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Demographic and Social Trends Issue Paper: The Future of Education in Europe until 2010

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Foreword

This paper has been produced in the context of *The Futures Project* of the IPTS, in particular the part dealing with demographic and social trends. It relates specifically to the analysis and projection of likely trends and plausible new developments in the field of education, in the early decades of the 21st century.

Much of the first year's work on *The Futures Project* from mid-1998 to mid-1999 has been organised around five expert panels including one on Demographic and Social Trends¹. A separate report (Futures Report No. 2: ***Demographic & Social Trends Panel Report***) summarises the work and achievements of this panel. (Report No. 1 in the Futures Report Series entitled *The Futures Project: Overview* provides an account of the scope, methods and aims of the overall project.)

This present paper provides complementary information, analysis and views on some of the key education, training and general learning issues that the panel raised, but in a more focused and elaborate way than has been provided in the Panel Report.

Given that the author of this paper has also been a Panel member, the way in which some of the themes are developed stems naturally from the ideas generated and discussed by the Panel. However, much of the discussions in the paper are developed beyond the point reached at the panel meetings, and in directions primarily determined by the author. In view of this, the paper does not necessarily represent the views of the panel as a whole, nor of the IPTS, but it nonetheless constitutes a rich source of additional material and ideas, which the Futures Project can draw on as further work unfolds.

James P. Gavigan & Mathias Ottitsch
D&ST Panel Co-ordinators²

IPTS, 1999

¹ The other Panel themes were Information and Communication Technologies and the Information Society; Life Sciences and the Frontiers of Life; Natural Resources and the Environment; and The Political and Economic Context.

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The Futures Project is a major prospective exercise of IPTS that explores the likely effects of the major economic, social and technological developments which will take place in Europe and the world in the next ten years on Technology, Employment and Competitiveness in Europe by 2010. It is organised as an interactive process based on expert panels and workshops, and supported by background research.

The output of the Futures project is a series of reports to be published in the course of 1999. The first publications will be an overview report and four panel reports (May 1999):

Report 01 The Futures Project: Overview

Report 02 The Demographic and Social Trends Panel Report

Report 03 Information and Communication Technologies and the Information Society Panel Report

Report 04 Life Sciences and the Frontier of Life Panel Report

Report 05 Natural Resources and the Environment Panel Report

A series of **Issue Papers** developed by different expert panel members will also be published (March – May 1999)

All reports will be available from the IPTS and will be available from the Futures Project Website:

<http://futures.jrc.es>

Further reports in the series will be announced on the website as they are published.

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Executive Summary

It is widely accepted, by individuals as much as by their governments, that education is now the most important investment they, and their societies, make. That at primary and secondary level within the formal education sector is already universal. The remaining part of this sector, that of Higher Education (HE), is however still some way off saturation across the EU. Accordingly, this will be the main national government funded element due for significant expansion. The current level, of around a third of young persons participating in it, is likely to double over the next decade. The rate of increase, leading to saturation at around a half to two-thirds of these young people - covering those who may be eventually able to benefit from this level of education, will be dependent largely on the rate at which funding is made available for this by national governments. Assuming that the cut-backs in infra-structural investments over the past decade are reversed in time to avoid a collapse of the various national systems, new developments in technology may cover subsequent shortfalls in teaching resource. Such is the priority given by national governments, though, that we should expect - unless a major recession develops - saturation in this (HE) sector also to come about by 2010AD. The EU's role is likely, therefore, to be only that of co-ordinating national programmes and ensuring that standards are acceptable in the pan-European context.

The most dramatic expansion will, however, be seen in the on-going education following on from formal qualifications; that of Life-Long-Learning (LLL). The emerging need for this is most clearly underwritten by the predicted need to radically retrain 80% of EU workers over the next decade - as their existing jobs are destroyed by radical changes in technology. This training will, though, shift from the existing conventional forms of in-house on-the-job experiential training. Instead, in the knowledge society, where in addition employability is now the prime factor, the need will be for longer-term education - providing intellectual frameworks for individual development - rather than shorter-term training - providing immediate job skills for employers. As there are, as yet, relatively few commercial providers, it is likely that existing HE institutions will be required to meet this demand; though few are yet planning to do this. The expansion of numbers in this sector - typically provided at present by short courses - will be dramatic, out-stripping those needing degree level tuition in the formal level sector, and may even outstrip the resources of the potential providers. The EC's initial role, therefore, may be to stimulate providers (in the HE sector) by publicity and, in particular, by pump-priming. It will then need to set and monitor standards, where much of this may - in the age of satellite links - be delivered across national boundaries, and the resulting new 'qualifications' will need to be recognised across the EU. An important extension to this process will be to 'certify' providers, so that their 'customers' can reasonably put their trust in them - where distrust of the unknown may otherwise dissuade students from participating. The large numbers of new providers, especially when commercial providers are drawn in, will pose a major challenge to regulators such as the EC; and the pan-European dimension may leave only the EC capable of this role. On the other hand, much of the core material - in the form of distance-teaching packages - may be provided by a small number of leading institutions. These may be the recipients of EC pump-priming funds, which in turn may be used to underpin some of the key standards and, indeed, to raise such standards overall. Direct funding should not, however, be a problem where individuals - or their employers - are likely to pay for this (LLL) education.

