

The development of ICT across the curriculum in Irish schools: A historical perspective.

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Abstract

This literature review explores the historical development of ICT in Irish post-primary/secondary schools and examines how the education system has responded to the various ICT initiatives and policy changes. The review has found that despite national policy and significant ICT initiatives, it appears that the use of computer technology has instead evolved independent of these changes. The various policy nudges throughout the past three decades have had limited impact on the nature of its use. The predominant use of the technology lies within discrete informatics subjects, which tend to focus on learning about the technology rather than learning with it. Future ICT policy needs to be cognisant of the past, particularly how national ICT initiatives are mediated within schools and the powerful influence of the prevailing ICT culture on external ICT initiatives.

Introduction

The evolution of Information and Communication Technologies (ICT) has placed continuous pressure on schools to 'modernise' and benefit from their educational potential. Ottesen (2006) argues that expectations of ICT are high both at a policy and institutional level. At a policy level its importance in sustaining competitiveness in the global economy is stressed; at an institutional level it is seen as a potential catalyst for change in education. Beliefs about the influence of ICT on existing pedagogy are quite prominent. Provenzo, Brett and McCloskey (1999) argue that there are a number of questions teachers using technology should ask, they include: how does the computer change the ecology of the classroom and the school? How does it change learning? How does it change instruction? This view of ICT as a catalyst for pedagogical change fails to consider the alternative perspective, that is, rather than asking how ICT changes pedagogy we should perhaps consider how existing pedagogy changes ICT? (Loveless, DeVoogd and Bohlin, 2001).

To date there has been little evidence that the introduction of ICT changes pedagogy, particularly to a more constructivist learning. Higgins and Moseley (2001) note that existing approaches to teaching and learning have a powerful inertia and that schools tend to assimilate, rather than accommodate new approaches to the use of ICT. Levin and Wadmany (2005) argue that despite the changes in society as a result of ICT, it is not widely integrated into the educational system and, where it is present, there is no evidence that it has affected teaching approaches. Hayes (2007) observes that although research into the use of ICT in education is into its third decade there is still 'a pressing need to better understand how computer-based technologies are influencing learning opportunities' (p.385).

There are many reasons given for the low levels of impact in the classroom. Many of the most common factors influencing the level of impact include: inadequate infrastructure, limited access to the technology, lack of training and personal expertise, weak technical support, poor planning and teacher beliefs (Ringstaff and Kelley, 2002; Baek, Jung and Kim, 2008). Ertmer (1999) categorises these barriers into two levels, first and second order barriers. First order barriers, which include equipment, time, training and support, are the most visible and easiest to remove. According to her the majority of early integration efforts focused on addressing these 'laundry lists' (p.51). Second order barriers on the other hand are more difficult to address since they are 'barriers that interfere or impede fundamental change' (p. 51). These types of barriers are rooted in teachers underlying beliefs and include beliefs about teacher-student roles, classroom practices, teaching methods, organisational and management styles and assessment.

While recent research has recognised the importance of these second level barriers, i.e., teacher beliefs (Levin and Wadmany, 2006; Hennessey, Ruthven and Brindley, 2005; Ertmer, 2005; Donovan, Hartley and Strudler, 2007), the integration of ICT is affected by the broader organisational culture of the educational system as much as specific local school cultures. This aspect precedes the first and second order barriers outlined by Ertmer (1999). It involves the systemic response to ICT reforms which largely determines how the technology initiative will be interpreted by the 'system' before being filtered into schools. It includes the school culture and the subject subcultures within it and the influence of previous regional and national policy. These factors have a very powerful influence on how technology initiatives and policy is mediated within an educational system and determines if, and how, the first and second order barriers will be addressed within the system.

This research aims to explore how the Irish post-primary¹ system has reacted to various ICT initiatives in the past three decades and how existing constructs of ICT within the educational system interpret externally driven ICT initiatives. This research aimed to:

- Explore the historical development of ICT in Irish post-primary schools in order to understand how current practices have evolved
- Examine how the Irish post-primary system reacts to national ICT policies and initiatives.
- Analyse how ICT initiatives are mediated on a systemic level.

Methodology

The study reviewed all known published material in relation to computers/ICT in Education in post-primary education (12 – 18yrs) in Ireland from 1975 to the present day. This included research papers, academic articles, national research reports, Department of Education and Science publications, curricula and curriculum guidelines. In addition, the documentary research also included teacher union publications, education publications, national newspapers and subject association publications. It was hoped that by using this broad range of sources a comprehensive picture of ICT in post-primary schools over the past thirty years would emerge.

¹ Post-primary education, also known as secondary education, caters for students of 12 to 18years of age.

