The version given here differs from the one submitted to ICDE in as much as it contains an additional section – “What drives the costs of online teaching?”

Introduction

Distance educators have always been fascinated by the latest developments in technology. Indeed, a history of distance education might well distinguish four quite distinct phases of development – each reliant on a core technology:

- *Correspondence teaching* –reliant on cheap postal and print technologies, and dating from 1840.
- *Educational broadcasting systems* pioneered in the 1930s and 1940s (as far as radio is concerned) and from the late 1950s (television).
- *Multi-media distance education systems*, dating from the 1970s.
- *Online distance education systems*, dating from c.1985 when computer mediated communications (e-mail and computer conferencing) began to be used, and evolving into today's virtual institutions and ALNs (Asynchronous Learning Networks).

Initially, no one really worried how much distance education cost. Obviously, commercial operators sought to make a profit, but well into the 1970s distance education projects operating within publicly funded dual-mode institutions were rarely costed. In the late 1960s and early 1970s, however, the application of technology to education came to be seen as a way of lowering the costs of education (Jamison, Suppes and Wells, 1974: 57), and international agencies (UNESCO, World Bank, USAID) began to put large sums of money into the development of ETV (educational television) systems. The costs of institutions such as the UK Open University also became a matter of concern for the governments funding such projects. As a result analysts began to research into both the costing of educational technology and the actual costs of distance education systems (for an account of the early work done in this field, see Rumble, 1999).

The outcome of this research showed that the costs of a particular system depended upon the relative impact of a number of factors:

- The number of students enrolled
- The number of courses presented
- The frequency with which course materials are remade
- The media (text, audio, video, computer-based, face-to-face) and technology employed
- The cost structure of the chosen media/technology
- The quality of the materials produced (print quality, video formats, etc.)

- The working practices adopted by the organisation (course team models, author-editor models, use of third party materials favoured or excluded as options, in-house versus outsourced production, etc.)
- The way in which staff are employed (e.g. core versus peripheral staffing models) and remunerated
- The organisational structure (including single versus dual mode options)

Decision-makers often want to know how much distance education in its various manifestations will cost. Those who have analysed the costs of distance education tend to be cautious when it comes to giving definitive answers, but most would, I suspect, agree with Bates's (1995: 5) analysis of the costs of various media, which showed that print, audio-cassettes, and pre-recorded Instructional Television are the only media that are relatively low cost for courses with populations of from under 250 students a year to over 1000 student a year. In addition, radio is also likely to be low cost on courses with populations of 1000 or more students. However, even here one would urge caution. One of the perplexing aspects of the research is the evidence that institutions using the same technology actually experience very different orders of cost. The NBEET [1994: 36, 37] study, for example, found that in Australia the range of cost for a 30 minute videotape was from Australian \$1000 to \$39,400, and that there were also significant ranges in the cost of print. It is clear that technology itself does not determine the costs of a particular system.

This runs counter to the view, commonly held in the 1960s, that "the most important single factor that gives an industry a distinctive character is its technology" (Blauner, 1964: 6), and that this in turn determined the socio-technical parameters of the industry. Such a position is one of technological determinism, the view that holds that technology "coerces social and economic organisations and relationships" (Grint and Woolgar, 1997: 11), and hence the cost structure and costs of an industry. Current research does not support this view (c.f. Grint and Woolgar, 1997). However, technological determinism continues to linger within distance education. Daniel (1996) suggests that the mega-universities "*operate differently* from other universities in many ways, not least in the way they have redefined the tasks of the academic faculty and introduced a division of labour into the teaching function" (p. 30, my italics). This does appear to be true, in as much as most of the mega-universities have adopted practices that have led to divisions of labour, but Daniel goes on to claim that "*changes in technology transform the structures of industries*" (p. 80, my italics). Further, he claims that this is a continuing process since "it is clear that *new technologies*, such as computer conferencing and the Internet, *will* [in the future] *change* the format of university courses taught at a distance" (p. 130, my italics). The problem with these statements is that technology itself does none of this.

None of this is meant to deny that technology enables new things to be done, may result in changes in the way in which the work force is organised, and may enable new organisational structures to emerge. However, the costs of a particular system will be determined by the structural and working practices that are adopted around the technology – and this is a matter of management choice. Since within any given technology the possible permutations are legion, it becomes very difficult to say how much a particular technological solution to the challenges of teaching at a distance will cost.

These introductory remarks need to be kept in mind when we turn to consider the costs of online learning, particularly given the current interest in whether online learning actually adds to, or reduces, costs.

Is Online Learning More Cost Efficient Than Other Options?

A number of case studies comparing the costs of online learning with other options are beginning to emerge. This section attempts to summarise the information we now have. In approaching this issue it is worth bearing in mind that what constitutes an 'online' system varies enormously. Typologies have their dangers, but they can also be useful in sorting out one's thinking – and the following typology is offered with this in mind:

- a. Type A online systems offer Computer-Based Learning (CBL) involving textual, audio, and video course materials in electronic format. No student support is involved.
- b. Type B online systems offer Computer Mediated Communications (CMC) supporting tutor-student and student-student interaction. This support may be offered in synchronous mode (Type B1) or asynchronous mode (type B2).
- c. Type A/B systems combining both CBT and CMC.

Comparing the Costs of Face-to-Face and Online Instruction

Bates (2000: 127) suggests that the cost of providing 'Type B' online student-teacher and student-student interaction tends to be lower than the cost of providing traditional face-to-face teaching in a classroom because "a good deal of the students' study time ... is spent interacting with the pre-prepared multi-media material, so the teacher needs to spend less time per student overall moderating discussion forums compared with the total time spent in classroom teaching" (ibid.: 128). However, "the online costs still have to be added to the costs of prepared multimedia materials" (Type A costs) (p. 128), and this pushes the total costs of online systems above those of correspondence and multimedia systems, but not necessarily of classroom-based systems since (a) the direct cost per student of CMC is less than the direct cost of classroom teaching, and (b) there are still economies of scale to be achieved. The question is, what is the breakeven point at which Type A/B online systems become cheaper (in average cost terms) than classroom teaching? Bates, based on his experience at the University of British Columbia, reports that

"We are fairly confident that a standard Web-based course, with a mix of pre-prepared Web materials, on-line discussion forums, and print in the form of required texts, becomes increasingly more cost-effective than face-to-face teaching as numbers per class increase beyond forty per year over a four-year period. This assumes that interaction between students and teachers remains high. Conversely, we tend to avoid developing distributed learning courses for fewer than twenty students per year. Between twenty and forty students per year per course, any cost differences are likely to be less significant than differences in benefits." (Bates, 2000: 128-9).

Bates's break-even number if students is low when compared with Jewett's (1999) analysis. The latter looked at the relative costs of classroom versus asynchronous network courses, and suggested that, if the instructors spend the same proportion of their time supporting students (i.e. between 25% and 33% of their time), then one needs

at least 450 students on an asynchronous network course before the average cost per student falls below that of classroom instruction on a course with the same number of credit units. However, if the instructors spend more of their time on supporting students (and they could be spending twice as much), then one will need at least 900 students before the average cost comes down below that of classroom instruction. Could such numbers be handled? Boettcher (1999) suggests that web courses can support from 25 to 65 students (at the upper end of the range) – numbers that are “far from the much larger numbers originally dreamed of by administrators and legislators”.

These reports are looking at the costs from the point of view of institutional teaching costs. What about the cost of the student’s time – an important factor in training courses. Ravet and Layte (1997: 143-2) point to the very significant overall savings that accrue from training online, compared to face-to-face training. These savings come from reducing the costs of the time and travel spent in attending courses. Phelps et al. (1991: 12-14) compared the costs of the on-line version of a two-week residential course for US Army reservists with the original version. They showed that while the conversion to computer-mediated communication format of a two-week residential course for US Army reservists involved additional staffing costs of US\$152,300, and start-up costs of \$73,100, the running costs came down from \$289,650 to \$121,300. They concluded that the online version would have been about 20 per cent more costly if it only substituted for one presentation of the residential course, but total costs were halved when it substituted for ten presentations.

Whalen and Wright (1998: 40) provide a cost comparison of a traditional two day face-to-face training course with various kinds of web-based courses (Table 1). They suggest that the web-based courses are more cost-efficient than traditional training courses. In particular Whalen and Wright (1998: 35) argue that studying a web-based course is more efficient in use of student time – so that the content that in a classroom is put over across 12 hours, actually takes only 4 hours to cover on a synchronous web-course, and 2.5 hours on an asynchronous web-course.

Whalen and Wright’s (1998: 42) conclusion is that while asynchronous web-based courses have higher fixed development costs than classroom instruction, these are offset by lower variable delivery costs. A significant proportion of this saving derives from course compression (the fact that in a web-course it takes less student time to study a given body of material than is the case with classroom instruction). Obviously, where the opportunity costs of student time is an important factor – as in in-company training – this is an important cost consideration. This would not apply outside the training situation where student time is ‘free’ as far as the provider is concerned.

Arvan, Ory, Bullock, Burnaska and Hanson (1998) looked at the time it took for the SCALE Efficiency Projects to achieve savings. All the projects had incurred development costs, and these were spread across each presentation of the course (a process akin to annualisation). Two scenarios were explored, one involving no discounting, and the other where future benefits were discounted at the fairly conservative (i.e. expensive) interest rate of 9% per annum. All nine of the projects they looked at succeeded in lowering expenditure per student without compromising quality. The savings achieved depend in part on the way in which faculty salary costs are calculated on the ALN (asynchronous learning network) and classroom-based versions of the course, but the savings per student on an economics course ECON300 ranged from a ‘worst case’

calculation scenario of US\$55 (150 students) or \$71 (180 students), to a ‘best’ case of \$181 (150 students) or \$209 (180 students). On this basis, the investment in developing the ALN version of the course would be recovered within one to three years.

Table 1: Per-student cost of classroom and 4 different formats of a Web-based course
(Source: Whalen and Wright, 1998: 40)

		Per student cost, Canadian \$			
		Class-course		Web-course	
Type	Synchronous	Asynchronous	Asynchronous	Asynchronous	Synchronous
Annualisation of development costs (years * students)	5 * 200	5 * 200	5 * 200	5 * 200	5 * 200
Learning platform	N/a	WebCT	Mentys	Pebblesoft	Symposium
Course development	143	660	660	434	53
Tuition	600	-	-	-	-
Travel	70	-	-	-	-
Server	-	25	25	25	25
Learning Platform	-	0.14	7	8	3.50
Student time	614	110	110	110	176
Instructor time	-	-	-	-	66
Total	1427	795	802	577	324
Savings per student over classroom delivery	N/a	632	625	850	1103

Comparing the Costs of Print-Based Versus Online Education

Inglis (1999) compares the costs of an introductory course on photography offered by the RMIT University in Australia. The print-based version comprised some 200 pages of printed material, a textbook prepared in Word, made-up in Adobe, and Xeroxed in looseleaf format before being express mailed to the students, a broadcast tele-series, assessment by a series of projects, and by a reflective piece of work undertaken under controlled conditions. Student support was offered over the telephone. Assignments were mailed, with local invigilation for the examination. For the online version, the printed material was converted into HTML and made available to students via a website, from which students could download. Student support was offered through e-mail. There was no change in the handling of the assignments and examination, nor of the tele-series, which was broadcast.