The third sector, that of informal education, will rapidly grow in importance where individuals now rate personal development more important than even career development. The new technologies, especially those of ICT, will be especially important in this sector. These will allow large numbers of providers to offer specific packages - ranging from whole programmes of post-graduate education down to the equivalent of a 100 page text - tailored to individual needs. Paralleling these Internet developments will be those resulting from digitisation of television, which will significantly overlap the informal education sectors. Once again, students will fund their own education in this market-driven sector. Accordingly, the EC's prime role will be to 'regulate' the large numbers of providers, to ensure again that pan-European standards are maintained, and that students may reasonably be able to put their trust in EC 'certified' providers.

Overall, then, the most dramatic increases in numbers will occur in the LLL sectors, for short courses an informal education, where the EC's role will initially be to stimulate developments, with some pump-priming. It will, though, eventually be to 'regulate' standards and to 'certify' providers; which, in view of the large numbers of these, may demand the creation of new EC infra-structures.

Introduction

It is widely predicted, by educationalists and politicians alike, that education - in general - will soon become the largest 'industry' in developed countries³. It is also expected⁴ to be central to most nations' future developments - on almost all fronts⁵ - especially in terms of their economic growth. In addition, with the growing emphasis on LLL (Life Long Learning)⁶, it is about to rapidly expand out of the earlier decades of an individual's life - to cover all their lifestages⁷. As this will significantly expand the numbers undertaking programmes of education, and will dramatically change both the content and delivery logistics, it is now the major force acting on this sector; and one whose unpredictable progress generates the greatest uncertainty overall⁸.

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- 3 More than half the managers in our (in OUBS - Futures Observatory) longitudinal research believe that this is likely extend to 'global mass education' by around 2030. This quantitative research was carried out, between 1996 and 1998, on 500 Open University Business School management alumni and students across Europe. Supporting qualitative work involved 30 focus groups and computer conferences with more than 500 Strategic Planning Society members; as well as discussions with lead bodies such as the European Commission (especially DG5), DfEE (UK Department for Education and Employment, Corporate Planning Division), IoM (UK Institute of Management), and DTI (UK Department of Trade and Industry, Foresight); and, of course, IPTS.
Mercer, D, Global forces which will shape our economic and political lives, *Futures Research Quarterly*, Vol. 13 No. 4 (1997)
Mercer, D, The Future Quantified, *Futures*, Vol. 30 No. 4 pp 305-322, 1998
Mercer, D, Long Range Marketing, pp 178-184 *Journal of Marketing Practice*, Vol. 4 No. 6 (1998)
 - 4 By the Demographic and Social Trends Expert Panel set up by IPTS in the Frame of its Futures Project (1998-99) amongst others.
 - 5 Amongst the managers and professionals in our (OUBS - Futures Observatory) longitudinal research, it is one of the most important 'non-disasters' (the most important developments predicted - for example global water shortage the highest of all at 6.05 on the scale of 1-7 - are all threats to humanity). Thus, global mass education rates 5.24 in importance; compared with 5.5 for 'cures for major diseases (which is the highest of the 'positive' developments); and the probability of it occurring has increased by 5% over the past three years.
 - 6 To indicate the range of requirements emerging, the Open University's internal (unpublished) background document (justifying its new LLL priorities) says "Professions require members to undertake regular small-scale updating courses. People with no HE background at all would welcome opportunities to try to walk before they can run. Others would like to study on a substantial scale but to spread it over a longer time period than 9 months, and to do so in clearly articulated stages. ..."
 - 7 Our respondents, in OUBS (Futures Observatory) longitudinal research, believed that, within 20 years, it will be life-long - with a probability 45% and importance for this of 5.14 - probably to retirement (44% with an importance of 5.15).
 - 8 On the other hand, although the numbers of individuals may be uncertain, the cost to government(s) should be containable at every level possible; since it is likely (based on our surveys of OUBS alumni) that most of this on-going education will be funded by the students themselves.

Education covers a very wide range of activities, and will cover even more in a decade's time; when it will be the key element of the coming knowledge society. It is useful, therefore, to think of it in three main areas of lifelong learning opportunities⁹:

- FORMAL EDUCATION, constituting the building blocks for 'awards' at all levels within the various qualifications frameworks; from primary education through to Higher Education (HE).
- SHORT COURSES, geared to a variety of needs for specific, supported learning - following on from formal education.
- INFORMAL EDUCATION, directed at the educational well-being of the community at large with no associated commitment to structured study

This report will, therefore, look at each of these areas in turn. The first, extended downwards to cover the primary and secondary sectors in addition to the tertiary, is the one most people still associate with education. It is also the most predictable - with the key trends already clear to see.

9 The definitions recently developed by the UK's Open University, which has led such developments over recent decades, reflect this categorisation, albeit with the reverse prioritisation:

- 1) *Informal*, geared to the educational well-being of the community at large with no associated commitment to structured study
- 2) *Short Courses* and packs geared to a variety of needs for supported (open) learning
- 3) *Long Courses*, constituting the building blocks for HE awards at all levels within the (OU) qualifications framework

Developments within the Open University (OU), for whom I work as an academic, will be referred to a number of times in the footnotes to this document. This is because the OU has consistently led work - globally - on distance learning; and, as far as we are aware, is still a number of years ahead of other comparable institutions in Europe. Only those institutions in the US, such as Harvard and Carnegie-Mellon, funded by the major computer suppliers have comparable experience - albeit, in their case, mainly in terms of application of ICT to the classroom.

