ICT in Education: Our Story at Dublin City University

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Introduction

This paper reports on the development of information and communications technology (ICT) in education at Dublin City University (DCU) in the context of evolving government policy in promoting ICT in education over the past two decades. It uses this historical account to trace the evolution at DCU of a distinctive approach to ICT in education and training at Masters Degree level. This approach can be characterised as a shift from imparting knowledge about computing technology and uses to the practical examination and development of innovative approaches to ICT in the educational process, and reflecting on the implications of these creative approaches for professional development in range of workplace contexts.

Irish Government policies in ICT in education

In the 1990s the Irish Government gave priority to extending and improving upon the number and quality of graduates who could take up paid employment in the emerging computing industry in Ireland. This led to a substantial increase in the number of places on computing courses at third level education. The same concern with catering for the computing industry's recruitment needs but over a longer time scale, led to the establishment of the National Centre for Technology in Education (NCTE) in the late 1990's to foster the application of ICT at primary and post-primary levels. Major advances have taken place in the use of computers at both primary and post-primary levels. The NCTE played a role in these developments, and in helping plan further major investments.

The role of the private sector

In 1980 Computer studies was introduced as an optional module in Leaving Certificate mathematics. Later in 1985, a Computer studies course was established at Junior Certificate level (NCCA, 2004) as a non exam based subject. In 1995, the Irish Government's White paper, 'Charting our Education Future' concerned with educational policy at large, failed to recognise fully the importance and the

implications of introducing Computing as a subject into post-primary education. Its only reference to Computing at post-primary level was the declared ambition to achieve competence and understanding in practical skills, including computer literacy and information technology in the junior cycle. This weak reference to the educational dimensions of an industry that was rapidly growing and exercising a profound influence on the development of the country's economy, caused concern to various bodies.

Due to the efforts of Professor Michael Ryan of the School of Computer Applications at DCU several positive developments emerged. For example, among those who believed decisive new steps should be taken was Mr. Donal Daly, of the Irish software company Expert Edge. He had seen the pioneer Tech Corps in operation in Massachusetts USA. and its effects on the school system there. This initiative involved companies helping their local schools by providing computing expertise on a part-time basis, and in some cases providing the computers as well. He brought the idea back to the Irish industry body, the Irish Software Association (ISA), who received it positively and drafted a proposal for an 'Irish Tech Corps' (ITC).

Subsequent to this exchange of views, Mr. Paddy Moore, Chairman of the ISA, discussed with DCU the possible involvement of DCU's School of Computer Applications with the 'Tech Corps' scheme and found there was an obvious fit with DCU's own planned intentions. A joint proposal for an 'Irish Tech Corps' (ITC) was drafted, agreed by the School and the ISA, and submitted to funding agencies and the Department of Education in 1996. The Department of Education and Science (DES) was supportive of the proposal, but wished to exclude schools that were deemed by the initiators of the scheme to be unable to benefit from the initiative. It was decided to proceed on the basis of non-Exchequer funding only. Over the following three years, the ITC set up networks of sixteen computers in each of forty-six schools, roughly half of them primary, half post-primary. The computers were typically three years old and transferred from organisations that were replacing equipment. Technical, pedagogic, and administrative support was provided. There was no direct cost to the State.

By the end of the pilot project, forty-six schools had been equipped with computer networks and selected software packages. An internet link was provided by Telecom Éireann (TE). The systems were set up in such a way that minimal technical

support was required. In general, the configurations worked well. A set of workshops on the use of the systems was devised and were well attended. Overall, the systems had a greater impact at primary level than at post-primary. A key idea from the ITC was teachers from different schools meeting in networks to share experiences. It became clear that curriculum pressures at post-primary level and the lack of computer-based resources for many subjects limited the use of the facility, whereas a wealth of material was available at the primary level and was used enthusiastically. In parallel to the ITC was the Information Age Towns/Schools Project (1997) which was funded by Telecom Éireann and included installing an internet access point and computers in each school and providing computers into homes and providing training to parents in designated information age towns; Ennis, Kilkenny, Killarney and Castlebar.