In costing the programme, the ISP costs were treated as an institutional rather than a student cost. The same design and delivery costs (basically salary costs) have been attributed to both versions of the course. The average cost per student is shown in Table 2 below. As the Table shows, the online version of the course is less cost efficient at all

levels of enrolment – and in both cases such economies of scale as there are have been more or less obtained by the time enrolments reach 150. The detailed figures provided by Inglis (1999: 233) show the costs of student support to be higher in the online version of the course, so that overall the cost savings arising from not printing the materials (\$18.62) are more than obliterated by the increased costs of delivering and supporting students online (\$63.59). The largest components of these increased costs arise from the charges paid to the ISP provider (\$29.93) and the doubling of the time spent supporting students in electronic written as opposed to telephonic spoken form (\$46 rather than \$23).

Table 2: Average cost per student of print and online versions of a course

(Source: Inglis, 1999: 231)

Volume of students	Average cost per student: 1999 Aus\$	
	Print version	Online
50	169.84	217.71
100	125.38	171.63
150	110.56	156.27
200	103.15	148.59

Comparing the Costs of Online and Broadcast-Based Distance Education

Jung (2000: 228-9) reports on the costs incurred in presenting standard three credit courses using various technologies at the Korea National Open University (Table 3). The cost of producing and delivering the web-based courses was kept down because KNOU used existing video- and audio-clips stored in its digital library, together with CD-ROM and printed textbooks. The figures do not show the relative balance between the costs of production and delivery, while the reported reduction in production costs arising from using archive materials means that it would be dangerous to extrapolate from these figures. What is encouraging, however, is the improved retention rate, which impacts on the differential between the average cost per enrolment and average cost per ‘graduate’.

Table 3: Costs of distance education at the Korea National Open University

(Source: Jung, 2000: 229)

	TV-based course	Radio-based course	Web-based course
Rating	16 week, 3 credit	16 week, 3 credit	16 week, 3 credit
Media	Textbook, TV programmes and face-to-face tuition	Textbook, radio programmes and face-to-face tuition	Textbook, video- and audio-clips, electronic tuition
Number of students	1000	1000	30
Cost to produce and deliver US\$	80000	35000	13000
Cost per student US\$	80	35	434
Drop-out rate (%)	60	60	10
Cost per completed student US\$	200	87.5	482

What Drives the Costs of Online Teaching?

To understand the costs of online teaching, we need to look at the costs of the component sub-systems rather than an overall comparison of the costs of one kind of system versus another. So far as the costs of online materials are concerned, the evidence (see Rumble, 2001) shows a wide variation in costs, reflecting the sophistication of the media used, and the way in which it is developed. But what about the costs of online teaching? Here we get into the costs of labour and the problems of student load. Bates (2000: 126-7) has suggested that in comparison with face-to-face teaching, online education will lower the costs of tuition because a good deal of the students' time is spent studying the material, and so the teacher needs to spend less time per student overall in class. Other analysts argue that students will also spend a great deal more time learning from their peers, and that this too will reduce the demands they make of their tutors. Certainly DiBiase, teaching for Penn State University's World Campus, found that he and his Teaching Assistant were spending less time supporting students on an online course (1.6 hours per student against 2.6 hours on a regular course) (DiBiase, 2000: 15-16).

However, the general consensus seems to be that online tutoring adds to traditional faculty workload (Arizona Learning Systems, 1998: 20; Arvan et al., 1998) given the enormous volume of messaging (Moonen, 1997) arising from increased interaction with students (Jewett, 1999: 37), with each message requiring more time to compose than is the case in verbal interactions (Inglis, 1999: 223). Moonen thinks that the increased load would be of the order of 5 to 10 hours a week for a class of 60 to 120 students (Moonen, 1997). Jewett thinks tutors could well spend twice as much time tutoring on-line as they do face-to-face (Jewitt, 1999: 41). This raises the question of how many students an online instructor can handle. In classroom courses in the USA it looks as if people think they can handle from 25 to 30 students, working perhaps 10 to 12 hours a week. Boettcher suggests that experience indicates that a member of faculty can handle more students on a web course – in the range 25 to 65, but that this will require more time – so that although there are courses with 50 – 60 students on them, there are many courses where student numbers are deliberately kept down, somewhere in the range of from 12 to 20 students (Boettcher, 1999).

One way of coping with an academic's increased workload is to hire more staff but this, of course, costs more. However, the impact on labour costs can be reduced through 'labour-for-labour' substitution – that is, the substitution of cheap labour for expensive faculty labour. This cheap labour might be students (Arvan et al., 1998), teaching assistants, or clerks covering help desks (Arizona Learning Systems, 1998: 24). These options are much discussed in the US literature. However, hiring cheaper labour is not possible in small classes run by just one academic; it only works in large classes (Arvan et al., 1998). Also, labour-for-labour substitution has its critics. Traditionally PhD students have helped teach courses but student labour is not the cheapest labour on offer. Adjunct staff hired by the class is even less expensive – so much so that there is concern that their employment could damage graduate programmes by reducing the employment opportunities for PhD students (Turoff, 1998).

Up to now I have been talking about the impact of CMC on the costs of traditional institutions. What about its impact on the costs of distance education delivery? Firstly, there is evidence that tutors spend more time moderating and tutoring e-courses. Tolley, drawing on her experience as an Open University tutor, found that she spent more than

twice as many hours tutoring the on-line version of *What is Europe?* as she did the 'traditional' version – 120 hours against 48 (Tolley, 2000: 263). She was not paid for the additional work, which also had a dramatic effect on her 'phone bill. Annand, from his perspective at Athabasca University, suggests that it is these costs that may in the end constrain the extent to which large-scale distance teaching universities can adopt on-line technologies (Annand, 1999: 20). Some institutions are trying to find ways of containing demands on tutor time by controlling student expectations and limiting the time for engagement on a particular topic; others, like the e-University, seem to be talking about putting the task of tutoring out to commercial ventures like Tutor.com, which will charge students for use (PriceWaterhouseCoopers, 2000, paragraphs 79-80).

Secondly, there are the costs of reception. Cost analysis tends to be bounded by the institutional budget. The costs students incur in acquiring and operating equipment is not generally taken into account – yet from the would-be student's point of view, these costs can have a major impact on affordability, and hence on access. In the USA the distribution of computers is highly graduated by income, race/ethnicity, and educational attainment (Gladieux and Swail, 1999). If owning the equipment is a necessary condition for participation, then expect to see more disadvantaged people being excluded on cost grounds.

Local centres may, of course, mitigate student costs by providing access to machines, but they cost a fair amount in rent, equipment, furniture and staffing to set up – and generally accommodate very few students at any one time. This is not a solution to mass access – which is why the African Virtual University is such a limited project. Internet cafés cost money to use and are not necessarily ideal environments for study. In any case, in a country like Uganda, anything that uses a telephone line is extremely expensive.

Some Tentative Conclusions

On the basis of these studies, it begins to look as if we might reach some conclusions about the relative costs of online systems as against other systems. For example, we might conclude that web-based courses have the potential to be more cost efficient (i.e. can achieve a lower cost per student) than television-based distance learning courses, but are less efficient than radio or print-based courses. We might also conclude that they tend to be cheaper than class-based courses – though as we have seen this is by no means proven with many people believing that web-based courses increase the workload (and hence the costs) of instructors.

Nevertheless, if online education is cheaper than face-to-face teaching, from a *purely* cost-driven point of view, it makes considerable sense for a traditional (i.e. face-to-face teaching) institution to adopt online teaching methodologies – but on the basis of the results available to date, and again from a purely cost driven point of view, it does not make sense for a distance learning system to do this. This is because “interactive group communication technologies, like computer conferencing, de-industrialise the distance education process, and hence increase costs” (Annand, 1999: 47). Annand believes that this will significantly constrain the adoption of these technologies in the existing distance teaching universities. On the other hand, the benefits that are said to derive from using ALN technologies (increased interaction, lower student drop-out rates) might well outweigh these financial considerations.

In addition to these course-based benefits, we should note that there are said to be benefits to be derived from using the web for student administration and general support purposes (see Rumble, 2001). The use of Call Centre and Help Desk methodologies might also lower costs. In addition, an all-web-based system will have much lower buildings and accommodations costs than almost any other kind of system, particularly if it is assumed that not just the students and tutors, but also the academic staff designing the courses, work from home. Given this, there seems to be a real case for adopting online technologies within educational systems. But is this actually the case? Part of the problem with the existing cost studies is that they tend only look at the costs of developing materials and tutoring online. Very significant areas of cost are ignored including, for instance:

- The costs of decision-making – for example, the development and continual adaptation of a technology strategy
- The costs of developing a website (said by a recent Gartner Group report to be at least US\$1,000,000 and rising by 25% per annum) (Farmer, 1999).
- The costs of maintaining and operating IT systems are considerable (see Leach and Smallen, 1978; 2000). These costs are generally higher than most analysts acknowledge. For example, most existing cost studies of online learning annualise IT equipment over a 5 year life – notwithstanding that the evidence suggests that most IT equipment is actually replaced between 3 and 5 years. One to two years' difference in annualisation has a considerable impact on costs.
- The significant costs of accessing the technology necessary to learn online that are passed on to the students. These are endangering the social mission underpinning many distance education systems. For example, Gladieux and Swail (1999) point out that in the USA the distribution of computers is highly graduated by income, race/ethnicity, and educational attainment.
- The additional staff time involved. Most analysts believe that the time required to develop online materials, and to teach online, is greater than the time required to design a classroom session, or to teach in class. A whole range of tactics are emerging to constrain these costs, including requiring staff to absorb the additional work; relieving staff of some of their other duties (release time); increasing staff compensations by making overload payments; hiring cheaper staff – either graduate students or even cheaper Teaching Adjuncts, etc. None of these strategies is without problems.

All this makes any comparison between one kind of system and another very difficult to draw at the present time, and underlines the fact that it is increasingly urgent to study the costs of online learning more fully so that policy making at every level (international, national, institutional, and departmental) can be better informed.