Formal Education

Primary and Secondary

In developed countries, such as the members of the EU, the education sector can currently be divided into three levels. Of these, the first two (primary and secondary) are already generally available to the whole population, even in the states about to join, and indeed are usually mandatory for all young people. In general, therefore, despite varying definitions and terminology only the school leaving age and the retention rates at the upper end of secondary education vary significantly between the members of the EU. For example, despite having a compulsory starting age of 7 years, Denmark has 61% of its three-year-olds in education¹⁰; which compares with 35% of the similar group in the UK, where the compulsory age is 5 years. At the other extreme, France, with the same - 16 years of age - minimum leaving age, has 84% of its eighteen years olds still in education compared with only 53% in the UK.

It is highly likely, therefore, that we will see almost universal education, from three years up to the age of 18 years, applying across the existing EU members before the end of the next decade (i.e. before 2010). Only the new members of the EU, with significant leeway to make up on existing members, are unlikely to reach saturation before the end of the decade. Most existing members are likely to reach this position within five years.

Higher Education

On the other hand, participation in tertiary level, higher education is much lower, though more comparable across countries (with France, for instance, at 33% at the undergraduate level compared with the UK at 24%). It will be some considerable time, therefore, before these approach saturation levels. Even then, education at (taught) masters level will be some way behind that at undergraduate level. The UK, for instance, currently has only 9% of undergraduates going on to reach masters level - and it is unlikely that the doctorate level, with its very specific focus on research, will ever reach significant numbers of the population. The evidence, for example of open access courses¹¹, seems to be that - given sufficient support - up to two thirds of all individuals might be able to obtain a degree of one form or another; and would be able to make productive use of this level of education in the new knowledge society. On the other hand, given the motivational problems still applying to some parts of the population - coupled with the lack of the very high level of resources needed to support marginal candidates, a more realistic saturation level might be reached at around half the population; though this is still almost double existing levels. On the other hand, as the first decade of the next Millennium progresses, the employment requirement to hold a degree in order to work in the new knowledge industries is likely to drive ever larger numbers of potential students to try and enter the existing higher education systems. This may pose problems on two fronts. First, it seems almost inevitable that the numbers in higher education will grow dramatically; probably the safest assumption is that the core demand will grow linearly until saturation is reached at the end of the decade. Secondly, an increasing number of marginal

10 According to the OECD (1996)

11 Specifically from the lower level Certificate and Diploma run by the Open University Business School for managers at a wide range of intellectual levels; though it should be noted that the less able members of this group will require significant support - especially on their initial courses.

candidates will find their way into the system. Although these are likely to drop out by the end of their first year, they will probably still absorb a disproportionate amount of the total support available; where support needs of such students are highest in the first year (perhaps twice as high as later¹²). The resulting 'productivity' gap may pose political problems; in terms of justifying funding for the institutions involved.

Funding

In any case, almost all nations - especially developed nations such as those in the EU - are already committed to escalating the numbers in education, especially at the tertiary level, as fast as they can; often claiming that this is their highest national priority. With a great deal of anecdotal evidence to support them, they claim that education represents the most important, and most productive, investment for the future any country can make. It is certainly true that it already represents the largest single category of investment in most countries¹³; exceeding those in capital equipment and property. It is inevitable that the level of such investment will grow, over the next decade, as the knowledge society burgeons. In addition, most individuals - across almost all levels of society - are now coming to realise the importance of receiving the best possible education; ideally to degree level. Accordingly, the demand for such education is so strong that, having rapidly saturated at the secondary level, it will continue to significantly outstrip supply in the tertiary sector for most of the decade. As indicated above, it seems likely that, despite recent rapid growth, numbers in the tertiary sector could be almost doubled again by the end of the decade - if the resources are made available.

It is reasonable to assume that the marginal increase in funds which might be needed at the secondary level will be provided; and saturation accordingly will soon occur. In fact, the position will be eased by the reduction in the numbers of the young coming through the system, which means that higher proportions of them can be educated, to higher levels, without any significant, absolute increases in funds. The major growth in student numbers overall is, accordingly, simply predicated upon the provision of suitable funding at the higher, undergraduate level. As we have seen, the growth in demand is likely to follow straight-line increases over the decade. On the other hand, supply - the availability of suitable funding, almost entirely from the state - will typically depend upon two main factors. The first of these is the growth in overall government income - reflecting economic boom or bust. It seems likely that the successful integration of the EU, under the banner of the Euro, will lead to boom conditions - over most of the decade - and these in turn will generate sufficient funds to meet most government needs. The exception may be the new members, and there will accordingly be some political pressure for the EC to provide educational development resources in these countries; and this may eventually come to represent a significant part of the EU budget - especially when it expands further. The second factor, the willingness to invest ever larger sums in education, is more difficult to predict. Governments across the EU, even though most are favourably disposed to the principle, are still wary of the fall-out from the monetarist experiments; and are nervous about increasing taxes. The evidence is, though, that they are underestimating the maturity of their electorates. These probably recognise - even before LLL

12 As indicated by the OU experience on its foundation courses.

13 Peter Drucker (in 1993) estimated that - in developed countries- up to 20% of GNP was already being invested in education in its widest sense (10% on schooling, 5% on employers' continuing education and up to 5% on research).

widens their horizons - that more resources need to be devoted to education¹⁴. The unknown element, therefore, is how quickly the individual nations will choose to divert resources to meet this growing popular demand; or, in the case of the new members, how rapidly it reaches the top of their priority lists - though, based on the experience in developing nations in general, it is probably already close to the top of their lists.

