Lifelong learning for the Celtic Tiger: the role of ICTs and open and distance learning

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Introduction

This paper examines the role which open distance learning (ODL) and information and communications technology (ICT) can play in meeting the needs for lifelong learning in the Irish economy. Starting from an analysis of the global and national forces driving the demand for new skills, which can only be met by the continual education, training and retraining of existing workforce, the paper outlines how ODL, ICTs and more recently eLearning strategies have emerged as key components of national and international policies. The preparedness of learners to use ICTs in education and training is an essential element in the successful adoption of ICTs. Three dimensions contribute to a climate of receptivity among learners: access to technology, expertise in using the technologies, and attitudes and perceptions of attributes of the technology in education and training. The paper will report on a survey of 587 managers taking ODL courses in Ireland in 2000 which shows that organisations and institutions intending to introduce ICTs in education and training must prioritise learners, not technology, in developing their programmes.

The Celtic Tiger Economy in Ireland

Ireland has seen rapid economic development since the early 1990s, fuelled by advances in information and communications technologies and substantial inward investment (Breathnach, 1998). It is also widely acknowledged that the Irish government's policy of investment in education since the 1960s has been a significant factor in bringing about the current Celtic Tiger economy. Between 1994-2000 there was a 40% growth in total employment to 1.7 million. This strong employment growth has involved a combination of growing numbers leaving the education system, falling unemployment (down from 221,000 [15% of the labour force in 1994] to 75,000 [4%] in 2000), rising female participation and growing net immigration (Barrett et al 2000). By 2001, unemployment had fallen to just under 4% and increases in employment in new sectors of the economy have led to skills shortages, with employers increasingly looking abroad for workers to fill positions. Rapid developments in technology, involving the convergence of telecommunications, computers and microelectronics, and the emergence of the Internet, have meant that many skills and jobs are obsolete, while at the same time, there is an increasing demand for new skills to manage and cope with the new technologies.

The main constraint on continuing strong growth in the Irish economy is likely to be a shortage of both skilled and unskilled labour. The main avenue for meeting the growing labour shortfall will be immigration: according to *The Irish Times* (January 24, 2001), an

unpublished Report of the Inter-departmental/Agency on Immigration Policy, prepared in early 2000, predicts that 336,000 people will immigrate into Ireland in the period to 2006. These will fill 75% of the job vacancies arising during this period. This leaves 25% to be filled from within the existing population. The bulk of new jobs which will be created over the next five years will be in high skilled areas (Economic and Social Research Institute, 1999). With the numbers graduating from second-level education declining (due to a fall-off in births from 74,000 in 1980 to 48,000 in 1994), there will be a growing need to enhance the education and skill levels of the existing adult population in order to meet the economy's labour needs in the short- to medium-term future. This will require an expanded programme of continuing education in which distance learning will have a central role to play.

According to Green (1999: 59-60) recognition of the need for continuing education and training to ensure employability has led to a new international policy discourse around lifelong learning and the 'learning society'. This discourse envisages learning as a permanent process throughout the life cycle, which will occur, not just in conventional educational institutions, but in the family home, the workplace, school and community. The ICTs will make lifelong learning possible through flexibility with regard to time and place, so that the campus is no longer the sole source of learning. This paper will examine the role which open and distance learning (ODL) and in particular the ICTs can play in the meeting the needs of managers in the Irish economy for access to lifelong learning.

ODL and ICTs

There are many definitions of open distance learning (ODL). In this paper we will use Berge's definition of ODL as 'organised formal education and training in which the learner is separated in space or time from the resources that are useful in learning the stated instructional objectives' (Berge, 2001). More recently the term eLearning has come into use as almost synonymous with ODL, with the adoption by the European Union of elearning as a vehicle to radically reform the entire education and training system to cope with the demands of the new knowledge society and global competition (CEC, 2001). eLearning is now promoted as both the driver and catalyst for this process and goes beyond the more restricted aims and approaches of ODL. One definition of eLearning offered by the US Commission on Technology and Adult Learning (2001) is 'instructional content or learning experiences delivered or enabled by electronic technology'.