References

- Annand, D. (1999). The problem of computer conferencing for distance-based universities. *Open Learning*, 14 (3), pp. 47-52.
- Arizona Learning Systems (1998). *Preliminary cost methodology for distance learning*. Arizona Learning Systems and the State Board of Directors for Community Colleges of Arizona.

- Arvan, L., Ory, J. C., Bullock, C. D., Burnaska, K. K., & Hanson, M. (1998). The SCALE Efficiency Projects. *Journal of Asynchronous Learning Networks*, 2 (2). Available at http://www.sloan-c.org/publications/jaln/v2n2/v2n2_arvan.asp
- Bates, A. W. (1995). *Technology, open learning and distance education*. London: Routledge.
- Bates, A. W. (2000). *Managing technological change. Strategies for college and university leaders*. San Francisco: Jossey-Bass Publishers.
- Blauner, R. (1964). *Alienation and freedom*. Chicago: Chicago University Press.
- Boettcher, J. V. (1999). *How many students are just right in a web course?* Available at <http://www.designingforlearning.info/services/writing/number.htm>
- Daniel, J. S. (1996). *Mega-universities and knowledge media. Technology strategies for higher education*. London: Kogan Page.
- DiBiase, D. (2000). Is distance teaching more work or less? *American Journal of Distance Education*, 14 (3), pp. 6-20.
- Farmer, M. A. (1999). Study: E-commerce sites pricey to build' CNET News.com. http://news.cnet.com/Study-E-commerce-sites-pricey-to-build/2100-1017_3-226442.html?tag=mncol
- Gladieux, L. E., & Swail, W. S. (1999). The Internet: New engine of inequality? Paper presented to the EDUCAUSE'99 Conference. Available at <http://net.educause.edu/ir/library/html/edu9949/edu9949.html>
- Grint, K., & Woolgar, S. (1997). *The machine at work. Technology, work and organization*. Cambridge: Polity Press.
- Inglis, A. (1999). Is online delivery less costly than print and is it meaningful to ask? *Distance Education*, 20 (2), pp. 220-39.
- Jamison, D. T., Suppes, P., & Wells, S. (1974). The effectiveness of alternative media: a survey. *Review of Educational Research*, 44 (1), pp. 1-67.
- Jewitt, F. (1999). *A framework for the comparative analysis of the costs of classroom instruction vis-à-vis distributed instruction*. Study undertaken for the New Jersey Institute for Collegiate Teaching and Learning. California State University, March 1999.
- Jung, I. (2000). Technology innovations and the development of distance education: Korean experience. *Open Learning*, 15 (3), pp. 217-32.
- Leach, K. & Smallen, D. (1998). What do Information Technology support services really cost? *CAUSE/EFFECT*, 21 (2), pp. 38-45. Available at <http://net.educause.edu/ir/library/html/cem/cem98/cem9829.html>
- Leach, K., & Smallen, D. (2000). *What do we really understand about the cost of IT support services?* Presentation to the EDUCAUSE 2000 Conference. Available at <http://www.costproject.org/>
- Moonen, J. (1997). The efficiency of telelearning. *Journal of Asynchronous Networked Learning*, 1 (2). Available at http://www.sloan-c.org/publications/jaln/v1n2/v1n2_moonen.asp

- NBEET (National Board of Employment, Education and Training) (1994). *Costs and quality in resource-based learning on- and off-campus. Commissioned Report no. 33*. Canberra: Australian Government Publishing Service.
- Phelps, R. H., Wells, R. A., Ashworth jr., R. L., & Hahn, H. A. (1991). Effectiveness and costs of distance education using computer-mediated communication. *The American Journal of Distance Education*, 5 (3), pp. 7-19.
- PricewaterhouseCoopers (2000). *Business model for the e-University*. Main report, available through http://www.hefce.ac.uk/pubs/HEFCE/2000/00_44.htm
- Ravet, S., & Layte, M. (1997). *Technology-based training. A comprehensive guide to choosing, implementing, managing and developing new technologies in training*. London: Kogan Page.
- Rumble, G. (1999). Cost analysis of distance learning. *Performance Improvement Quarterly*, 12 (2), pp.122-37.
- Rumble, G. (2001). The costs and costing of networked learning. *Journal of Asynchronous Learning Networks*, 5 (2), 75-96.
http://www.aln.org/publications/jaln/v5n2/v5n2_rumble.asp
- Tolley, S. (2000). How electronic conferencing affects the way we teach. *Open Learning*, 15 (3), pp. 253-65.
- Turoff, M. (1998). Alternative futures for distance learning: The Force and the Darkside. *Online Journal of Distance Learning Administration*, 1 (1). Available at <http://www.westga.edu/~distance/turoff11.html>
- Whalen, T., & Wright, D (1998). Cost-benefit analysis of web-based tele-learning: Case study of the Bell Online Institute Pilot Project, University of Ottawa, Faculty of Administration, July 1998.

14. Just how Relevant Is E-Education to Global Educational Needs?

This article was first published in 2001 in Open Learning, Vol. 16, No. 3, pp. 223-32.

Introduction

Distance education has been with us for 160 years. For much of that time it has been seen as a poor substitute for classroom-based forms of education, not least because it fails to provide for substantial, rapid and easy dialogue between teacher and learners, and among learners. On the other hand, it has been seen as having certain distinct advantages - most notably the flexibility in respect of time and place of learning that makes it peculiarly attractive to those unable to get to a classroom. By the 1970s, however, another clear advantage was emerging: the substitution of capital, in the form of educational materials, for labour, in the form of teachers' time, enabled distance education to bring down the unit costs of education. Faced with the demands engendered by population growth and by the emergence of egalitarian philosophies intent on redressing past educational deprivation in both advanced industrialised and developing countries, distance education came to be seen as the only way of meeting frustrated demand for education, and of training/educating sufficient people to meet rising demands for trained human resources. As a direct result it is arguable that access became a key value in evaluating the utility of distance education.

Over the past 15 or so years, technological advances have enabled distance educators to address the perceived failure of earlier forms of distance education to provide opportunities for interactive dialogue. Currently, distance educators are, in common with many in traditional education, seeking to exploit the capabilities of asynchronous learning networks. The question arises, however, whether the pursuit of this new goal is undermining distance education's pursuit of the goal of opening up opportunities for access to education, and if so, whether this is in fact a retrograde step. This article seeks to explore some of these issues through a focus on the values that underpin distance education.

Demand

During the 1960s and 1970s it became clear that few countries could afford the costs of providing traditional forms of education for burgeoning populations of young people, let alone the emerging demand from adults for lifelong learning. Distance education provided an alternative and more cost-efficient way forward. However, although the distance education sector has grown enormously over the last 40 years, with 135 million children of primary school age currently not attending school, one billion adolescents and adults under-literate or illiterate, and two billion individuals requiring some kind of retraining and re-skilling in their lives (Dhanarajan, 2001: 67), there is still plenty to do. Indeed, distance education can only increase in importance as the world population moves beyond its current estimated 6.1 billion (US Bureau of the Census, 2001) towards perhaps 9.5 billion by 2050 (US Bureau of the Census, 2000).

Cost

Traditional education is a labour intensive business. However, worldwide the public sector's ability to pay for education was by the 1960s and 1970s severely tested. Generally governments were looking for, and continue to look for, ways of reducing or at least containing the cost. One way is, of course, to pass the cost on to the consumer. Another is to use methods that reduce the unit cost of education. In the 1960s the application of mass communications technology came to be seen as a way of lowering the unit costs of education (Jamison et al., 1974: 57; Eicher et al., 1982: 40). The result was a flurry of interest by economists who set out to study the costs of particular systems - but most notably educational television (ETV) and open university systems, and to develop methodologies for studying the costs of educational technology (c.f. Rumble, 1999, for an account of this work). Fortunately experience shows that some forms of distance education can be more cost-efficient than traditional forms of education (Rumble, 1997: 134-160).

Unfortunately, current developments in distance education, and in particular the development of third generation systems (c.f. Nipper, 1989: 63-64), look as if they are pushing the costs of distance education up. Understanding this claim requires some knowledge of the nature and cost structure of e-education.

A fully 'e' education system would, I suggest:

- make learning materials available to students in electronic form;
- teach and support students online; and
- provide online administrative services, e.g. enrolment, billing, information and advice.

The costs of e-education would therefore embrace all of the following:

- (1) The development of e-materials.
- (2) Teaching students online.
- (3) Administering students online.
- (4) Providing the infrastructure and support within which e-education can operate.
- (5) Planning and managing e-education (Rumble, 2001).

So far as the costs of developing e-materials are concerned, Arizona Learning Systems (1998: 13-14) found a wide variation in the costs of developing a three credit hours Internet course, of from US\$6,000 to \$1,000,000, depending on the approach used. Much of this is the cost of academic and technical labour. The cheapest approach involved the presentation of simple course outlines and assignments; the most expensive involved virtual reality. Costs escalated rapidly as soon as the course designers moved beyond text to the incorporation of audio, video, simulations and virtual reality. Obviously the costs can be contained by choice of media, but part of the advantage of e-education has to be its ability to deliver a rich spectrum of materials to resource-poor environments such as sub-Saharan Africa. The evidence is that the more that is built into the resource-library, the higher the costs of development.

Delivering materials in electronic form to the end-user's computer seems to bring the costs of delivery down sharply, as evidenced by a study of document delivery costs at the Library of Virginia, where the costs of providing a single copy of a four-page report

in digital format is just 90 US cents, compared with \$19 to supply a surface-mail customer and \$12 to supply an on-site user (Roderick, 1998). Applied to course materials, online delivery to order could cut inventory, packing and postage costs enormously. However, students used to being given their course materials are likely to see their costs rise as they access materials online and print them off themselves.

The fixed costs of developing materials can, of course, be spread across the student body, so in principle there is no reason why one should not use expensive media provided the audience size is large enough to absorb the cost, and provided the cost of student support is kept low. Unfortunately, it is precisely in this latter aspect where costs seem to rise. Although there are those who believe that it takes less hours on average to support an online student, the consensus seems to be that online teaching is more labour intensive than face-to-face teaching in either a distance or a traditional educational setting (see Rumble, 2001, for a review of the evidence). This might explain both why Boettcher (1999) found that the average class size of an online course of from 12 to 20 students was less than the 30 or so students found in face-to-face classes, and why the American literature on the introduction of online classes is so preoccupied with labour-for-labour substitution (i.e. the practice of replacing expensive faculty labour with cheaper adjunct labour) (Arvan et al., 1998; Arizona Learning Systems, 1998: 24).