Teaching Resources

Another, even more unpredictable wildcard, factor is whether these resources will arrive before the educational infra-structures - which have been starved of resources in the recessions of the 1990s - start to collapse; and if that happens there may be a major funding crisis¹⁵. It is possible, however, that this will be resolved by the internal migration of qualified teachers from the new members - posing rather different problems for the EU - or by external migration from developing countries overseas - in which case it will pose a challenge to immigration policy. Accordingly, major educational policy choices may not need to be made directly, at least at primary and secondary level, but will cascade into other areas.

Overall, though, it would not seem unrealistic to expect 'current' entry levels to undergraduate courses to be approaching their, 50%, saturation level of the available population by the end of the decade - in the existing members - and those of post-graduate (taught) level courses to be as high as 15% (with saturation in their case, at 30% say, not being reached until a further decade later). Even so, the doubling of student numbers in the tertiary sector may be possible in most existing members, except possibly France, without dramatic impact on the existing infra-structures. With some increase in class sizes, but in particular with the deployment of standardised materials derived from distance learning experiences, existing facilities and teaching staffs might be able to cope with most of the growth, by more effective utilisation of these resources; though direct student support costs will still need to be increased proportionately.

Primary / Secondary / Tertiary Delivery Systems Technology

The deployment of new technologies will probably be the area of greatest area of uncertainty for these sectors over the next decade. There is a widespread belief that computerisation, especially that linked to the Internet, will make very rapid progress¹⁶. Indeed, many education authorities, and indeed governments, are undertaking a wide range of pilots; almost all exploring the ICT delivery technologies involved¹⁷. On the other hand, much of this may be misdirected, since there is significantly less development under way, outside of the leading distance-learning institutions, on the all-important content.

14 Although respondents in OUBS (Futures Observatory) longitudinal research may rate 'learning new skills' as only 59th in importance of the 162 forces for change we measure, they also rate this as 7th on the list of developments most likely to happen.

15 Since they will take as long to recover - perhaps two decades - as they took to run down. The lead-time on new teachers, for instance, may stretch out to half a decade (if recruitment is taken into account as well as training). This is why it is so important to maintain such infra-structural elements.

16 Around half of our sample of managers in OUBS (Futures Observatory) longitudinal research thought it probable that the traditional school would disappear - albeit not until 2030 - and instead teaching would be at home by computer - as early as 2020.

17 Our own respondents, again in our OUBS Futures Observatory longitudinal research, also believe that teaching will be by computer (42% probability) and distance taught (38%); but will not generally fall into the category of 'edutainment' (20%).

In fact, it is likely that the delivery technology will develop independently of educational needs. The driving force will be, as always, that of the commercial markets; especially the developing 'in-home' markets. The new distance learning curricula, and the content of the courses within these, will however emerge almost entirely from within the leading educational institutions; probably led by those with the greatest experience in the field. The main impact of these new technologies may therefore be indirect, extending the use of ready-prepared material to larger numbers of classrooms. Currently, although many primary schools make good use of standardised material, the secondary and especially the tertiary sector are still dominated by teaching material developed personally by the teachers delivering it; with only limited support provided by text books. Now, however, much of the Internet delivered supporting material - which they will probably be forced by the increasing emphasis on national standards to use in their lessons - will take the form of sessions of distance learning; albeit often still tailored to the specific specifications of the individual teacher - rather than readings from texts. This will change the style of teaching in many institutions; allowing teachers to most productively focus on the face-to-face tutorial elements which optimise their personal contributions. The clear generation gap, between those currently under 20 years who have learned to integrate computer communications (through the Internet) into their lives and those of the older generations - including their teachers - who still see these as a marginal part of their lives, could initially pose tensions in the classroom. However, by the end of the decade, when this new generation will start to form an important part of the teaching profession, as they replace the ageing population of existing teachers, it may become a new strength.

Content

The pattern of work is shifting dramatically for everyone. In less than a generation we have gone from the end of the industrial economy to the start of the information economy. As a result, the content of education has already changed substantially, and - despite the conservatism of many in the field of education - will continue to be revolutionised in the future. Traditionally it has focused, in the primary school, on the techniques of the 3Rs (Reading wRiting and aRithmetic) - and there are still appeals for it to concentrate on these. On the other hand, reading - in the new IT age - requires an understanding of icons as much as of words and writing now depends upon the correct use of the spell-checker. Simple arithmetic has not really been needed since the invention of the pocket calculator. Beyond these techniques is the whole realm of knowledge; now available at people's fingertips on CD-ROM or via the Internet. These may be simplifications; but the scale of changes they indicate should already have had a dramatic effect on education in general. In fact, the conservatism of practitioners, and the scarcity of resources, has delayed many of the necessary changes. A recent survey conducted¹⁸ showed that no major educational suppliers were providing genuinely interactive offerings, and most CD-ROMS merely had existing text-books dumped on to them; but even so it is likely that practice will catch up with reality in the near future.

In terms of the techniques taught to students, the need will be to match them to modern requirements; to teach data acquisition¹⁹ in general rather than just reading (though that will still be essential, where the symbolic representation of ideas by words is becoming ever more important in society); to teach analytical skills in general rather than just arithmetic, say (though numeracy, too,

18 By the Open University Business School

19 According to our latest (mid 1998) horizontal extension of OUBS Futures Observatory research with 500 OUBS MBA alumni, as yet unpublished, IT accounts for almost a quarter (22%) of organisational activities - according to our most recent research

is an essential skill for modern society); to teach communications skills in general²⁰, not just writing (though that also has become ever more important; albeit via a keyboard rather than pen). The point to emphasise is that these new skills - many of which are already being taught - do not preclude the older ones. One has only to realise that it is only in recent decades that illiteracy has become a debilitating handicap. It is to say that the addition of the new requirements will make education even more demanding, and even more important.