Interest in the potential of ODL in meeting the needs of the Irish economy has increased in recent years as evidenced by reports and policy statements from government and transnational sources. The Information Society Commission published a report in 1999 on *Building a Capacity for Change – Lifelong Learning in an Information Society* highlighting the potential of ODL and flexible learning in developing IT literacy in the general population. Forfas (the policy advisory and coordination board for enterprise development and science, technology and innovation in Ireland) published a report on *E-Commerce – The policy requirements*. This report recommended that third-level institutions build on their reputation for excellence by developing new internet programmes and marketing courses internationally. The *Report of the Review Committee*

on Post-Secondary Education and Training Places (HEA, 1999) recommended that the participation of mature students in higher education should increase by over 10,000 places and that ODL could contribute to achieving this target. The White Paper on Adult Education (2000) *Learning for Life* stated (p75)

> *'In the context of changing technology, constraints on physical capacity, the demand for localised access, the need for enhanced flexibility, adult-friendly and family-friendly policies and the need to provide for increased professional development of those in the workforce, a more pro-active and strategic approach to the development of distance learning is an imperative.'*

Pressure to adopt the ICTs is also coming from the European Union which sees the ICTs as instrumental in combating global competition, particularly from the US and Japan. The EU through its eLearning and other initiatives, including the Socrates programme has had significant influence on the thinking of policy makers with regard to incorporating ODL and flexible learning in both lifelong and on-campus learning. A recent communication from the Commission entitled 'The *e-Learning Action Plan: Designing tomorrow's education'* expresses a commitment to using ICTs in all areas of education (CEC, 2001).

How has Ireland responded to these calls for action on ODL and eLearning? In the next section, we examine the role of ODL and technology supported eLearning in Ireland, before considering the response of one of the major stakeholders, students, to this relatively recent technological imperative in education and training.

ODL provision in Ireland

The major provider of ODL in Ireland since 1982 has been Oscail[1], the National Distance Education Centre in Ireland, located in Dublin City University. Oscail's brief is to extend access to qualifications to adults throughout Ireland. Surveys in Ireland have consistently shown that the returns to educational participation can be significant (in 1987, average graduate earnings were 86% greater than those who left school without qualifications, Barrett et al, 2000). In the early 1980s, the adult population was characterised by low educational attainment and Oscail has concentrated on providing degree level education both for those who have previously not had access to education (second chance students) as well as to those seeking to upgrade their qualifications. While based in Dublin City University, Oscail has a national remit with dedicated funding from the Higher Education Authority. From its inception Oscail has worked in cooperation with the universities and other educational institutions in designing, developing, accrediting and presenting distance education programmes (Mac Keogh, 1998). In 2001 over 3,500 students were enrolled in a range of programmes at undergraduate, postgraduate and continuing and professional development levels. To date the methodology of course delivery has used second generation technologies (Nipper, 1989) relying on a mix of correspondence texts, video and audio tapes, some computer based learning and supported by face to face tutorials. This policy has been dictated by considerations of cost, accessibility and concerns about the pedagogical quality of most of the technologies which have been proposed over the last twenty years. Nevertheless Oscail has been deeply involved in

[1] Oscail is the Irish word for 'Open'

monitoring and analysing trends in technology in education for many years (see for example Curran and Fox 1999).

By 1999 national, international and global developments suggested that the time was at last opportune for Oscail to consider the introduction of ICTs or third generation technologies into its programmes. It is argued that the successful adoption of ICTs in education requires a receptive environment. While it is important to ensure that the financial and infrastructural support is in place, the attitudes, perceptions and personal profile of the end users (i.e. students) is also of key relevance. It is proposed that readiness to learn with ICTs is influenced by differential access to the technology, levels of expertise and experience in using the technologies for education, and perceptions of attributes of these technologies. In 2000, Oscail embarked on an action research exercise designed to inform its strategy for incorporating the ICTs in its programmes. One of the first steps in this exercise was to establish the readiness of students to adopt the ICTs. A survey of 587 managers studying a range of undergraduate and post graduate courses with Oscail was carried out with a view to collecting data on access, expertise, experience, and attitudes to using the ICTs in Oscail's programmes. The next section of this paper will report on the outcomes of this survey.

Survey Questionnaire

In Spring 2000 Oscail issued a postal survey of all students taking its Bachelor of Arts and Bachelor of Science in Information Technology. A sample of 18 students taking the Master of Science in Management and Applications of Information Technology and Accounting also completed the questionnaire. The questionnaire gathered information on personal characteristics (gender, age, employment, previous education etc) motivations for studying, experience of using the new technologies, and levels of access to and proficiency in using various technologies. Finally to gauge perceptions and attitudes to various attributes of the new technologies, respondents were presented with 14 items using a Likert scale which were designed to calculate a receptivity score. These items had earlier been piloted and refined to ensure validity. The questionnaires were issued by post, and responses were anonymous to ensure confidentiality. 1080 students responded representing a response rate of 58.5% which can be regarded as a satisfactory response to a postal questionnaire. The data were analysed using SPSS (Statistical Package for the Social Sciences).