In addition, the design and maintenance of a web site capable of supporting online teaching and administrative functions seems to have been largely ignored in the literature, as has the overhead cost of planning, designing and managing an e-education system, but the cost is not insubstantial. For example, a Gartner Group report suggested that e-commerce web sites are harder than expected to build, with costs of US\$1 million on average-and that this cost is likely to increase by 25% per annum over the next two years (Farmer, 1999). Certainly the cost of developing the Open University's web site to support online information and administrative functions has been many times this amount, and while there may well be benefits as the costs of transactions (for example, the cost of enrolling a student on a course, or changing a student's address) are brought down, it is not clear that the savings will be commensurate with the costs.

Given the unwillingness or inability of governments to meet the additional costs involved, the tendency is either to forego the expenditure, or to pass these costs on to the students. Both these strategies are evidenced strongly in the *Business Model for the [UK] e-University*. In talking about "an e-version of programmed learning books", the report is suggestive of an approach that will not provide students with adequate support as of right (PriceWaterhouseCoopers, 2000, paragraph 52). Indeed, the report makes it clear that students will have to pay for access to online libraries offered by firms such as XanEdu and Questia, for tutorial support (Tutor.com), for guidance and advice, and for examinations and awards (paragraphs 79-80, 87-89, 107, 91-99). In effect, the learner will pay the providers of these services - often sourced out to commercially orientated firms - as they use them.

In addition, of course, there is the greatly increased cost of accessing e-education that falls on the student. Students will in the main be expected to provide their own PC, printer and software, and to meet the costs of running and replacing the equipment, and of logging on to the Internet. These costs are not insubstantial. In the USA the distribution of computers is highly graduated by income, race/ethnicity and educational

attainment (Gladieux and Swail, 1999). In Third World countries, the ratio of the cost of purchase and running the equipment to annual income is much higher.

Local centres may, of course, mitigate student costs by providing access to machines, but they cost a fair amount in rent, equipment, furniture and staffing to set up – and generally accommodate very few students at any one time. This is not a solution to mass access to e-education-which is why the African Virtual University is such a limited project. Commercial Internet cafes cost money to use and are not necessarily ideal environments for study. In any case, in a country like Uganda, anything that uses a telephone line is extremely expensive.

Unfortunately it is not always clear whether comparative studies of the costs of e-education and, on the one hand, traditional classroom-based systems, and, on the other, first and second generation distance learning systems, take account of (a) the full institutional costs of the systems, including overheads, and (b) the full system costs, including those costs that have been passed on to the students. The likelihood is that the reported costs will only cover the costs falling on the institutional budget, and will either wholly ignore or else seriously underestimate the costs of maintaining the network, and over-estimate the period over which computing equipment can be annualised (see Rumble, 2001, for more detailed information on this).

One approach is to substitute computer-mediated communications (CMC) for classroom teaching-leaving everything else unchanged. A study conducted at the University of Illinois found that unit costs came down on all nine courses in which asynchronous learning networks were substituted for face-to-face instruction (Arvan et al., 1998). Bates (2000: 126-127) also thinks that online university courses using just CMC, and involving no real e-materials development, will be cheaper than face-to-face courses. However, as soon as one begins to add in materials, the cost structure begins to change, at which point the student load becomes an important consideration. Bates (2000: 128-129) suggests that a standard Webbased course, with a mix of pre-prepared Web materials, online discussion forums, and print in the form of required texts, is increasingly more cost-effective than face-to-face teaching as numbers per class increase beyond 40 per year over a four-year period. Under 20 students, it is not economically worth doing. Between 20 and 40 students per year per course, any cost differences are likely to be less significant than differences in pedagogical benefits. Bates' findings, however, will be critically influenced by whether or not he has got the costs of tuition right, and by whether the larger class size is feasible. Boettcher (1999) suggests that it might not be. Certainly, Arizona Learning Systems (1998: 24) found that the cost per course enrolment of an 'average' Internet course (US\$571) is higher than that of traditional classroom instruction (\$474), though labour-for-labour substitution might bring this down to \$447. However, much depends on the nature of the materials and their associated development costs which, as we saw, they estimated to vary from US\$6,000 to \$1,000,000 for a three-unit Internet course.

When it comes to comparing the costs of e-education with other forms of distance education, the findings of the few studies we have seem much clearer. In an Australian study, Inglis (1999: 233) found the online version of a course was less cost efficient at all levels of enrolment (50-200 students) than a print-based distance education course. Elsewhere, Jung (2000: 228-229) compared the costs of presenting standard three credit courses at the Korea National Open University. The course involving textbooks, CD-ROM

and electronic tuition was more expensive than the courses using textbooks, radio and face-to-face tuition, or those using textbooks, television and face-to-face tuition. However, drop-out was only 10 per cent on the c-course, compared with 60 per cent on the other two types.

Values

The rush of distance educators into e-education raises very considerable questions about the values that we hold. Looking back at the development of the Open University in the UK, and of similar 'open' or distance teaching universities, colleges and schools in other countries, one can discern a remarkable consistency in the values that underpinned their foundation. Almost invariably these institutions were set up to enable access to education. Of course, exactly who the 'open universities', 'open colleges' and 'open schools' were designed to serve varied depending on the circumstances pertaining in a particular jurisdiction, but generally they included school leavers whose wish to enter secondary or higher education was frustrated by a lack of sufficient places in the traditional system, and for whom the capability of distance education to provide more places at a lower average cost per student provided cash-strapped governments with a potential solution to the problem of frustrated demand; and those who, for a variety of reasons, wanted to enrol on a course of study, and for whom distance education provided a more flexible and accessible route to education.

Significantly, distance education has been seen as a way forward in both advanced industrialised, emerging industrialised and developing countries. Jurisdictions as diverse as the UK, Spain, the Netherlands, Germany, Costa Rica, Venezuela, Iran, Israel, India, Bangladesh, Thailand, Korea and Tanzania have set up distance teaching universities. Indeed, it is not even necessary to set up a distance teaching university: all that is needed is to diversify existing universities so that they too, as dual-mode institutions, embrace distance teaching methods. That this has happened with increasing frequency is a testament to the pressures on universities to expand, to seek new markets, and to lower their costs by embracing the combination of resource-based learning and independent study strategies that together make up distance education.

For many people, however, increased access to education through distance methods comes at a price - a decline in the quality of the educational experience. From its earliest days distance education was perceived as having a quality problem. Partly this arose because of its origins in the commercial correspondence college sector. Although there have been some excellent providers, far too many providers have been more interested in the economics of the diploma mill and of "drop-out money" (Noble, 1999). This maximised profit at the expense of teaching quality, student success and ultimately of reputation.

By the 1970s there were signs that the dubious reputation of distance education was being overcome. The best providers, both public and private, wanted to offer accessible educational opportunities, based on quality materials, leading to reputable qualifications. Additionally, many wanted to do this at a cost to the student that would enable those from disadvantaged backgrounds to participate. It is to their credit that institutions such as the Open University and the National Extension College in the UK, and their counterparts in other countries, had a lot to do with the establishment of this ethos. In the process many hundreds of thousands of students who would otherwise have been denied a place have benefited from the opportunities that have been made available.

Nevertheless, distance education continued to be seen as second best because it separated the teacher from the learner, and thus cut out opportunities for dialogue to occur. The argument that it provided, through correspondence, opportunities for “guided didactic conversation” (Holmberg, 1995: 47-50) was never very convincing, but even those systems such as the Open University that built in some face-to-face tuition tended to weaken its impact, firstly, by making participation voluntary, and secondly, by getting tutors to more or less restrict themselves to the content defined by the materials. As a direct result distance education, at least at the higher education level, is seen to be deficient because it tends to over-emphasise the package at the expense of serendipity, and because it fails to provide an environment within which social and cultural learning can take place (Escotet, 1980: 11-19), and within which democratic discussion and argument can flourish (Harris, 1987: 142).

Of course, none of these criticisms is wholly fair. Conventional courses too are often highly structured. Campus-based universities are often far from perfect, given the prevalence of overcrowded lectures and the lack of opportunities in large institutions for students to know and hence to discuss their ideas with either their teachers or even their peers (Harris, 1987: 142; Ritzer, 1993: 141-142). Still, it is this perceived deficiency in earlier forms of distance education that led to distance educators showing such interest in asynchronous learning networks, the defining characteristic of which is to provide “substantial, rapid, asynchronous activity with others” (Mayadas, n.d.), in contrast to other, inferior, distance teaching models, such as the predominantly American models of synchronous audio or video presentations and conferences, and videotaped courses, and the basically European model of teacher-driven, mail-based correspondence courses.

There seems little doubt that it is the capacity of computer-mediated communications (CMC) and Asynchronous Learning Networks (ALNs) to support dialogue that is one of the reasons why these approaches are *also* being avidly embraced by those who work within traditional universities, so much so that there is for the first time a real rush from within the traditional university sector to enter (third generation) distance education. Early on in this development Harasim (1989: 60), working out of the Ontario Institute for Studies in Education, argued that CMC would enable *traditional* students not only to control the time, place, pace and nature of interaction, but also to access a *great deal more class time*, since this would no longer be confined by the finite time allocated to face-to-face classes. (Unacknowledged at the time was the impact this was likely to have on the time required of the teacher.)

Additionally, online interaction with their teacher and peers gets round the increasing irrationality of large campus universities where education can be “a de-humanizing experience”, and in which it is difficult for students to get to know other students and virtually impossible for them to know their professors (Ritzer, 1993: 141-142). In these circumstances, and as ALNs increasingly move beyond textual messaging to audio and video messaging, so they can provide an experience that is better because it is both more immediate and more personalised, and also more social-thus opening up the possibility of group-based constructivist learning.

Of course, these pedagogically- and socially-driven values are not the only reasons why traditional universities are embracing CMC/ALN-based distance learning. Another reason is the increasing trend for higher education to be seen as just one more consumer good. To understand this we need to look at what has been happening in traditional

higher education where, according to one US report, students “are bringing to higher education exactly the same consumer expectations that they have for every other commercial enterprise with which they deal” (Levine, 1993: 4). What students want, the report suggests, is “a stripped-down version of college without student affairs, extracurricular activity, residence life, varsity sport, campus chaplains one that provides ‘high-quality products but ... low costs’ and one where education is close to home and operates ‘during convenient hour preferably round the clock’” (ibid.).

Ritzer (1998: 154) argues that, to satisfy these students, universities embrace technology because students are attracted to high-tech environment technology promises to lower university costs; and because technology promises deliver programmes both to satellite campuses near where they live, and, like Domino’s pizzas, into their homes (p. 11). Convenience education, like convenience foods, is with us. Indeed, officials at the University of Northern Arizona specifically claim that their university is “designed around the concept of convenience for the student” (Howard, 1996: 7). Integral to this is the delivery of distance and online education courses for home consumption. What is delivered is content and, possibly, interaction. Once this kind of education is provided locally, there is no reason why it cannot be provided globally. The possibility of capturing a global market thus adds to the attraction of e-education.