Once beyond these basic skills, much of education has traditionally concerned itself with imparting basic knowledge - the learning of vast quantities of facts (be they the dates of historical battles or the formulae for chemical reactions). Where computers will increasingly be able to (instantaneously) provide each of us with the information we need, down to the minutest detail with miraculous infallibility, it will no longer be necessary to fill our heads with all the knowledge we might need in a lifetime²¹. But we now need to teach the frameworks of knowledge, so that the individual can find their way to the correct database, and then put the resulting information in context²².

Less obviously, the shift to individual empowerment needs to be accompanied by a deeper understanding, by students as much as by the general population, of the accompanying responsibilities. Individuals now have a considerable say in what governments, including the EC, are allowed to do. If they are not to be unduly swayed by the popular blandishments of the media moguls, and government suborned as a result, they need new forms of education to prepare them for this new responsibility. At the same time, individuals need to be taught how to manage their lives in a society where change is endemic; and the risks, not least in terms of uncertainty of employment, are much higher. The current model, assumed in much of education, is a static one, based on an assumption of lifetime employment, whereas what is needed is a dynamic one, to provide life-long employability.

Delivery Systems

Many of the experts predict that the teaching of knowledge, and of many skills will be most efficiently provided by some form of computerised learning; 80% of respondents to our own recent research, for instance, expected to be taught at home by computer (in 2020) and more than two thirds foresaw the demise of the traditional school by 2025²³. In addition, it is likely that teleconferencing will, within five years²⁴, develop to become widely available, even for home use²⁵. The reality, however, is that neither of these is likely to have a significant impact on education; except for widely dispersed, small populations of students demanding teaching of

20 This also takes up almost a quarter (23%) of organisational activities, again according to our wider (1998) sample of respondents

21 Although our respondents (in the wider 1998 sample) report that knowledge management only takes 13% of organisational time at present, it is expected to reach a fifth by 2020

22 Time Magazine, The Learning Revolution, Spring 1995

23 Diane Ravitch - from the Brookings Institute (When School Comes to You, The Economist, 11 September 1993) - suggested that "The new technological era in education should promote greater equity of access to good education...all children will have access to exactly the same electronic-teaching programs, learning at their own speed and in settings of their own choosing...regardless of race or parent's income."

24 According to British Telecomm.

25 The New Scientist (Buried in the Noise, 15 October 1994) even suggested "...it could all be so much fun that your kids might start asking awkward questions about why they should be going to school at all", and continues "The real rub will come when employers - and some teachers - start to agree."

specialist subjects. This will, by itself offer a significant increase in the 'richness' of education, where - despite government opposition - demand is moving to the ever wider syllabus which will need such solutions to handle the resulting much smaller class sizes.

Otherwise, the limitation on the numbers it is possible to teach in a single classroom will still impose limits. Although media hype suggests that teleconferencing will allow very large numbers to be taught, the very reverse is true. Spreading a number of students across a number of remote, dispersed sites actually reduces the total possible; since there is a hidden overhead in terms of monitoring a number of separate audiences. The joker in the pack may be education in the developing countries - especially in Africa - for which the EU may accept some responsibility (as 'associate members')²⁶. In this case, distance learning, initially paper-based, will be the key to rapidly educating literally millions of students; at the secondary level in particular. The key to success here will be the significant economies of scale offered by well-designed distance-learning programmes²⁷. A million students may be taught for relatively little more, perhaps a few hundred Euros a head per annum, than a thousand such students taught conventionally. The result may be that there will be some pressure on the EC to invest in such distance learning programmes - in terms of infra-structure and core content - so that these may be offered more widely; perhaps as a tool of diplomacy²⁸.

26 Under the latest versions of the Lomé accord education has now been accepted as a suitable investment vehicle for development aid.

27 In this way the Open University, for instance, is now able to teach literally thousands of students in the Horn of Africa at costs which, possibly at less than 2,000 Euros for a complete degree programme, even the aid agencies can afford.

28 The OU's work in the Horn of Africa was originally supported by the UK's FCO to ensure that the fledgling moves to social democracy there were sustained.

Short courses

The most obvious changes in the short term are likely to occur in this sector; which now encompasses Life Long Learning (LLL), following on formal education. It is estimated by the EC (DG5) that, over the next decade, around 80% of employees will be forced to change to radically new technologies. This means that they will need to be re-educated; if they are to continue to be employable, and to continue to contribute to the wealth of society. On the other hand, in view of the financial pressures being experienced by the organisations involved - due to the rapid pace of change which is at one extreme forcing them out of business and at the other creating the new opportunities for them to move in - it is likely that the task of re-educating these individuals will fall to government; and, in particular, to the EC to stimulate such programmes of re-education.

Due to the uncertain speed of development in the demand for LLL, it may though be very much more unpredictable than that for formal education. To date this sector has been dominated by in-house, on-the-job skills training²⁹; with individual leisure education falling some way behind. Despite the uncertainty of timing, it is still clear that the emphasis will soon shift more to the forces driving LLL³⁰. These forces are well recognised by most governments, and individuals. Not least, as these new technologies are likely to be those emerging from the knowledge industries, it is probable that the workers displaced will require significant re-education - in one form or another - rather than incremental skills re-training.