Government's decisive shift toward promotion of computer education

Meanwhile, Government policy was swinging strongly in favour of more decisive approaches to the promotion of the ICT in schools. In 1997, the Minister for Education and Science, Michéal Martin, T.D. launched the Schools IT 2000. This initiative was to be implemented by the NCTE which was established in early 1998. It represented a bold initiative by the Irish government to promote ICT in schools in Ireland. It highlighted the need for more teacher training, more funding for computers, more technical support, and encouragement to make use of ICT in education (DES, 1997). The main objective was to ensure that all pupils should have the opportunity to achieve computer literacy and to equip themselves for participation in the information society while teachers were to be supported toward the development and renewal of their professional skills, so as to enable them to utilise ICTs as part of the learning environment. It acknowledged that a special effort by Government was needed to educate teachers in making use of ICT in their day-to-day teaching. A key aspect of the Schools IT2000 was the Schools Integration Project (SIP). It involved pilot projects in a number of 'lead' schools in Ireland working in partnership with education centres, businesses, industry, third-level institutions and the community to develop and share 'best practice' in the use and integration of ICT in teaching and learning. Some of the largest funding in the States history to that date was for SIP. The project details can be accessed at http://www.sip.ie/

The role of technology in teaching and learning was highlighted again in

another Irish Government policy document. The 'Blueprint for the Future of ICT in Education' (DES, 2001), set out a three year strategic action plan for ICT in primary and post-primary schools. It outlined the main thrust of DES' ICT strategy that included expanding ICT capital provision for schools, increasing access to, and use of Internet technologies, further integrating ICT into the school curricula, and improving the professional development of teachers.

The Irish Government's policy for the development of ICT in education was further elaborated in the 'Statement of Strategy 2005-2007' (DES, 2004) document, which referred to the need for education to support a knowledge and innovation-based society and lifelong learning. The emphasis on computer literacy skills is clear in the following statement: 'we encourage pupils to achieve computer literacy and acquire the necessary skills for participation in the Information Society' (2004, p. 36). There was also reference to key challenges in the changing teaching environment. These included:

- the changing face of delivery of education, including changes in the practice and profession of teaching to reflect today's information age.
- the role of the teacher: less focused on the provision of knowledge and more concerned with the teaching of learning skills.
- the changing environment requiring ongoing training, support and development.

(DES, 2004, p. 14)

The initial drive of ICT policy was focused on equipping schools and the metric used was lowering the pupil to computer ratio. The second and third policy became more focused on usage of equipment.

The drive towards uses of ICT in schools has come not only from Government policies and reports, but also from public agencies and businesses, such as the Higher Education Authority (HEA) and Discover Science. Industry's interest in promoting computer education was a powerful influence. ICT Ireland is the representative lobby group for the knowledge sector within IBEC (Irish Business Employers Confederation). Dr. Kevin Marshall, Academic Programme Manager of Microsoft Ireland and the chairman of the ICT Ireland group stated that the aim is to ensure that

‘we have a coherent, costed and forward thinking ICT policy for schools, in order that we can meet the challenges of the knowledge economy’ (Marshall cited in O’Brien, 2006).

The views of the National Council for Curriculum Assessment (NCCA) are particularly relevant to the mainstreaming of developing interest in the effective use of ICT in schools. The revision of the junior cycle curriculum, and later the senior cycle and primary curricula began with the formation of the NCCA in 1987. The revised primary school guidelines were issued in 1999 without any reference to ICT. However, a later supporting document ‘Information and Communications Technology (ICT) in the Primary School Curriculum’ was developed by the NCCA and launched by the Department of Education and Science (DES) in 2004. Over the past decade the NCCA has published reports and consultative documents in the area of ICT in schools. The NCCA commissioned a team from the University of Limerick to explore ‘the possible form, content and perceived impact of the introduction of a new computer-based subject to the Leaving Certificate (established)’ (2004, p 6). Their report ‘Computers and Curriculum: Difficulties and Dichotomies’ (2004) brought to a close the idea of Computing as a Leaving Certificate subject and it was left as an optional subject for Transition year and the Leaving Certificate Vocational Programme. Other reports included: ‘Curriculum Assessment and ICT in the Irish Context: a Discussion paper’ (2004); the ‘ICT Framework: A structured approach to ICT in Curriculum and Assessment Revised Framework’ (2007). The aim of the ICT Framework was to realise the integration of ICT across the curriculum. It is clear that the NCCA recognised the need for teachers to be knowledgeable about how ICT could be used in appropriate ways in teaching and learning, and describes the teacher as ‘a gatekeeper of his/her students’ classroom learning – including learning with ICT’ (NCCA, 2004, p. 9). A corollary of statements of this kind could be that teachers are expected to have adequate pedagogical support in using ICT in education.