As a direct result of these developments, there are widespread pressures to move towards e-education from distance educators, those working in campus settings, trainers, and from new entrant firms such as Merrill Lynch, Banc One, and a host of venture capital groups who see Internet education and training as the next ‘Killer App’ (Peterson et al., 1999).

Disbenefits

A Canadian scientist, Ursula Franklin (1992: 124), wisely observed:

“Whenever someone talks to you about the benefits and costs of a particular project, don’t ask *What* benefits?’ ask ‘*Whose* benefits and *whose* costs?’ At times it helps to rephrase an observation in line with a perspective from the receiving end of technology.”

I have little doubt that e-education has enabled distance educators and others to improve the quality of the dialogue available to students, and often to provide them with a richer spectrum of materials. For those students within the fold, the quality of their educational experience is being enriched. They have in effect gained a personal tutor, there to answer any query that they care to put forward. However, the potential for these additional services to be the subject of a separate charging system should give us cause for concern: e-education has the potential to disaggregate the overall product, and charge according to use. In such a system, the poor lose out.

More generally, I have little doubt that e-education is more costly than first and second generation distance education, but I also suspect that it may prove to be more costly than traditional education. In such circumstances three choices seem to be open to providers. Firstly, to severely restrict both the range and quality of the materials put online and the interactive experience open to students. To do this negates the whole purpose of moving into e-education. Secondly, wherever possible, to lower costs - most

notably through degrading the work of, and casualizing the employment of, the staff involved in developing the materials and teaching online. Thirdly, by putting more of the costs of distance education on to the students.

It is the third of these problems that most concerns me. The technology and business practices involved in e-education place additional costs on the learner. As societies and nations fracture across ever widening gaps in wealth, so the additional costs to the learner involved in e-education will fall most heavily on the poor. Currently there is widespread concern at the existence of a digital divide. As always, the solution is to seek to develop programmes that will at least allow some people among the disadvantaged sectors of society to benefit from the new developments, but in the face of the growing population, these measures increasingly look like palliatives. No doubt the costs of the technology will come down, but those who are not able to afford e-education are being written out of the game. Unfortunately this is most likely to be the case in developing countries (Perraton, 2000: 150).

Globalizing providers of distance education who exploit the capabilities of e-education to transcend frontiers will no doubt look to that part of the market that can afford to meet the costs of e-education. As they turn their attention towards the global market, so it will become easier for them to forget those sectors of the market (including the local market) that cannot afford the cost. The temptation to become increasingly commercial will grow – a temptation that is being fuelled by current approaches towards public expenditure. It is here that the crux of my concern lies: just how are distance educators going to respond to the increasing global need for cheap, affordable education to meet the needs of a world population that will on current forecasts grow by over three billions in the next 50 years? Is our current concern with e-education helping or hindering us in this? Or don't we care?

References

- Arizona Learning Systems (1998). *Preliminary cost methodology for distance learning*. n.p., Arizona Learning Systems and the State Board of Directors for Community Colleges of Arizona.
- Arvan, L., Ory, J. C., Bullock, C. D., Burnaska, K. K., & Hanson, M. (1998). The SCALE Efficiency Projects, *Journal of Asynchronous Learning Networks*, 2 (2). Available online at http://www.sloan-c.org/publications/jaln/v2n2/v2n2_arvan.asp.
- Bates, A. W. (2000). *Managing technological change. Strategies for college and university leaders*. San Francisco: Jossey-Bass.
- Boettcher, J. V. (1999). *How many students are just right in a web course?* Available online at <http://www.designingforlearning.info/services/writing/number.htm>
- Dhanarajan, R. (2001). Distance education: Promise, performance and potential. *Open Learning*, 16 (1), pp. 61-68.
- Eicher, J. C., Hawkrige, D., McAnany, E., Mariet, F., & Orivel, F. (1982). *The economics of new educational media. Volume 3: Cost and effectiveness overview and synthesis*. Paris: The UNESCO Press.

- Escotet, M. (1980). *Tendencias de la Educación Superior a Distancia*. San José, Costa Rica: Editorial Universidad Estatal a Distancia.
- Farmer, M. A. (1999). Study: E-commerce sites pricey to build, CNET News.com. Available online at http://news.cnet.com/Study-E-commerce-sites-pricey-to-build/2100-1017_3-226442.html?tag=mncol
- Franklin, U. (1992). *The real world of technology*. Concord, Ontario: House of Anani Press Ltd.
- Gladieux, L. E., & Swail, W. S. (1999). The Internet: New engine of inequality? Paper presented to the EDUCAUSE '99 Conference. Available online at <http://net.educause.edu/ir/library/html/edu9949/edu9949.html>
- Harasim, L. (1989) On-line education: a new domain. In R. Mason & A. Kaye (eds.), *Mindweave: Communication, computers and distance education*. Oxford: Pergamon Press.
- Harris, D. (1987). *Openness and closure in distance education*. Barcombe: The Farmer Press.
- Holmberg, B. (1995). *Theory and practice of distance education*. (2nd edn.). London: Routledge.
- Howard, E. G. (1996). Satellite Solution: Popping up like Dandelions, Satellite Campuses tighten Bond of Learning, Students. *Kansas City Business Journal*, 14, sec. 1, p. 7.
- Inglis, A. (1999). Is online delivery less costly than print and is it meaningful to ask? *Distance Education*, 20 (2), pp. 220-39.
- Jamison, D. T., Suppes, P., & Wells, S. (1974). The effectiveness of alternative media: a survey. *Review of Educational Research*, 44 (1), pp. 1-67.
- Jung, I. (2000). Technology innovations and the development of distance education: Korean experience. *Open Learning*, 15 (3), pp. 217-232.
- Levine, A. (1993). Student expectations of college. *Change*, September/October, p. 4.
- Mayadas, A. F. How the term 'ALN' came about? <http://www.alnorg/alnweb/aln.htm>.
- Nipper, S. (1989). Third generation distance learning and computer conferencing. In R. Mason & A. Kaye (eds.), *Mindweave: Communication, computers and distance education*. Oxford: Pergamon Press.
- Noble, D. (1999). *Digital diploma mills. Part IV, Rehearsal for the revolution*. Online at <http://communication.ucsd.edu/dl/ddm4.html>
- Perraton, H. (2000). *Open and distance learning in the developing world*. London: Routledge.
- Peterson, R. W., Marostica, M. A., & Callahan, L. M. (1999). *E-Learning: Helping investors climb the e-learning curve*. Minneapolis: Bancorp Piper Jaffray.
- PriceWaterhouseCoopers (2000). *Business model for the e-University*. Main report available through http://www.hefce.ac.uk/pubs/HEFCE/2000/00_44.htm.
- Ritzer, G. (1993). *The McDonaldization of society*. Thousand Oaks, CA: Pine Forge Press.
- Ritzer, G. (1998). *The McDonaldization thesis*. London, Sage Publications.

- Roderick, E. (1998). More than just pretty pictures: A cost/benefit analysis of digital library holdings. A paper presented to the CAUSE '98 Conference, Seattle, December. Available online at <http://net.educause.edu/ir/library/html/cnc9804/cnc9804.html>.
- Rumble, G. (1997). *The Costs and Economics of Open and Distance Learning*. London: Kogan Page.
- Rumble, G. (1999). Cost analysis of distance learning. *Performance Improvement Quarterly*, 12 (2), pp. 122-137.
- Rumble, G. 2001. The costs and costing of networked learning. *Journal of Asynchronous Learning Networks*, 5 (2), pp. 75-96.
http://www.aln.org/publications/jaln/v5n2/v5n2_rumble.asp.
- U.S. Bureau of the Census (2000). International Data Base, estimate as at 10.5.2000
<http://www.census.gov/ipc/www/idb/>
- U.S. Bureau of the Census (2001) International Data Base, as at 1 January 2001. <http://www.census.gov/ipc/www/idb/>

Name Index

- Ainsworth, D.: 46
 Annand, D.: 48, 127, 147, 170
 Ansari, M.M.: 12, 107
 Arena, E.: 11
 Arvan, L.: 126, 128, 146, 147, 150, 166, 169, 177, 178
 Atkinson, J.: 60
 Bacsich, P.: 123, 143
 Bailey, K.: 132
 Bako, C.T.: 12
 Bashir, T.H.: 114
 Bates, A. W.: 15, 43, 44, 46, 112, 124, 126, 128, 144, 146, 149, 150, 160, 164, 165, 169, 178
 Becher, T.: 113
 Bell, D.: 16, 123
 Bell, R.: 111, 113
 Berg, G.A.: 148
 Blauner, R.: 16, 123, 164
 Boettcher, J.V.: 126, 145, 146, 166, 169, 177, 178
 Bogdanov, V.: 14
 Boucher, A.: 123, 143
 Braithwaite, L.B.: 11
 van der Brande, L.: 47, 124
 Brown, J.S.: 132
 Bullock, C.D.: 166
 Burnaska, K.K.: 166
 Callahan, L.M.: 120
 Champion, M.: 55, 73, 81, 104
 Chale, E.M.: 12
 Child, J.: 63, 64
 Chivore, B.R.S.: 12
 Christopher, G.R.: 12
 Chute, A.G.: 12
 Cilesio, C.: 143
 Coase, R. H.: 131
 Collis, B.: 20, 46
 Coombs, P. H.: 139
 Costello, N.: 119
 Crabb, G.: 139
 Cumming, C.: 11, 107
 Curran, C.: 104, 110, 113
 Daniel, J.S.: 11, 13, 16, 17, 18, 19, 20, 21, 27, 43, 45, 70, 112, 113, 132, 164
 Dawkins, A.: 98, 99
 Dhanarajan, R.: 122, 175
 DiBiase, D.: 126, 146, 169
 Dodd, J.: 70
 Dodds, T.: 11
 Downes, L.: 131
 Duguid, P.: 132
 Dunlop, J.T.: 16, 123
 Eicher, J.-C.: 9, 11, 15, 17, 33, 37, 41, 44, 139, 176
 Ellenbogen, B.: 11
 Elliott, L.: 132
 Escotet, M.: 120, 180
 Evans, T.: 111
 Farmer, M.A.: 148, 160, 171, 177
 Farnes, N.: 55, 97, 99
 Fevre, R.: 60, 61
 Fielden, J.: 139
 Finkelstein, M.J.: 148
 Fletcher, J.D.: 46
 Ford, H.: 55, 56
 Franklin, U.: 48, 133, 134, 181
 Futagami, S.: 11
 Fwu, B.-J.: 11, 43, 81, 104, 113, 114
 Garrison, D.R.: 18
 Giegerich, A.: 132
 Gifford, B.R.: 19
 Gladieux, L.E.: 127, 147, 170, 171, 178
 Griffith, B.C.: 113
 Grint, K.: 16, 45, 123, 164
 Guadamuz Sandoval, L.: 11
 Guiton, P.: 73, 104
 Hahn, H.A.: 46, 128
 Hall, J.W.: 69, 71
 Hall, P.: 70
 Hallak, J.: 19, 44, 107
 Hamilton, D.: 103
 Hanna, D.: 131
 Hanson, M.: 166
 Harasim, L.: 120, 121, 180
 Harbinson, F.H.: 16, 123
 Harris, D.: 120, 180
 Harry, K.: 34, 67, 97
 Hartge, T.: 46
 Hawkridge, D.: 9, 11, 15, 41
 Heckscher, C.: 132
 Hogan, T.P.: 113
 Holmberg, B.: 69, 113, 120, 180
 Holmes, D.R.: 11
 Howard, E.G.: 121, 181
 Hron, A.: 46
 Hulik, M.: 12
 Hülsmann, T.: 7, 15, 16, 124, 125, 144, 152, 157, 158