Of the 1080 respondents, 587 were working in managerial capacities (523 on a full-time basis). Of these, 249 were enrolled on the Bachelor of Arts programme (following a range of subjects including psychology, social science, history, english, philosophy), 320 were enrolled on the Bachelor of Science in Information Technology (Computing, Management Information Systems, Human Sciences, and Communications Technology) and 18 were on the Masters in Science in Applications of Information Technology in Accounting. In the analysis reported below, BA will designate Bachelor of Arts students, IT will designate BSc in Information Technology students and MSc will designate Masters students.

Respondents were asked to indicate their level of management responsibility among five levels: supervisory, junior, middle, senior, and professional (e.g. accountants, computer analysts etc). As Table 1 below indicates, the distribution of management level varies significantly between the three programmes. BA students are mainly at the lower managerial level (38.2% at supervisory or junior level). Almost half of IT students (45.3%) were at professional level, compared with some 50% of MSc students who held middle to senior management positions.

Table 1: Distribution of Management Level by Programme

Management Level	% BA	% IT	% MSc	% Total
Supervisory	21.7	11.6	0	15.5
Junior	16.5	15.9	5.6	15.8
Middle	16.9	20.6	33.3	19.4
Senior	7.2	6.6	16.7	7.2
Professional	37.8	45.3	44.4	42.1
Total	100%	100%	100%	100%
N =	249	320	18	587

$\chi 2 = 20.634$ df = 8 p <.008

Characteristics of Respondents

There are significant differences between respondents on the three programmes in terms of gender, age profile, and previous education status. The typical BA respondent is female, aged over 40 years, while the typical IT respondent is male, aged under 40 years. While women represent 41.7% of respondents, they are mainly clustered in the BA programme (66.1% of the group) compared with 23.0% of IT respondents and 35.3% of MSc respondents. The age profile of BA students is higher than in the other two programmes, with almost half of BA students (46.1%) aged over 40 years compared with just 18.4% of IT students and none of the MSc students. With regard to previous education, MSc students were required to hold an honours degree or equivalent as a condition of entry, whereas entry to the undergraduate programmes is open to adults aged over 23 years without any qualification requirements. Nevertheless, over half (56.9%) of BA students and over two thirds (67.5%) of IT students held post second-level qualifications, while a small percentage (6.5% of BA and 4.1% of IT) had no formal qualifications. As these are distance education programmes, it is not surprising that students lived on average 38 miles from the university, however the range was quite wide. Just over one fifth (22.1%) live under 5 miles away, while another fifth (22.2%) live over 120 miles from the university. There is a tendency for BA students to reside closer to the university, however it is interesting to note that a large proportion of MSc students is resident outside Ireland.

Motivations for Studying

Students were asked to indicate their reasons for studying with Oscail. Four possibilities were offered: career advancement, career change, top up education and personal interest.

Students could tick more than one reason. While the IT and MSc programmes could be said to be focused on more obvious employment related topics, nevertheless, the wide ranging nature of the BA has its attractions particularly for employees in employment areas requiring generic graduate level skills, such as critical and strategic thinking, research and report writing skills, team working etc, or increasingly, a degree in any discipline. However, as might be expected, there are differences in reported motivation for studying. As Table 2 shows, BA respondents are less likely to cite career related reasons than IT respondents and MSc respondents are more inclined to cite 'to top up educational qualifications' since the programme is clearly designed to do this. Of the BA respondents 39% cited career advancement compared with 67.8% of IT respondents and 77.8% of MSc respondents. Fewer respondents wished to change career direction (35%). Significantly more BA respondents reported doing the programme for personal interest (68.3%) compared with 37.8% of IT respondents and 16.7% of MSc respondents.

Table 2: Motivations for Study

	% BA	% IT	% MSc	% Total	N =
Career advancement	39.0	67.8	77.8	55.9	328
Career change	37.3	34.4	27.8	35.4	208
Top up education	25.3	25.0	50.0	25.9	152
Personal interest	68.3	37.8	16.7	50.1	294
N =	249	320	18	587	