In 2008 further Government reports on ICT in education were published. These included the ‘ICT in Schools: Inspectorate Evaluation Report’ (DES, 2008) and the Strategy Group’s report ‘Investing Effectively in Information and Communications Technology in Schools 2008-2013’ carried out at the request of the Minister for Education and Science (DES, 2008). The reports acknowledged that there was a need at post-primary level to focus on the general application of ICT in teaching and learning. However it was recognised that there was a need to provide

teachers with the appropriate ICT infrastructure and supports to facilitate greater ICT integration in learning and teaching. It was also found that a quarter of teachers rated themselves at the 'intermediate' or 'advanced' level in terms of IT skills. One of the key investment priorities recommended in the reports was in the professional development of teachers to ensure the integration of ICT in teaching and learning. It is in the context of these reports that the NCTE produced a handbook for Principals and Coordinating teachers called 'Planning and Implementing e-Learning in your school' along with an e-Learning roadmap with the purpose of assisting schools to develop strategies and action plans to integrate ICT into learning and teaching across the curriculum. The e-Learning Roadmap allowed a school to review its current state of ICT use and where it would like to go under the following headings: ICT infrastructure, e-Learning Culture, Professional Development, ICT in the Curriculum, Leadership and Planning. Industry continued their interest in promoting ICT in education with the publication of the Joint Industry-Government publication entitled 'Smart Schools = Smart Economy' (DES, 2009) which marked the start of Industry's involvement in the policy formation of ICT in schools. The publication called for the 'holistic integration' of ICT into the curriculum and assessment procedures' (2009, p. 9) and recommended that the Teaching Council focus on the ICT professional development needs of teachers in the development of its strategy for the Review and Accreditation of initial teacher training programmes. It is interesting to note that this latter issue was addressed in the Initial Teacher Education: Criteria and Guidelines for Programme Providers (Teaching Council of Ireland, 2011) which specifically refers to ICT in teaching and learning as a mandatory component of all initial teacher education programmes in Ireland. There are still challenges in integrating technology into classroom practices, despite reports that Governments and other stakeholders in OECD countries have dedicated large budgets to ICT projects in schools (Enochsson and Rizza 2009). Research shows that although increasing numbers of teachers and student teachers are becoming personal users of ICT, and the availability of technology is increasing, this knowledge does not simply transfer into teaching practices (Ottesen, 2006; Player-Coro, 2007). While the very important issue of integrating ICT into the curriculum moved centre stage in government policy, the characteristics of Computing as a subject have in some measure been lost sight of. In Northern Ireland Computer Studies has been a subject at GCSE (General Certificate in Secondary Education) and A-Level (Advanced Level) for the past two decades.

However, there are hopeful new developments in the Republic of Ireland with the Framework for Junior Certificate (2012) developed by the NCCA which focuses on key skills with ICT at the core. NCCA will initially develop eight short courses for the junior cycle but schools are also encouraged to develop their own short courses. The Framework for Junior Cycle will commence in 2014 with Digital Media Literacy and Computer Programming to be among the first short courses to be offered. It is interesting to note that although ICT is integrated into the curricula, the assessment remains the same. Perhaps there will be no change in assessment until ePortfolios are introduced into the Junior Cycle Framework.