- Ilyin, V.: 99
 Inglis, A.: 126, 129, 146, 150, 167, 168, 169, 178
 Innes, S.: 83
 Jamison, D.T.: 9, 11, 14, 15, 41, 44, 122, 139, 163, 176
 Jevons, F.: 69, 76, 81
 Jewitt, F.: 126, 146, 169
 Johnson, H.T.: 14, 81
 Johnson: R.: 98
 Jung, I.: 129, 151, 168, 178
 Kaplan, R.S.: 14
 Karmacharya, D.M.: 11
 Karmel, P.: 72
 Kearsley, G.: 111
 Keegan, D.: 7, 9, 19, 22, 69, 97-102, 103, 104, 105, 109, 110, 112, 113
 van der Kelen, B.: 11
 Kelly, M.: 81
 Kemp, J.E.: 12
 Kerr, C.: 16, 123
 Kim, S.: 74
 Kinyanjui, B.K.S.: 11
 Klees, S.J.: 11, 14, 15, 41, 44, 139
 König, R.: 53
 Laidlaw, B.: 11, 21, 29, 34, 35, 36, 107
 Land, H.: 70
 Latchem, C.: 131
 Lau, R.: 132
 Layard, R.: 11, 21, 29, 34, 35, 36, 107
 Layte, M.: 46, 47, 128, 149, 166
 Leach, K.: 46, 48, 130, 148, 149, 158, 159, 160, 161, 171
 Lee, K.W.: 11
 Le Goff, J.: 132
 Leffingham, W.H.: 54, 55
 Leslie, J.D.: 30, 78
 Levine, A.: 121, 181
 Lewis, R.: 114
 Livingston, R.: 11
 Lueddeke, G.: 114
 Lumsden, K.: 11, 37
 Lynch, P.: 36
 Mace, J.: 11, 14, 15, 21, 36, 42
 MacKenzie, N.: 9, 107, 112
 MacLeod, D.: 62
 Makau, B.: 12, 107
 Mandl, H.: 46
 Mariet, F.: 9, 15, 41
 Marostica, M.A.: 120
 Massy, W.F.: 147
 Mayadas, A.F.: 120, 180
 Mayo, T.K.: 11
 McAnany, E.: 9, 14, 41
 McGraw, B.A.: 46
 McGraw, K.L.: 46
 McGuinness A.C.: 16, 45
 Melmed, A.S.: 11
 Moe, M.: 132
 Moonen, J.: 46, 126, 146, 169
 de Moor, R.: 69
 Moore, M.G.: 111
 Moran, L.: 47, 113, 158
 Morpeth, R.: 12
 Mugridge, I.: 7, 9, 22, 93-95, 103, 104, 105, 109, 110, 113
 Mui, C.: 131
 Mullins, N.C.: 113
 Muñoz Aquino, G.: 11
 Muta, H.: 11, 21, 73, 74, 107
 Muzio, J.: 12, 48
 Myers, C.A.: 16, 123
 Naidu, C.G.: 11
 Nation, D.: 111
 Naughton, J.: 127, 148
 Neil, M.: 113
 Neilsen, H.D.: 12
 Nettleton, G.: 12
 Nipper, S.: 123, 176
 Nkinyangi: 11
 Noble, D.: 120, 133, 179
 Oblinger, D.: 127, 128, 131, 148,
 Ohmae, K.: 81, 83, 109
 Olaloku, F.A.: 11, 107
 Oliveira, J.B.: 11, 12, 41
 Orivel, F.: 9, 11, 15, 16, 41, 139
 Ory, J.C.: 166
 Palmer, C.: 12
 Parker, R.: 70
 Pearson, P.K.: 139
 Perraton, H.: 11, 12, 15, 18, 27, 41, 43, 130, 151, 182
 Perry, W.: 17, 69, 70, 76, 113
 Peters, O.: 53, 54, 59, 61, 62, 70, 113, 120
 Peters, T.J.: 82
 Peterson, R.W.: 120
 Phelps, R.H.: 46, 47, 128, 150, 166
 Pillai, C.R.: 11
 Postgate, R.: 9, 107, 112
 Raggett, P.: 54, 55, 59, 61, 97, 99, 112
 Rajasingham, L.: 20, 46
 Ravet, S.: 46, 47, 128, 149, 166
 Reddy, G.R.: 18, 43, 70

Index

- Renner, W.: 55
Renwick, W.: 20, 44, 107
Ritchie, C.: 11
Ritschard, M.R.: 47, 149, 160
Ritzer, G.: 55, 56, 58, 61, 62, 120, 121, 180, 181
Robertshaw, M.: 104, 110, 113
Roderick, E.: 46, 126, 146, 162, 177
Rumble, G.: 7, 11, 12, 17, 19, 21, 22, 34, 41, 43, 45, 46, 47, 48, 57, 59, 67, 70, 73, 74, 78, 83, 89-91, 93-95, 97, 101, 103, 104, 108, 109, 110, 111, 112, 113, 122, 132, 139, 163, 169, 171, 176, 177, 178
Saba, F.: 145
Saito, T.: 11, 107
Sakamoto, T.: 11, 73, 107
Salmon, G.: 142
Saunders, M.R.: 71, 81
Schifter, C.C.: 146, 147, 157, 158, 159
Schneider, B.: 46
Schramm, W.: 15
Schultz, T.: 9, 139
Schuster, J.H.: 148
Scott, A.: 37
Scott, P.: 14, 19, 44, 108
Scupham, J.: 9, 107, 112
Seal, R.K.: 148
Sewart, D.: 103
Sharma, R.D.: 107
Sharrat, R.: 104, 113
Shott, M.: 100
Siaciwena, R.M.: 71, 73
Singh, B.: 71, 73
Siqueira de Freitas, K.: 36
Skewes-Cox, T.: 11
Smallen, D.: 46, 48, 130, 148, 149, 158, 159, 160, 161, 171
Smith, K.R.: 73
Smith, M.R.: 71, 81, 82
Smith, W.A.S.: 70
Snowden, B.L.: 11, 13, 21, 27, 113
Sparkes, J.: 29, 31, 145, 157
Spencer, E.L.: 47, 149, 160
Srisa-an, W.: 74
Stockman, J.: 62, 103
Suppes, P.: 9, 41, 122, 163
Swail, W.S.: 127, 147, 170, 171, 178
Swinerton, E.N.: 113
Tait, A.: 22, 97
Tatto, M.T.: 12
Taylor, J.C.: 12, 76, 107, 108
Tergan, S.-O.: 46
Thompson, J.L.: 82
Tiffin, J.: 20, 46
Tight, M.: 80, 111, 113
Timmers, S.: 32
Todaro, M.P.: 73
Tolley, S.: 127, 147, 169, 170
Turniansky, U.: 11
Turoff, M.: 127, 147, 158, 169
Vaizey, J.: 9, 139
Wagner, L.: 11, 13, 14, 18, 22, 19, 30, 35, 43, 76, 78, 107, 108
Waterman, R.H.: 82
Webb, A.: 70
Webb, G.: 143
Wells, R.A.: 46, 128
Wells, S.: 9, 11, 14, 15, 37, 41, 44, 122, 139, 163
Whalen, T.: 46, 47, 123, 125, 128, 130, 143, 145, 149, 150, 159, 160, 166, 167
White, V.J.: 7, 9, 12, 22, 76, 89-91, 103, 104, 107, 108, 109, 110
Wolff, L.: 11
Woodley, A.: 69
Woolgar, S.: 16, 45, 123, 164
Wright, D.: 46, 47, 123, 125, 128, 130, 143, 145, 149, 150, 159, 160, 166, 167
Zemsky, R.: 147
Zuboff, S.: 55