Access to Technology

There is growing recognition that if eLearning is to be successfully implemented for lifelong learning, attention must be paid to ensuring access to the technology to avoid the creating a digital divide (CEC 2001; Commission on Technology and Adult Learning 2001). The relatively low level of internet connectedness among the general population in Ireland is a potential barrier to implementation of eLearning. At the end of 2000, less than one third of Irish households had a PC (Quarterly National Household Survey 2001) and less than two thirds of those in turn had an internet connection (i.e., less than one fifth of households had an internet connection, which is well below the level of many European countries. Of households with no one employed, only 7.8% have computers (*Irish Times*, 21/3/01 p 11). Of course participants in the Oscail survey are not representative of the total population as shown in responses to a series of questions on access to various technologies. PCs are available at all campus locations, however, in view of the distance from these universities, many students would have difficulty in accessing these. However, given that access to technology may be obtained at work, as well as other places such as local libraries, cyber cafes, friends' or relatives' houses, respondents were asked to indicate where they could access PCs, email, and Internet. The results show high levels of access with just 2.6% reporting no access to PCs, 6.0% with no access to email, and 5.9% with no access to the internet. Given this high saturation level among the respondents, it may appear that it is possible for Oscail to proceed with introducing more technology-based education. However, caution must be exercised when the figures are further analysed to establish differences between programmes and the location and timing of access. The ideal position is where respondents have access to

technology at work and home, thus allowing for greater flexibility in time and location of study. However, as Table 3 a) shows, while over four fifths (86.4%) of IT respondents (most of them working in the IT industry) have home+work access to PCs, just 61.8% of BA and 66.7% of MSc respondents report such access. Further analysis of the figures for home+workplace access to the key technologies facilitating eLearning, email and internet reveal a more restricted scenario. Just over one third of BA respondents have work+home access to email and internet, compared with over two thirds of IT respondents. It is surprising to note the relatively low level of work+home access among MSc respondents. The figures for work only access are given in Table 3 b and those for home only access are given in Table 3 c.

Table 3:
a). Access to technology: Home and Workplace

Technology	% BA	% IT	% MSc	% Respondents
PC	61.8	86.4	66.7	75.5
Email	36.8	67.8	38.9	54.5
Internet	37.4	66.3	41.2	54.0

b) Access to technology: Workplace only

Technology	% BA	% IT	% MSc	% Respondents
PC	9.2	6.6	33.3	8.6
Email	24.5	19.5	61.1	23.0
Internet	23.2	16.8	58.8	20.7

3 c) Access to technology: Home only

Technology	% BA	% IT	% MSc	% Respondents
PC	21.9	6.0	0.0	12.4
Email	24.5	9.2	0.0	15.0
Internet	24.1	12.0	0.0	16.4

Workplace support for use of technology for education
Given the importance of the learning organisation in supporting lifelong learning it was decided to investigate the support given to managers wishing to use workplace technology for educational purposes. The US Commission on Technology in Adult Learning has recently highlighted barriers inhibiting wider participation in elearning presented by companies with policies and practices restricting work-time access to elearning opportunities (ASTD, 2001: 24). Schreiber (1998) identifies four stages of organisational technology capability for distance learning, starting at stage 1 with the introduction of separate and sporadic distance learning events within an organisation, with stage 4 characterised by the institutionalisation of ODL within the organisation through implementation of policies, communication and good practice. Analysis of Table 4 reveals that many organisations have yet to move beyond the first stage. The relatively unsupportive attitudes of employers to providing an environment for learning in the

workplace may be inferred from the levels of access to workplace based technology for educational purposes reported by respondents. As Table 4 shows, access to technology in the work place for educational purposes is restricted, with just under one third (32.2%) of all respondents reporting access during working hours, over half (51.5%) having access after work hours, and some 16.4% who have no access at all. Further analysis shows significant variations in access between programmes (p = <.001). As expected more IT respondents have access during work hours, however it is surprising to note that the proportion is still relatively small, with just 36% having access compared with 27.3% of BA respondents. Almost one quarter (24.4%) of BA respondents have no access to workplace technology which is of some concern to Oscail in designing its programmes in the near future.

Table 4: Access to technology for educational use in work-time by course followed

	% NO ACCESS	% AFTER WORK	% DURING WORK	N =
BA	24.4	48.3	27.3	205
BScIT	11.5	52.8	35.8	288
MSc	5.6	66.7	27.8	18
TOTS %	16.4	51.5	32.1	
N =	84	263	164	511

$\chi 2 = 17.604$ df=4 P <.001

Expertise

Having established the levels of access to technology, it is also important to consider levels of expertise in using the technology. Where levels of expertise are low, programmes should be designed to involve a certain element of skills development to ensure that students can take advantage of the learning opportunities. Respondents were asked to rate their expertise in using a range of technologies on a scale of 1 to 5, with 1 = no proficiency, 5 = highly proficient. As Table 5 shows, while respondents reported relatively high levels of skills in word processing, internet and email, relatively few reported expertise in computer conferencing, which is one of the key technologies in recent eLearning practice. The mean skill proficiency in word processing, spread sheets, databases, email, internet and computer conferencing were compared and the F statistic was calculated. As Table 5 shows, variations in proficiency between programmes were noted, with BA students being significantly less proficient in all areas. It is to be expected that IT students will be proficient in the technologies, however, it will be necessary to build IT skills into the Introductory Modules for the BA programme to facilitate Oscail's plans for technology based education.