Dublin City University's Centre for Teaching Computing (CTC)

The role of DCU's School of Computer Applications in setting up the Irish Tech Corps (ITC) in collaboration with the Irish Software Association and the impact that this has had in the schools sector has already been referred to. That initiative coincided very well with DCU's distinctively education-orientated approach to the handling of computer studies in the institution generally. In 1992 DCU had set up a Centre for Teaching Computing (CTC) as a joint venture with the University of Ulster, to support computing academics throughout Ireland, in the shared development, evaluation and dissemination of teaching materials and methodologies. Professor Michael Ryan was Head of the School of Computer Applications in DCU at that time and the Centre for Teaching Computing (CTC) developed under his direction with the guidance of Dr. Michéal O 'hEigeartaigh. The Centre organised workshops and conferences for higher education staff and annual conferences on subjects concerned with ICT in the curriculum. This was the first Centre that was established in Ireland to support the use of technology in the context of teaching and learning in higher education. Margaret joined the Centre for Teaching Computing in November 1997. Previously she had taught Computer Studies to A-level, Business Studies on BTEC (British Technical Education Council) courses and Computer Studies and Information Technology to GCSE level in a Sixth Form college in London and an International School in Brussels. The strength of the GCSE Information Technology curriculum was that it valued the process of inquiry. It provided the opportunity for students to explore and experiment with ICT and to carry out project work in areas of interest and relevance to them. It also enabled the teacher to apply an interactive approach to IT teaching in the classroom.

In 1998, the staff in the CTC organised a conference jointly with the Association for Computing Machinery (ACM) on Teaching Computing, USA which took place in DCU. During its lifetime, CTC also organised conferences for primary and post-primary teachers, e.g. the Socrates–Comenius Conference on 'European Linkage in Teaching Computing at Primary and Secondary Level', jointly organised by DCU and the Computer Education Society of Ireland (CESI). CESI had organised its own annual conference since 1973 and since that time it has given an organised voice to the innovators of ICT in education. The establishment by the Government of the NCTE in early 1998 on the DCU campus was welcomed by the Irish Tech Corps.

After the establishment of the NCTE, the School of Computer Applications in DCU continued to link with schools and a University-School Collaborative project called Setanta (http://webpages.dcu.ie/~farrenm/SetProject.htm) was established in 1999 between the School of Computer Applications and St. Aidan's Secondary school in North Dublin. It involved close partnerships between pupils and teachers in St. Aidan's school and students and lecturing staff in the School of Computer Applications. The idea was to develop an intranet with learning resources appropriate for teaching and learning in post-primary schools around Ireland. It aimed to develop a model for a school-based intranet for the teaching of post-primary subjects and to develop courseware for use in Irish post-primary schools. Some of the courseware developed as part of the Setanta project included an Interactive Maths Tutorial, as well as a Virtual Art Museum (VAM) for use in the teaching of Art at Leaving Certificate level (Farren, Mooney, Pentony, 2001). The Setanta project later evolved into one of the SIP projects.

Third Level Qualification in Computer Applications for Education

A Masters degree in Computer Applications for Education was established in DCU's School of Computer Applications in 1996 as a two year, part-time programme. It was the first Masters Degree programme in Computer Applications for Education in Ireland. The programme consisted of the following modules; Computer Programming, Algorithms, Computer Software Installations, Network Information Management, Computer Networks, Computer Architecture and Operating Systems, Quantitative

Methods and Simulation, Multimedia and Information Retrieval Systems, Computer Applications in Education and Human Computer Interaction. From a glance at these modules it can be seen that the programme was mainly geared towards technical understanding of ICT rather than about ICT as applied to education. The teaching and research interest of the majority of academic staff in the School of Computer Applications was in the technical aspects of computing rather than computer applications for education. It is clear now that this technical approach to ICT was important but it underestimated the necessity for teachers to examine appropriate pedagogical uses of ICT in day-to-day teaching and learning. By the time the programme closed in 2002 over one hundred teachers had received the MSc. in Computer Applications for Education. Teachers who graduated from the programme have become champions in the use of technology in their own schools and some led developments in technology-in-education initiatives that have enabled the wider teaching community in Ireland to explore the benefits of technology in education. The assumption of the MSc. in Computer Applications for Education programme was that the teachers being trained would teach Computing as a subject. It was also assumed that if they were to make use of computers in other areas of the curriculum they would already have the pedagogical understanding of how to make full use of ICT. The programme closed at a time when there were calls for the professional development of all teachers in the pedagogical uses of ICT in the classroom, the development of appropriate third-level certification and accreditation structures, and the promotion of postgraduate research (NPADC, 2001).