Index of Institutions

- African Virtual University: 127, 147, 170, 178
- Air Force Institute of Technology (USA): 12
- Allama Iqbal Open University (formerly People's Open University) (Pakistan): 32, 68
- al-Quds Open University (Jordan): 68
- American Distance Education Consortium: 131
- Anadolu University (Turkey): 18
- Andhra Pradesh Committee on the Establishment of an Open University (India): 27
- Andhra Pradesh Open University (India): 18, 43, 68, 70, 73
- Arizona Learning Systems (USA): 46, 48, 125, 126, 129, 130, 144, 145, 146, 149, 150, 157, 169, 176, 177, 178
- Armidale CAE (Australia): 99
- Asynchronous Learning Networks: 180
- AT&T Teletraining (USA): 12
- Athabasca University (Canada): 11, 31, 36, 68, 127, 147, 170
- Australian Broadcasting Corporation: 125
- Banc One: 119, 181
- Bell Online Institute: 47
- Brisbane CAE (Australia): 99
- British Open Tech Project: 38
- British Telecommunications plc: 47, 83
- California State University (USA): 37, 62, 103
- Capricornia LAE (Australia): 99
- Cardean University (USA): 131
- Carnegie Mellon University (USA): 131
- Centre National d'Enseignement à Distance, CNED (France): 18, 97, 101
- Centros APEC de Educacion a Distancia, CENAPEC (Dominican Republic): 11
- Chicago Junior College (USA): 10, 107
- China TV University System: 18
- Colorado State University (USA): 11, 30
- Columbia Business School (USA): 131
- Comisión Organizadora de la Universidad Nacional Abierta, COUNA (Venezuela): 27, 70
- Committee of Scottish University Principals: 19, 103, 108
- Coopers Lybrand: 12
- Correspondence Course Unit (Kenya): 11
- Correspondence Directorates (India): 12, 71
- Curtin University of Technology (WAIT) (Australia): 98
- Darling Downs IAE (Australia): 99
- Dawkins Green paper: 81
- Deakin University (Australia): 31, 72, 77, 83, 98, 107, 139
- Department of Employment, Education and Training, Commonwealth of Australia: 77
- Domino's Pizzas: 121, 181
- Edith Cowan University (Australia): 47, 131
- El Salvador Educational Television (ITV) Project: 11, 34
- e-University: 119, 127, 128, 130, 131, 134, 147, 148, 170, 177
- Everyman's University (Israel), *see also Open University, Israel*: 11, 68
- FernUniversität - Gesamthochschule (Germany): 68, 82, 83
- Florida Gulf Coast University (USA): 147
- Free University (Iran): 68
- Gartner Group: 148, 171, 177
- Gippsland IAE (Australia): 99
- Hagerstown ITV Project (USA): 11
- Hawkesbury Agricultural College (Australia): 99
- Heriot Watt University (UK): 36
- Hudson Report: 81
- Hunter IHE (Australia): 99
- Illinois Wesleyan University (USA): 69
- Indira Gandhi National Open University (India): 11, 18, 43, 68
- Institut de Recherche sur l'Economie de l'Education at Dijon (France): 10, 41
- Integrated Teacher Education Course (Zimbabwe): 12
- International Council for Educational Media: 10
- IRDEB Madureza Project in Bahia (Brazil): 11
- Ivory Coast primary education project: 11
- James Cook University (Australia): 98
- Johnson Report: 81
- Karmel Committee: 72
- Kinder-Care: 56
- Korea Air and Correspondent University (South Korea): 68, 74
- Korea Air Correspondence High School: 11

- Korea National Open University: 18, 129, 151, 168, 178
- Korean Council for University Education: 74
- Korean Elementary/Middle School project: 11
- Kota Open University (India): 68
- Library of Virginia (USA): 46, 126, 145, 176-177
- LOGOS II (Brazil): 11
- London School of Economics and Political Science (UK): 131
- Macquarie University (Australia): 71, 98
- Malawi Correspondence College: 11
- Maranhão Schools Instructional Television Project (FMTVE) (Brazil): 11
- Mauritius College of the Air: 11, 34
- Merrill Lynch: 119, 181
- Mexican Radioprimary: 11
- Mexican Telesecundaria: 11
- Mitchell CAE (Australia): 99
- Murdoch University (Australia): 71, 98
- Nalanda Open University (India): 68
- National Board of Employment, Education and Training (NBEET): 44, 48, 124, 125, 164
- National Distance Education Centre, Ireland: 104
- National Extension College (UK): 12, 61, 83, 120, 134, 179; *Technician Training Scheme*: 12
- National Open University (Taiwan): 68
- National Teachers' Institute (Nigeria): 12
- National Technological University (NTU) (USA): 11, 30, 32, 36, 81, 83, 104, 114
- National Universities Degree Consortium (USA): 131
- News International plc: 131
- Newsweek: 56
- Nicaraguan Radio Mathematics Project: 11, 34
- NKS Norway: 152
- Ontario Institute for Studies in Education (Canada): 120, 180
- Open College (UK): 83
- Open Learning Agency British Columbia (Canada): 15, 31, 84
- Open Learning Institute (Hong Kong): 68, 104
- Open Polytechnic (UK): 80, 81, 83
- Open Universiteit (Netherlands): 68, 69
- Open University (formerly Everyman's University), Israel: 68
- Open University (UK): 11, 13, 14, 15, 17, 18, 19, 20, 22, 27, 29, 30, 31, 32, 33, 34, 35, 36, 37, 41, 42, 43, 44, 47, 48, 58, 59, 61, 63, 68, 69, 70, 73, 76, 80, 81, 82, 83, 84, 100, 104, 105, 108, 111, 119, 120, 124, 132, 134, 147, 148, 152, 163, 170, 177, 179, 180
- Orange Agricultural College (Australia): 99
- Payame Noor University (Iran): 18, 68
- Penn State University's World Campus (USA): 126, 146, 169
- PricewaterhouseCoopers: 119, 127, 128, 130, 131, 147, 148, 170, 177
- Project Acesso (Brazil): 12
- Queen's University, Ontario (Canada): 69
- Queensland Fire Service (Australia): 12
- Questia: 126, 131, 146, 177
- Radio and Television University of China: 68, 97
- Radio Education System (Nepal): 11
- Riverina Murray LAE (Australia): 99
- RMIT University in Australia: 167
- Royal Melbourne Institute of Technology (Australia): 99
- SmartForce: 131
- South Australian CAE (Australia): 99
- Sri Lanka Open University (previously the Sri Lanka Institute of Distance Education): 32, 68, 70
- Stanford ITV Project (USA): 11
- Stanford University (USA): 131
- Stanford University Institute for Communications Research (USA): 10, 41
- Sukhothai Thammathirat Open University (Thailand): 18, 68, 74, 97
- SURGE (State University Resources for Graduate Education), Colorado State University (USA): 11
- Swedish Committee for Television and Radio in Education: 72
- Sylvan Learning Centers: 56
- Tasmanian State IT (Australia): 99
- Téléuniversité in Quebec (Canada): 97
- Teacher upgrading projects (Sri Lanka and Indonesia): 12
- Telescundaria (Mexico): 34
- Tutor.com: 127, 131, 147, 170, 177
- UK National Council for Educational Technology: 10
- UNDP (United Nations Development Programme): 70
- UNESCO: 10, 11, 21, 41, 139, 163

- UNEXT.com: 131
 Universidad Estatal a Distancia (Costa Rica): 11, 30, 32, 59, 68
 Universidad Nacional Abierta (Venezuela): 11, 27, 36, 68, 70, 73
 Universidad Nacional de Educación a Distancia (Spain): 18, 68, 83
 Universidad Pedagógica Nacional (Mexico): 35
 Universitas 21: 131
 Universitas Terbuka (Indonesia): 18, 68
 University College of Southern Queensland (Australia): 12, 76, 76, 91, 108
 University Correspondence College (UK): 83
 University of Queensland (Australia): 69, 71, 98, 99
 University of Bologna (Italy): 132
 University of British Columbia (Canada): 165
 University of California, Berkeley (USA): 69
 University of Chicago (USA): 69
 University of Chicago Graduate School of Business (USA): 131
 University of Illinois (USA): 128, 150, 178
 University of Lagos Correspondence and Open Studies Unit (Nigeria): 12
 University of London (UK): 34
 University of Melbourne (Australia): 131
 University of Nairobi External Degree Programme (Kenya): 12
 University of New England (Australia): 71, 98
 University of New South Wales (Australia): 98
 University of Northern Arizona (USA): 121, 181
 University of Phoenix (USA): 148
 University of South Africa: 18, 68, 69, 83
 University of Sunderland (UK): 103
 University of the Air of Japan: 11, 68, 73
 University of Victoria (Canada): 12, 84
 University of Waterloo Correspondence Program (Canada): 30
 University of Wisconsin (USA): 69
 University of Zambia: 71
 US Academy for Educational Development: 10
 US Bureau of the Census: 122, 175
 USAID (US Agency for International Development): 10, 41, 139, 163
 Warmambool CAE (Australia): 99
 Western Australian CAE: 99
 Wollongong University (Australia): 98
 World Bank: 10, 139, 163
 XanEdu: 126, 130, 131, 146, 177
 Yashwantrao Chavan Maharashtra Open University (India): 6

Subject Index

- access: 37-8, 39, 69-70, 120, 127
 administration, costs of e-administration: 127-8, 131, 134, 140-1, 142, 148-9, 160-2, 171; nature of e-administration: 142
 annualisation; of computing equipment etc.: 130, 149, 165, 171; of course development costs: 140, 166
 asynchronous learning networks, definition of: 120; costs relative to synchronous learning on-line: 125, 150, 178
 audio-cassettes, cost of: 15, 164
 benefits of on-line education: 48, 133-4
 broadcasting: 10, 42
 budgets: 130
 bureaucracy, and efficiency: 57; bureaucratisation: 53-4
 buying in courses and materials: 104, 110, 113; copywrite materials: 122, 140
 capital, cost of: 29, 139; *see also annualisation*; substitution for labour: 58, 175
 classrooms: *see also face-to-face tuition*
 collaboration: 83-4, 94-5, 100, 104-5, 110, 111, 113-4
 competition: 70, 80-5, 89-91, 93-5, 104-5, 107-14
 'competitive vulnerability' debate: 21-2, 73-85, 89-91, 93-5, 97-101, 103-5, 107-14
 computer mediated communication: 120, 180; costs of: 125-7; equipment costs: 130, 149
 consortia: 82, 83
 constructivism: 21, 48
 consumerism and education: 121, 180-1
 'convenience education': 121, 181
 convergence (of traditional and distance education): 93, 111
 correspondence education: 41-2, 120, 163
 cost, capital costs: 29; opportunity costs: 47, 128, 149-150, 159; overhead costs: 29, 130, 149; projection of: 13
 cost accounting, problems with: 42