The problem has been, until very recently, that - apart from some Continuing Professional Development (CPD) programmes³¹ - there has been little evidence that this LLL might be provided in either public or private sectors. Outside of (ad-hoc) on-the-job skills training by employers, the commercial providers have in the past typically only put low investment into a limited range of skills courses; often of questionable quality, long on gimmickry and short on expertise. In addition, even though it looks as if inaction by the government sector might force employers to fill the gaps, there has been little evidence that this is in fact happening³². As already suggested, the position is even worse in the public sector, with almost no LLL actively under consideration in the higher education institutions which might have been expected to have welcomed this as a valuable expansion of the markets open to them³³.

29 Though, our respondents - in the wider 1998 survey - are clear that the current main form, 'in-house on the job' (30% of the total time they devote to education/training) will become less important (down to 24% in 2020), as will class teaching (both internal and external) - down from 22% to 17% - 'self study (books)' (down from 19% now to 16% in 2020) and seminars (11% down to 8%).

30 Our own 1998 respondents look to a number of other forms to replace conventional teaching; with 'distance taught' up marginally (11% now to 12% in 2020), but with the main beneficiaries as Internet (up from 4% now to 14% in 2020) and in-house computers (up from 6% to 13%). So, they believe that the main shift will be from face-to-face teaching by people to distance teaching by computers.

31 Typically run by professional bodies. The UK Engineering Council, for instance, usefully defines this as "...the systematic maintenance, improvement and broadening of knowledge and skill, and the development of personal qualities, necessary for the execution of professional, managerial and technical duties throughout a practitioner's working life"

32 Though this has been the case in Japan for a number of decades, and it is reported that within the EU Sweden has much higher rates of participation.

33 The only important, but very new, development under way is that the by UK's Open University, which has just launched a major initiative to specifically address LLL. This may have resulted from pressure by the UK government, whose 'University for Industry' has so far addressed the need to provide skills

Indeed, for most of the next decade LLL is likely to focus primarily on the changes brought about by the economic forces - destroying old jobs and creating new ones, which will need worker re-education. With the emergence of the knowledge society, the need will be for education, investment in longer-term frameworks of understanding which will not be so rapidly outdated, rather than training, for short term skills in the current jobs which will soon be displaced. Even so, there will be blurring at the edges, so that this education may sometimes look very much like training - and, in the shorter term, it is still likely that it will still be largely driven by employer needs. Even so, and despite the fact that the demands are emerging from employers, it is likely that many of the providers of this new education will now come from the higher education sector. Not least, the needs of the new knowledge society will call for their expertise, where the lessons are likely to be far removed from largely repetitive manual skills taught by on-the-job training, which currently dominates employer offerings, and the narrowly focused offerings of many of the commercial providers. Indeed, the HE sector will be needed to teach new intellectual 'frameworks' for handling the knowledge which is becoming available at the touch of a button on the nearest PC.

Individual Needs

Towards the end of the decade, however, it is likely that the driving force will switch to the individual³⁴. With individual empowerment focusing on (LLL) education as a right for all, and individuals accordingly demanding access to it as a basic necessity for fulfilling their lives, LLL will take on the role of broadening their horizons. It may also give rise to better citizens, of the EU for instance which may wish to sponsor such developments - and deliver the educational resources for citizens to achieve their new goals. The providers of this will come from both public and private sector.

Short Courses – Delivery Systems Technologies

Since this sector is currently dominated by face-to-face teaching - most often one-to-one in the workplace, it will be revolutionised by the greater availability of a wider range of distance- and open-learning technologies³⁵. New ICT developments will enable almost any mode of education to be viable - even at a distance. Even so, it is probable that paper-based technologies will initially expand fastest; until the ICT educational offerings are, towards the end of the decade, better developed to fully meet the learning needs of individuals. In the form of CBT (Computer Based Training) ICT should, however, be increasingly used to teach procedural skills - which cover much of the teaching of technological skills, from mathematics to programming. In terms of the Internet, it may increasingly be used to deliver modular components of short courses. With the development

training for the young unemployed; but, with the OU's involvement, this has now moved on to cover the much larger need to re-educate the older population in employment.

34 In terms of what is taught, according to our wider 1998 survey, the percentage of time given to 'skills' teaching will show the greatest reduction (down from 22% now to 17% in 2020), with smaller drops in 'social networking' (12% down to 9%) and 'knowledge' - now becoming available at the touch of a key on your PC - down from 23% to 20%. These can perhaps be seen as the elements of education demanded by organisations; though 'personal development' stays static at 20%. The growth areas, on the other hand, are seen to be those which are truly personal: 'hobbies/interests' up from 11% now to 18% in 2020 and 'entertainment' up from 10% to 15%. Thus, for instance, they agree more strongly that it is needed for 'personal development' (5.8 on a seven point scale) than that it is needed for career development' (5.4)

35 Our 1998 respondents look to a number of other forms to replace on the job training; with 'distance taught' up marginally (11% now to 12% in 2020), but with the main beneficiaries being the Internet (up from 4% now to 14% in 2020) and in-house computers (up from 6% to 13%).