Margaret's move from the School of Computer Applications to the School of Education Studies in 2002 paralleled the shift to mainstreaming ICT in education that was beginning to happen as a result of the development of Government policy. A two-year part-time Masters in Education and Training Management with a focus on leadership had been established in the School of Education Studies since 1995. In her move to the School of Education Studies Margaret began to integrate an ICT strand into the existing Masters in Education and Training Management programme. This brought an ICT dimension into the Masters programme and an ICT research dimension to the School of Education Studies. In 2006 the ICT strand was renamed e-Learning emphasising the developing trends in education and training on learning facilitated and supported through the use of ICT. Participants on the MSc. in Computer Applications for Education in the School of Computer Applications

(1996-2002) focused on computing as a body of knowledge and sought to master computer systems and procedures. Participants on the MSc. in Education and Training Management (e-Learning) (2002-present) in the School of Education Studies are offered a different approach to teaching, learning, and research, (e.g. Moodle virtual learning environment is one of the tools used to assist participants to collaboratively explore the values embedded in their practice). They also have the opportunity to engage the imagination and creatively in developing multi-modal forms of representation in their practice-based research.

Since 1993, with the establishment of the Self-study of Teacher Education Practice Group of the American Educational Research Association (AERA), higher education educators have been exploring the epistemological implications of self-studies (researching one's own practice) for the generation of educational knowledge. The International Handbook of Self-Study of Teaching Practice (Loughran, Hamilton, La Boskey, Russell, 2004) provides clear evidence of how self-study is influencing teacher education in the academy and other social formations. According to Pithouse, Mitchell and Weber (2009), 'the very process of self-study itself changes its practitioners and their situations. Seeing things differently, self-study can prod us to take action.' These authors include action research, narrative inquiry, arts-informed inquiry, auto-ethnography, and life histories as approaches to self-study research. The idea of practitioners generating knowledge has not been given serious weight in the academy. Schön (1995) referred to the power of the disciplinary in-groups that have grown up in the academy around the dominant epistemology. The increasing flow of literature on practitioner research approaches influenced Margaret's choice of research methodology for doctoral research. In researching her own practice she clarified the meaning of the values of a web of betweenness and pedagogy of the unique as they emerged in the course of her practice (Farren, 2006). Yvonne's interest in the use of multi-modal forms of communication and expression to represent educational knowledge and her belief in the power of visual methods led to her doctoral research in which she used multi-modal forms of communication to express her practice-based research and clarify what it means to have an educational entrepreneurial spirit (Crotty, 2012). The direction taken by Margaret and Yvonne in their doctoral research studies has influenced the philosophical and educational foundation and growth of the MSc. in Education and Training Management (e-

Learning) programme.

M.Sc. in Education and Training Management (e-Learning strand)

We will now focus on the specifics of the masters programme. This programme was originally designed in 2002 to meet the professional development needs of practising teachers who were keen to learn how to integrate technology into their subject area. Over the past decade the programme has attracted professionals from different sectors of education (primary, post-primary, and tertiary), and other areas, eg. corporate training, industry including technology, pharmaceutical, creative arts, banking, non-government organisations (NGO's), government departments, community organisations, and state agencies. What unites participants is their interest in improving their own practice and developing creative approaches to the use of ICT in the particular learning environments in which they work.