Table 5: Proficiency in IT skills

Skill	BA	IT	MSc	F	Sig
WP	3.51	4.13	3.72	18.363	<000
Spreadsheet	2.78	3.82	4.33	44.795	<000
Database	2.43	3.26	2.67	23.964	<000
Email	3.32	4.18	4.28	29.158	<000
Internet/WWW	3.16	4.04	3.28	28.671	<000
Computer conferencing	1.50	2.06	1.61	14.190	<000

5 = highly proficient: 1 = no proficiency

Attitudes

The third measure of the climate of receptivity to technology in education may be obtained through analysing the attitudes and perceptions of students. A series of fourteen likert statements concerning different aspects of technology use in education were drawn up following an earlier pilot exercise. Statements were designed to tap into societal concerns, impact on student learning and concerns with the impact on pedagogy and the learning experience. Respondents were asked to indicate the strength of their agreement with the statements (1 = agree strongly, 5 = strongly disagree). Responses were summed to calculate an overall receptivity score for each respondent. A score of 14 would indicate maximum receptivity, whereas 70 would indicate minimum receptivity. The average score for all respondents was 29.29 which indicates that respondents were somewhat receptive, but with reservations which emerged on closer examination of the items on the scale. While respondents were inclined to agree with the statement 'Access to computers is essential for the modern learner' (mean response 1.50), concerns with impact on the learning experience were evident in the less positive response to the item 'computers are preferable to library visits' (mean response 2.83) or 'computers do not reduce the quality of learning' (mean response 2.61). When mean scores are compared, Table 6 shows, as might be expected, receptivity varied between programmes with IT and MSc respondents being significantly more receptive (score 27.44) than BA respondents (31.82).

Table 6: Receptivity to Technology in Education

	BA	IT	MSc	All	F	Sig
Score	31.82	27.44	29.80	29.29	20.128	<.000
N	184	256	15	455		

While the receptivity score was designed to tap into attitudes to the general concept of ICTs in education, respondents were also asked to indicate their attitude to taking a programme using technology. The differences in attitudes between programmes are revealed more starkly in the figures shown in Table 7. Here we see that almost two thirds

(62.6%) of IT respondents report a very positive attitude to technology, compared with over one third (38.1%) of BA respondents. Remarkably, some 8.8% of IT respondents report negative attitudes, compared with 22.6% of BA respondents. These figures indicate that students are not a homogenous mass of end users and that disciplinary differences and orientations will affect the degree of receptivity to new technologies. Howard remarks on this phenomenon in relation to workers in NYNEX 'the early support for distance education came from the information technology groups. With their comfort with workstation interaction, constant shortage of time and egos that fit the self study mode, the early CBT students were taking courses on mainframe, using crude languages and blue screens to transfer new knowledge and new rules of COBOL' (Howard, 2001: 273)

Table 7: Attitudes to taking courses using ICTs

	% BA	% IT	% MSc	% Total
Very positive	38.1	62.6	56.3	52.1
Somewhat positive	39.4	28.6	37.5	33.4
Negative	22.6	8.8	6.3	14.5
N =	226	297	16	539

$\chi 2 = 37.14$ df = 4 p = <.000

Conclusions

This paper started by citing the national and global pressures impacting on Ireland's Celtic Tiger economy which is creating the demand for new skills and the identification of ODL and ICTs as the engines for meeting the need for lifelong learning. However, as the results of a survey of Oscail students have shown, introduction of the ICTs in the educational process is not just a technical, infrastructural issue. The preparedness of learners to use the new technologies is a key factor in the successful implementation of eLearning strategies. This preparedness is composed of three dimensions: access to the technology, expertise and skills in using the technology, and attitudes and perceptions of the learner. As the Oscail survey has shown, the 587 managers taking distance learning courses are not a homogenous group, with the key differences emerging along disciplinary lines. While access to the technology among respondents is far higher than that among the general population, there are significant differences in expertise levels and attitudes to using technology in education between groups. This is a key message for course designers which is often overlooked.

Another issue which has emerged from the survey is the role of organisational support for learners in the workplace. Despite the fact that respondents were largely motivated by career based concerns to participate in Oscail's programmes, it is of particular concern that less than one third (32.2%) of respondents reported that they would be permitted to use technology for educational purposes in work hours. This has clear implications for flexibility and accessibility. The results of this research is being used to inform Oscail's strategy for the most effective means of introducing the ICTs in its programmes, without enlarging the digital divide and alienating learners and tutors alike.

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