- cost analysis, process of: 12-3, 143-4
- cost benefits of online education: 170-1
- cost comparisons (between face-to-face, distance and on-line education): 12, 18, 27, 43, 107, 112, 128-9, 149-151, 165-8, 170-1, 178-9; difficulty of analysing costs: 107, 112
- cost drivers (in distance education): 42, 122, 140, 163-4
- cost-efficiency: 36-7, 43
- cost function: 13, 28
- cost measures (per student, per learning hour): 16, 17, 151-2; student loads: 12
- cost studies (of distance education): 11-12, 41, 45-6, 107, 122, 139, 143, 163
- cost structure: 13, 27, 42
- cost to students, *see student fees*
- costs of mass higher education: 14, 43-4, 103, 108
- course development: 62-3, 133, 141; costs of: 28, 29-34, 46-7, 59, 124-6, 140, 144-5, 150, 157-8, 165-6, 169, 176
- course lives: 17, 42, 122, 140, 163
- course presentation, costs of: 28, 29-34, 158
- course production, *see materials production*
- course: 17, 34-6, 42, 73, 75, 76, 80, 82, 99-100, 122, 140, 163
- course teams: 17, 59, 163
- credit transfer: 114
- curriculum: 34-6, 72, 76, 82, 99-100
- deflation: 13
- deskilling: 54, 55, 59, 61
- dialogue: 120, 180; guided didactic conversation: 120
- disaggregation (of organisational structures): 131, 132
- disbenefits of on-line education: 181-2
- distance education: 9, 112-3, 114, 119, 163, 175; advantages of: 67; cost structure of: 15, 27, 121-3, 163; de-industrialisation of: 171; Fordist nature of: 55, 141; generations of: 123fn, 163; industrialisation and: 53-5; McDonaldisation and: 55-7, 58, 61, 62; separation from other forms of education: 112-3; technology and: 41; traditional education and: 18, 112-3, 114, 176, *see also post-bureaucratic organisational models*
- distance teaching universities: 18-19, 67-71, 97-8, 179; cost studies of: 11-12, 41-2; costs of: 42, 43, 57, 73-5, 139-40; establishment of: 69-70, 97-8; strategic options for: 82-5, 91, 109; strategic vulnerability of: 80-2, 93-4, 98-9, 110-1; strengths of, 70-71, 98; *see mega-universities*
- dual-mode (mixed-mode) systems: 19-20, 22, 30, 68-9, 71-3, 103-4, 107-9, 110-1; costs of: 76-8, 98-9, 107-9; productivity gains from technology and independent learning: 103; regulation undesirable: 104; strengths of: 71-3, 103-4, 108-9; use of distance education methods at: 77, 103; weakness relative to distance teaching universities: 89-90, 98, 103
- e-commerce practices within education: 148-9
- economics of education: 9, 139; *see cost studies*
- economies of scale: 14, 20, 21, 35, 36, 42, 58, 59, 71, 75, 76, 81, 100, 101, 112, 132, 140, 163; within online learning: 126-7, 145-7, 169-70, 178
- economies of scope: 48
- education, costs of: 14, 176; craft status of traditional education: 54, 122, 139; demand for education: 121-2, 175; nature of traditional education: 67-8
- educational broadcasting: 10, 42, 163
- educational television: 15, 122, 133, 176
- e-education: 16, 20-1, 22, 45-8, 119-34, 165; and developing countries: 134, 182; costs of: 20, 123-9, 144-52, 157-62, 165-7, 169-70, 176-9, 181-2; scope of: 119, 176
- face-to-face teaching: 76, 79
- foreign exchange: 16
- fees, *see student fees*
- flexible learning: 43, 109
- franchising: 83-4
- globalisation: 83, 182
- higher education, as consumer good: 121, 180-1; mass higher education: 43-4, 103, 108; re-engineering of: 43-4
- independent learning: 147
- inflation: 13
- instructional television, *see educational television, television, video*
- interactive instructional television: 15
- joint products: 78-80, 109
- joint ventures: 83-4

- labour, contracts for service: 122, 140;
 contracts of service: 122, 140; core
 labour force: 60, 163; division of labour:
 54, 59-60, 61, 141, 164; *see also*
deskilling; labour costs: 16, 17, 18, 30-1,
 75-6, 125-6, 140, 145; labour-for-labour
 substitution: 30-31, 123, 129, 140, 146,
 147, 169-70; labour market in distance
 education: 16, 17, 18, 42, 57-64; labour
 substitution: 20, 29, 30-1; peripheral
 labour force: 60, 163; reduction of labour
 costs: 29-30; role development: 142; skill
 acquisition: 63, 101, 103; specialisation:
 54-5, 63-4; two-tier labour market: 60-1;
 library request fulfilment costs: 126, 146,
 176-7
- materials production, costs of: 20-1
- media choice: 31, 122, 140, 163; *see also*
technology choice
- media, relative cost of: 45, 164
- mega-universities: 18-9, 43, 45, 112, 132
- mergers: 84, 131-2, 134
- mixed-mode, *see dual-mode*
- networks: 114
- online education: 15-6, 21-2, 45-8, 119-34,
 165; costs falling on academic staff: 127,
 146-7, 148, 170; costs of: 16, 123-9,
 143-52, 157-62, 165-7, 169-70, 171,
 181-2; nature of systems using: 165;
 perceived advantages within campus-
 based institutions: 120-1, 180-1; *see also*
online tuition
- organisational structure and costs: 18, 21,
 42, 45, 163
- output measurement, *see cost measures*
- overhead costs: 29, 130
- partnership models: 131
- post-bureaucratic organisational models:
 132, 141
- print: 15, 32, 164, 167-8
- productivity as driver of change: 103, 110,
 139; and structural change: 134
- quality: 82, 83, 84, 89-90, 94, 109-10, 133,
 163, 179-80
- radio: 15, 33, 164
- remote classrooms: 34
- shadow prices: 13
- standardisation: 54, 58
- student fees: 37-8; and other costs falling
 on students: 38-9, 46-8, 122, 127, 130,
 133, 141, 140, 144, 147, 158-9, 170, 171,
 177-8, 181-2
- student loads, in online learning: 126-7,
 145-7, 169-70, 178; *see economies of*
scale
- student support: 17, 28, 34, 42, 47, 75, 76,
 77; 81 *see tuition*
- study centres (local centres): 47, 127, 142,
 147, 170, 178
- synchronous online study: 125; cost relative
 to asynchronous online learning: 125,
 150, 165, 178
- teaching on line; *see under tuition*
- technology, and convenience-based
 consumerism: 121; choice of: 17, 31, 42,
 44-5, 122, 140, 163; cost reduction and:
 176; costs of: 9, 15-7, 45, 74, 77;
 distance education and: 41;
 organisational structure and: 123, 131-2,
 164; *see technological determinism*;
 relative effectiveness of: 45, 75
- technological determinism: 18, 45, 123fn,
 164
- telecentres, *see study centres*
- television: 32; *see educational television*
- text, *see print*
- tuition (face-to-face teaching): 34, 61-2, 63;
 online tuition: 48, 126-7, 131, 133, 142,
 146-7, 159, 170, 177; *see also student fees*
- value chains: 131
- values: 179
- video: 32-3; instructional video: 30, 46,
 108, 164; *see also remote classrooms*:
 34; video tape, 36, 43, 75, 78, 164
- web-site development costs: 148, 171, 177
- working practices: 17, 18, 30-1, 42, 122,
 163; *see also labour*

ASF Series

Studien und Berichte der Arbeitsstelle Fernstudienforschung (ASF) der
Carl von Ossietzky Universität Oldenburg
The Series of the Center for Research in Distance Education (ASF) at the
Carl von Ossietzky University of Oldenburg

The Series' Editors: U. Bernath, F. W. Busch, D. Garz, A. Hanft, W.-D. Scholz

- Volume 1 **Bernath, U., Fichten, W., Klaus, J., & Rieforth, J. (Eds.)**. Psychologische Gesundheitsförderung für Pflegekräfte in der Dialyse - Dokumentation einer betriebsinternen Fortbildung. – 2000 – 112 pp. – ISBN 3-8142-0668-1 / €9,30
Available as an electronic data file at: <http://docserver.bis.uni-oldenburg.de/publikationen/bisverlag/2000/berpsy00/berpsy00.html>
- Volume 2 **Hülsmann, T.** The costs of open learning: a handbook. – 2000 – 165 pp. – ISBN 3-8142-0724-6 / €14,40 / \$ 16.50
- Volume 3 **Friesen, H., Berr, K., Gerdes, K., Lenk, A., & Sanders, G.** Philosophische Dimensionen des Problems der Virtualität in einer globalen Mediengesellschaft - Beschreibung eines Forschungsprojektes. – 2001 – 60 pp. – ISBN 3-8142-0763-7 / €11,30
- Volume 4 **Holmberg, B.** Distance Education in Essence. An Overview of Theory and Practice in the Early Twenty-first Century. (2nd ed.) – 2003 – 124 pp. – ISBN 3-8142-0875-7 / €16,00 / \$ 19.00
- Volume 5 **Peters, O.** Distance Education in Transition. New Trends and Challenges. (4. ed.) – 2003 – 250 pp. – ISBN- 978-3-8142-0931-9 / €26,00 / \$ 30.00
- Volume 6 **Bernath, U., & Rubin, E. (Eds.)**. Reflections on Teaching and Learning in an Online Master Program. A Case Study. – 2003 – 295 pp. – ISBN-3-8142-0848-X / €24,00 / \$ 28.00
- Volume 7 **Rumble, G.** Papers and Debates on the Economics and Costs of Distance and Online Learning. – 2004 – 192 pp. – ISBN 3-8142-0886-2 / €20,00 / \$ 23.00
- Volume 8 **Beaudoin, M.** Reflections on Research, Faculty and Leadership in Distance Education. – 2004 – 144 pp. – ISBN 978-3-8142-0905-0 / €18,00 / \$ 21.00
- Volume 9 **Brindley, J., Walti, C., & Zawacki-Richter, O. (Eds.)**. Learner Support in Open, Distance and Online Learning Environments. – 2004 – 330 pp. + DVD-Video – ISBN 3-8142-0923-0 / €38,00 / \$ 45.00
- Volume 10 **Hülsmann, T., & Perraton, H. (Eds.)**. Educational Technology for Distance Education in Developing Countries. (forthcoming 2008)
- Volume 11 **Holmberg, B.** The Evolution, Principles and Practices of Distance Education. – 2005 – 174 pp. – ISBN 3-8142-0933-8 / €20,00 / \$ 23.00
- Volume 12 **Perraton, H., Robinson, B., & Creed, C. (Eds.)**. International Case Studies of Teacher Education at a Distance – 2007 – 314 pp. – ISBN 978-3-8142-2037-6 / €28,00 / \$ 39.00
- Volume 13 **Bernath, U. & Sangrà, A. (Eds.)**. Research on Competence Developments in Online Distance Education and E-Learning - Selected Papers from the 4th EDEN Research Workshop in Castelldefels/Spain, October 25 - 28, 2006. – 2007 – 263 pp. – ISBN 978-3-8142-2077-2 / €24,00 / \$ 32.00

Related publications:

Bernath, U., & Szüics, A. (Eds.). Supporting the Learner in Distance Education and E-Learning. Proceedings of the Third EDEN Research Workshop, Carl von Ossietzky University of Oldenburg, Germany, March 4 - 6, 2004. – 2004 – 556 pp. – ISBN 3-8142-0902-8 / €50,00 / \$ 57.50

Bernath, U. (Ed.). Online Tutorien - Beiträge zum Spezialkongress "Distance Learning" der AG-F im Rahmen der LEARNTEC 2002. – 2002 – 201 pp. – ISBN 3-8142-0806-4 / €12,00

Bernath, U., & Rubin, E. (Eds.). Final Report and Documentation of the Virtual Seminar for Professional Development in Distance Education. – 1999 – 433 pp. – ISBN 3-8142-0657-6 / €20,50 / \$ 23.50

For more information please see: <http://www.mde.uni-oldenburg.de/40574.html>