Yvonne began full-time lecturing in the School of Education in 2005. She started to teach on the Masters in Education and Training Management (e-Learning) programme and set about revising the modules especially the Multimedia in Education modules and also developing new programme modules e.g. Digital Creativity in the Workplace thus combining multi-modal forms of learning on the programme. The masters programme modules are constantly updated to meet the evolving needs of professionals in the workplace. The programme modules now include: Visions for Emerging Technologies, e-Learning: Culture and Organisations, Emerging Pedagogies, Multimedia and Educational Innovation, Digital Creativity in the Workplace, Entrepreneurial Education and Training and Collaborative Online Learning Inquiry.

As educators, we believe that dialogue is fundamental to the teaching and learning process. Throughout the programme, participants develop their own sense of being as they learn in relation with others. This relational quality of learning underpins the notion of a web of betweenness (O'Donohue, 2003; Farren, 2005) bringing us back to the intuitive world-view of the Celtic imagination and capturing the idea that each person's uniqueness enriches the community: 'True community is an ideal where the full identities of awakened and realised individuals challenge and complement each other' (O' Donohue, p.25, 2003). ICT, far from displacing the educator, opens up new creative possibilities provided that they see learning as a collaborative process not only involving teacher/student dialogue but with a wider

dimension of student/student dialogue moving toward a web of betweenness that ICT can facilitate (Farren, 2005, 2006, 2008). Like Max van Manen we do not consider pedagogy to be found in observational categories, but rather like love or friendship in the experience of its presence – that is, in concrete, real-life situations (1991, p. 31). Throughout the course of the programme, professionals from a range of workplace contexts are supported to develop their own capacity as learners and encouraged to observe and reflect on what is happening in their own pedagogical practice and in their relationship with others. The idea of pedagogy of the unique (Farren, 2005) expresses the belief that each participant on the programme has a particular and distinctive constellation of values that motivate their research inquiry and that sets a distinctive context within which that enquiry proceeds. Participants analyse their educational influence in terms of the transformation of their embodied values and knowledge into public knowledge, by showing their educational influence in their own learning, in the learning of others and in the education of social formations in which they work. At the same time they engage critically with the most advanced and established social and educational theories of the day. The Masters programme has been a 'conversion experience' (O'Carroll, 2006, p. 139 cited in Rohr, R. 2006) for these professionals as they examine their own value system and provide practice-based accounts of how they are living their values more fully in order to improve work practices and the wider social organisation in which they work.

In order to confront Schön's warning about the need for scholars to make their practice into appropriately rigorous research (Schön, 1995, p. 34) and to ensure that research demonstrates 'academic rigor and practical relevance' (Schneberger, Pollard, Watson, 2009), we draw on Winter's (1989) six criteria for judging action research accounts; dialectical critique, reflective critique, collaboration resource, risk, plural structure, theory, practice and transformation. These criteria emphasise dialogue, reflection and action, collaboration, listening to other points of view and taking risks in bringing new ideas into action. All these help to foster transformative learning. We also take account of Smith's point (1989, 1993, cited in Sparkes, 2002, p. 221) that judgement in qualitative inquiry should take place through debate, discussion, and the use of exemplars. As for methods establishing social validity, we include the application of Habermas's (1976) four criteria of comprehensibility, truth, rightness and authenticity.

The following are examples of the research questions carried out by some of the

previous programme participants:

How am I using inquiry-based learning to improve my practice and to encourage higher order thinking among my students of mathematics?
Caitriona Rooney, Post-primary school teacher

How can I use Irish language e-portfolios in the assessment for learning approach in my primary classroom? *Martina Clerkin, Primary school teacher*

How am I learning to scaffold an online learning environment for professional development in a training environment?
Elspeth Hennessy, Education Officer, Professional Services Membership Association

How can I improve my practice as a clinical nurse facilitator through the development of a vodcast, video and e-learning course to make education more accessible to nurses in my organisation?
Sinead Murphy, Clinical Nurse Facilitator