of the new electronic payment methods, such as certification, commercial exploitation - even by institutional providers - should progress rapidly. Indeed, as many of the new placements will be commercially funded - by employers and by the students themselves, resourcing limitations will, for once, be largely removed³⁶. The initial constraints will, therefore, be in terms of the development of the necessary infra-structure. With the very large numbers of students ultimately involved - many times greater than the existing undergraduate populations - it is almost inevitable that much of this education will have to be provided by distance learning; there will simply not be enough traditional instructors to meet the demand. Even so, and even though there are relatively few institutions with experience in this field, the transferability of the material produced and the scalability of operations should mean that the material itself need not be in short supply. Indeed, as mentioned earlier, the resulting economies of scale may well result in excellent productivity. Much of such material should even be translatable across national boundaries within the EU. Experience³⁷ shows that, unless the content is very specifically delineated in terms of culture, students have little trouble in adjusting to 'foreign' material - though the associated examination systems will still be culturally specific! Once again, therefore, there will be pressure on the EC to fund the core developments; to ensure that such material is available across the EU, and - not least - is translated into its minor languages.

Distance Learning Requirements

The initial infra-structural limitations, to making use of such distance learning on a larger scale, relate to the personal elements on both sides of the equation:

Tutors - even distance learning, at least in the initial stages, requires considerable personal support from tutorial staff; albeit working with groups of students. The core of these tutorial staff may be initially provided from within the existing institutions. As the numbers of students grow, however, much larger numbers of tutors will be needed; and these will probably be recruited from earlier cohorts of students³⁸.

Students - until these become 'independent learners', who can study distance taught courses with minimal personal supervision, they will need considerable tutor and counselling support; and will have to learn to adjust to significant changes in the lifestyles - learning at home in their leisure time. Once they have achieved independent learner status however, which experience suggests normally happens within a couple of years of them returning to formal education³⁹, they will need less face-to-face support. They should then have integrated it within their normal lives and, in any case, should have built their own informal support groups amongst other students.

36 Surveys (including our own 1998 survey) amongst OUBS alumni indicate a widespread willingness to pay themselves for their LLL. They rate LLL overall at 5.3 (on a seven point scale), but are less clear what form they expect this to take; rating the various alternatives at much the same level - from 4.5 for short programmes to 4.8 for one-off courses. While they are somewhat cynical about the likelihood that their organisation might pay for this (again rating it at 3.8 on a seven point scale), they rate the likelihood of paying for it themselves at 4.9. They expect to pay around 650 Euros a year for this, and to spend 80 hours studying on it.

37 Most notably, on the large scale, in terms of experience with OU students in Eastern Europe

38 As the Open University Business School, facing similar growth rates, has successfully done in the Horn of Africa. Using previous cohorts of students to teach new students, who in turn become the next batch of teachers, allows an exponential growth in teaching resource.

39 Clearly, if on-going education follows on soon after formal education this extra investment will not be needed

Both of these bottlenecks should, therefore, eventually be resolved. In the shorter term, though, they may significantly limit the development of LLL, especially if the higher education institutions drag their feet in responding to the pressure to recruit sufficient numbers of staff. Again, some form of intervention by government, and especially by the EC, may be desirable.

Informal Education

This is the new, or at least newly recognised, element which may well be the most uncertain - indeed revolutionary - in nature. We have already seen that the progress of LLL itself may be quite unpredictable. We can be reasonably certain it will come, but do not yet know when. It is arguable, though, that many of the 'informal' elements to support it at the level of the individual already exist. We already read books - borrowed from libraries or, now that funding for these has been cut, bought from the new bookstores including those on the Web; we attend leisure classes in the evening - though, again, funding for these has been cut back; and, above all, we watch television - though the power of public service broadcasting has also been trimmed. Clearly, one of the changes to come will be a reversal of these cuts in funding; maybe led, once more, by some form of 'cultural' intervention by the EC. But, above all, there probably will be a widespread recognition, not least by the providers and their government funders, of the importance of such informal education as part of LLL. The EC may well be especially well-placed to take a lead in this process; especially where investment in pan-European distance-learning infra-structures may be so important to it.

One reason the informal sector will be so important for LLL is that this will eventually pervade most aspects of life, in the home as well as at work, and will be genuinely life-long. We won't be able to escape its influence wherever we are. We will never stop learning; or at least we will all now recognise this fact - and organise at least part of our private lives to meet this challenge. Equally, the providers - even those bordering on being entertainment providers - will increasingly need to organise their offerings to better complement the demands for LLL from their individual customers. The very large numbers of such potential providers will, though, make even the tracking of developments an almost impossible task. Controlling them will be, as we will see below, almost as difficult; and the quality of their provision may be crucial to the successful development of the overall process - again calling for new, innovative, forms of regulation by governments, such as the EC.

Delivery Systems Technologies

This is the part of 'education' which should benefit most directly from technological developments:

The Internet - this is where web-delivery of limited size modules of education, each just a few hours long, will come into its own. The short length, and comparably low price, of these modules will, at one extreme, let individuals make them almost an impulse purchase; whilst still allowing them to integrate the modules within their overall educational programme. At the other extreme, it will allow large numbers of small providers the opportunity to supply text-based offerings aimed at meeting specialist needs. The volume market, however, is more likely to be the province of the larger multinationals, which will have the resources to develop the sophisticated interactive multimedia blockbusters which are likely to be demanded. Indeed, the most likely candidates⁴⁰ are the leading software companies (especially Microsoft) and the Hollywood studios - where a typical offering might most closely parallel the logistical provisions of a feature film.