Reflecting Back and Looking Forward

As ICT reaches into every branch of human and non-human information exchange, one may rightly ask where the bounds of any subject described as Computing can be set. The Forfás reports on Irish government policy would have strongly advised government to fund ICT in education. The Expert Group on Future Skills Needs (EGFSN- Forfás, 2008) reported that the demand for ICT skills in Ireland would exceed the domestic supply. In January 2012 the 'ICT Action Plan: Meeting the High Level ICT Skills Needs of Enterprise in Ireland' was launched. It outlined the immediate introduction of graduate conversion courses (Level 8) to meet the ICT needs of industry. Government policy and indeed business thinking over the past two decades have focused on computer literacy and the integration of ICT into teaching and learning across the curriculum. However, Computer Studies has been a subject at GCSE and A-Level in Northern Ireland for at least two decades. The 'Review of the ICT Skills Demand in Ireland' document published by the Joint Committee on Jobs, Enterprise and Innovation, Ireland in October 2012 put forward a number of key

recommendations to bridge the gap between the needs of the ICT industry and the capacity of the Irish workforce to meet the needs. One recommendation was that the DES should include Computer science and /or Programming in the school curriculum. The need for post-primary schools to move from 'application usage' to 'application development' (p. 19) was noted in the report. As already mentioned, the NCCA are now developing short courses in Digital Media Literacy and Computer Programming and plan to introduce these courses in the junior cycle in 2014.

Various initiatives and policies over the last two decades have led to progress in understanding what ICT can contribute to teaching and learning. Much has changed from the Masters in Computer Applications for Education programme in DCU's School of Computer Applications (1996-2002) when it was assumed that teachers would have sufficient pedagogical knowledge and would only require technical skills in order to integrate ICT in their teaching. It was also envisaged, at that time, that the programme would enable teachers to teach Computing as a subject. In the end Computing was not introduced into the post-primary school curriculum. The MSc. in Education and Training Management (e-Learning) programme (2002-present) is enabling educators to engage learners in the creative uses of ICT, in addition to helping teachers, among other professionals, to reflect on their pedagogical practice and offer practice-based accounts of how they are learning to live their values of humanity as fully as they can within their workplaces and communities. Our experience in this ICT in education and practitioner research approaches has led to invitations to participate in a European Seventh Framework project, 'Pathway to Inquiry Based Science Education' (2010-2013) and a Competitiveness and Innovation Framework project (2013-2016), 'Inspiring Science' with a focus on mainstreaming eLearning in national policies for the modernisation of education and training, and the professional development of educators.

Of particular relevance to our work as Higher Education educators charged with the development of professionals from a range of workplace contexts is the ICT Action Plan's reference to up-skilling the current workforce in ICT skills (DES, 2012, p. 16). Through the MSc. in Education and Training Management (eLearning) we have been engaging professionals from a range of workplace contexts to develop skills in the use of digital technology and multimedia; gain a critical understanding of the enabling capacity of digital technology through the fostering of a reflective,

collaborative and entrepreneurial approach in developing innovation and creativity in the workplace; combine action and self-reflection; along with developing new pedagogical approaches to improve their own learning, the learning of others and the learning of the wider social enterprise. In this way we are embedding the learning experienced in the workplace to the curriculum in higher education. In order to up-skill the workforce in the south-East of Ireland we have extended the programme to Dunhill Multi-Education centre - a community owned education, training centre in County Waterford. We have also spearheaded a unique initiative in collaboration with the Global eSchools and Communities Initiative (GeSCI) which enables African leaders to gain a Graduate Diploma in Leadership Development in ICT and the Knowledge Society from Dublin City University (Figure 8.1) - http://www4.dcu.ie/cwlel/Global-eSchools-Research.shtml. Extending our work and research to the African continent is further evidence of the flourishing of a web of betweenness that ICT can facilitate.

Figure 8.1 Launch of the Graduate Diploma in Leadership Development in ICT and the Knowledge Society.

In order to bring the various European and International research projects together we have established the Centre for e-Innovation and Workplace Learning <http://www4.dcu.ie/cwlel/index.shtml> Through our practice based and practice led research we are enabling practitioners from a range of workplace contexts to make explicit the values underpinning their own pedagogical practices and to carry out actions based upon wise and considered practice. We are also contributing to developments in ICT in education especially in light of the possibilities of next-generation approaches to the application of ICT and their incorporation into education and training contexts.

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