40 According to scenarios developed within OUBS

The problem for the individual, and for the new small providers, will be the vast choice available. It will be difficult enough to find an offering to match individual needs - even though the present search engines should soon be replaced by much more efficient (AI) agents⁴¹ - let alone to find guaranteed quality. It is likely, therefore, that the key development will be the emergence of institutional 'certifiers'. The framework of 'certification', for both purchasers and vendors, is already being set up by consortia of leading banks and carriers⁴². This is initially in order to facilitate commerce, with low baseline costs such as will be needed for informal education, but this will subsequently offer a potentially useful framework for 'validation'. Such a service is already offered, for institutional qualifications and this could, in principle, be extended down to the lower levels needed. On the other hand, the vastly larger numbers of operators requiring such validation will test the logistics of any new system; and will almost certainly require new approaches. This will be particularly problematic, however, where such provision will range across national boundaries - especially where it is delivered by the new satellite channels - and this will probably require harmonisation of regulation, and at least of standards, by the EC.

Television - digitisation, reception of which should be widespread by the end of the decade, will have dramatic impacts in this area. At one extreme, the hundreds of different channels available will allow the space for educational material to have its own channels; covering the range from enriched versions of the documentary material now put out by the Discovery and National Geographic channels to an expanded range of true educational material, such as that now being provided by the BBC's Learning Zone. It is arguable that television is already the major - hidden - contributor to most people's education; it is just that this comes about randomly by accident. In future it is likely that even this element, although still informal, will be more firmly located in overall programmes of education; specifically planned by students or their advisors. The fact that digital television will be interactive, and will significantly overlap the other electronic media, will make such managed informal education a powerful new development. This will be cross-border in nature, not least due the likely use of satellite delivery technology. Accordingly, in view of its power to influence popular opinion across the EU in general and in particular to control the new on-going (LLL) education which will prepare citizens for their new responsibilities, there will be considerable pressure on the EC to regulate, possibly tightly, such broadcasting.

Books - despite all the hype, however, the market for the printed word, even in the form of books and journals, will also expand. Thus, the sheer numbers of those needing LLL would ensure that this happens, even if the printed word were only a marginal element of the new developments. In fact, for most of the decade, it is likely to remain the central element of even informal education. Even much of that delivered by the web will be in the form of static text - with the genuinely interactive electronic media only offering an extension of the ideas and, in particular, managing the experience.

41 Possibly based on software - such as that being developed by IBM - that rates the links to other key sites (analogous to the citations approach for journal papers) as a basis for determining the handful of 'hub' sites which offer the most expert guide for a given topic - thus paralleling the networking approach used by many human researchers.

42 BT, for instance, is working with a number of leading banks on different approaches to this.

One of the key requirements for all these forms of 'mass' education will be suitable protection by the intellectual property laws. The EC will, of course, be central to this. On the other hand, it will be difficult to give absolute protection; not least to the ideas which are central but which, unfortunately, cannot be protected in this way⁴³.

Teaching Institutions - these, too, are likely to greatly expand their output; although only a few of them will become major providers of the volume distance learning modules. But much of the new learning process will demand, even in this informal sector, face-to-face teaching or at least tutoring. To meet this demand, however, they will need to recruit large numbers of new teachers to tutor and counsel the new students. It seems likely that a major source of these may come from the 50+ age group; who will, in any case, be seeking greater fulfilment from 'community service'. A first requirement, therefore, will be the provision of TTT (Teach The Teachers) programmes to bring these new recruits rapidly up to speed as teachers in general; along with programmes to introduce existing teachers to the new forms of learning. In view of the leverage they will exert on the overall provision, these TTT courses will need to be given the highest priority by governments; not least in terms of creating, and supporting, the new 'qualifications' demanded.

In addition, though, such institutions - supported, in some locations perhaps, by those in the secondary sector- may find more of their staff's time being taken up with counselling; eventually leading to full blown management of their students' educational programmes. This may, most profitably for the providers, eventually stimulate the growth of 'clubs'; institutions which cater for many of their members 'soft' needs - including those beyond education - in the new information age. This process may take education ever deeper into the 'lifestyles' sector. Once again, regulation may be needed to protect their 'customers' from exploitation.

43 The computer games companies now work on the principle that they typically will have only three months to make their profits before others copy their idea.

Overall

Education is guaranteed to grow rapidly, to become the largest industrial sector before the end of the decade; as well as the most important for the economic and social development of society. The growth will be more rapid in the area of short courses, and most rapid in the new informal education sector. It will be driven in the shorter term by the large number of older, educated individuals needing LLL as part of their 'retraining' to meet the demands of new workplace technologies. Towards the end of the decade, the market for such life-long education will switch to meet the increasing demand for individual fulfilment. The large numbers of new students involved in short courses, and especially in the informal education sector, means that much of the expansion will be in the form of distance learning.

It seems likely that the delivery technology, especially in terms of the new electronic media, will be available to meet this demand: across all three sectors (long courses - including primary/secondary/tertiary education, short courses and informal education). Similarly, much of the core material content should be available - based upon the expertise of the existing suppliers of distance learning. More problematic, in terms of the volume of operators to be screened, will be validation of the many new suppliers to these markets - especially those in the informal sector. Most problematic of all will be the response - not least in recruiting extra staff - of the large number of higher education institutions⁴⁴; who will be needed to tutor and counsel the new LLL students. The emergence of a new profession - in terms of educational advisors, may require new standards to be developed; if the problems previously experienced with financial advisors are not to be repeated.

44 Even the new priorities being proposed by the Open University itself are being challenged by some of its more conservative faculties!

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