According to Cohen, Manion and Morrison (2007) historical research of this nature can show how, and more importantly why, educational practices have developed. May (2001) argues that in addition to exploring the past, historical research can provide us with an insight into how the present has come about. Through an exploration of past social, political and economic relations he further argues that this can provide perspectives on contemporary issues. While recognising the limitations of research based exclusively on documentary evidence, he argues that;

Documents, read as the sedimentations of social practices, ... constitute particular readings of social events. They tell us about the aspirations and intentions of the periods to which they refer and describe places and social relationships (May, 2001, p. 176)

May *ibid.*, is also cognizant of the criticisms of documentary research. He notes that documents may be misleading and 'impressionistic' and warns 'despite the richness of insights that are available from documents, research reports based upon these sources may find themselves subject to misunderstanding' (p. 176). Yet the use of any source, whether from empirical research data or documentary evidence, is subject to interpretation. Scott (1990) identifies ways in which this potential bias can be reduced. Among the ways of improving validity and reliability, the accuracy, legitimacy and sincerity of all the sources should be established. In addition, the researcher should also understand their representativeness and meaning before considering their use.

All sources found were analysed in chronological order as the review aimed to explore the evolution of the technology. Critical milestones in the development of the technology in the system were recorded and, in particular, reaction to these policy launches/changes and initiatives across the wider educational sphere were assessed. At all times reported material was cross-checked, where possible, with statistical and empirical evidence of actual use of the technology since the divide between the reported used of technology and its actual use within schools was an issue that emerged from an early stage in the analysis. Locating levels of technology resources and use in schools proved difficult, particularly during the 1970s and 1980s, due to the limited number of empirical research studies into the actual use of computers.

Broadly speaking the development of computer technology in schools has had three distinct phases. Phase 1 was a time of early exploration of the technology, phase 2 is defined by the formalisation of computer technology in schools through the development of informatics subjects. The third and final phase began with the focus on the integration of ICT across the curriculum coupled with significant ICT funding by Irish standards. The analysis will follow these three phases in the following section.

Findings from the documentary research: Tracing the past.

The early technophiles stage

Initial interest in computer technology began in 1971 with the provision of Department of Education funded summer in-service courses. The interest created by these courses led to the establishment of the Computer Education Society of Ireland

(CESI) in 1973. Brady (1987), commenting on his experience at that time as an ICT enthusiast teaching Maths in a post-primary school, noted;

Only very enthusiastic, very computer orientated, teachers were involved at this time [early seventies] ... most of us who became involved at this stage had only the vaguest idea of what computing was about. We were motivated more by curiosity about the new technology than by educational considerations but, in general, teachers who got involved at this stage intended to teach Computer Science. (p. 46-47)

Although membership of the CESI was not confined to teachers of particular subject disciplines, the majority tended to be from the Mathematics background since, as O'Shea explained, 'the majority of teachers with qualifications in Computer Studies tended to be Maths' (O'Shea, 1983, p. 22). This society aimed to promote the development of computer education in Ireland in a number of ways. Throughout the 1970s the society primarily focused its activities on providing training to members. This training was prioritised as it was felt that the development of teachers' computer skills was essential before 'any progress in computer studies would be possible' (*ibid.*, p. 22). These courses had a strong hands-on focus and were largely devoted to programming since schools rarely possessed their own computer equipment, as McKenna, Brady, Bates, Brick and Drury (1993) noted; 'computers were extremely expensive, not very powerful, and way beyond the financial resources of schools' (p. 29). In the summer of 1980, for example, over 300 teachers attended training provided by the society at a time when there was approximately 800 post-primary schools in the state.

Brady (1987) recalled that the introduction of the microcomputer in the late seventies placed computer systems in the reach of schools. O'Shea's comments from that time highlight the effect of this within schools;

The microcomputer arrived in Irish schools around 1977. It was a price and size and lack of complexity which made it attractive to schools. In the years that followed, many schools bought their own system as the time went on, we even heard whispers of schools which had two or three or up to six systems (O'Shea, 1983, p. 21).

A CESI secretary's report from 1977 also noted increased use noting that;

The most notable feature of the year has been the growth of computer hardware in schools in the Dublin branch area. At the time of writing six schools have either obtained or placed an order for a computer ... the resulting expertise and enthusiasm will enrich the entire CESI. Indeed we have already benefited from the willingness of the lucky schools to share their resources with others. (CESI,1998, p.1).

This growth, although significant in comparison to existing levels, did not have any major impact and computer use remained a peripheral activity. Computer use at this time depended on both the resources available to schools and committed enthusiastic teachers. O'Shea describes how 'early computer studies developed along the lines

not too dissimilar to the school Chess Club or Debating Society' (O'Shea, 1983, p. 20).

In addition to providing training to members and other computer enthusiastic teachers, the society also lobbied for the introduction of a national computer subject in the post-primary curriculum. From the late 1970s and into the early 1980s there appeared to have been a significant amount of pressure by the society and the computer industry to introduce a computer-based subject at post primary level. Writing in the Irish Times in 1980, the education correspondent noted that;

There has been a very strong lobbying action put on the department of education over the past few years to introduce a computer option or a computer studies course into the school programme. This has come from some people in the department, from the computer industry itself and from a very active and dedicated bunch of teachers who belong to an organisation called the Computer Education Society of Ireland (Murphy, 1980, p. 10).

Despite calls for a separate subject the Department of Education instead introduced an optional computer module in the Leaving Certificate Mathematics course in 1980. This development was planned as an initial step towards separate computer-based subjects in the curriculum. Explaining its rationale for this approach the Department of Education wrote;

A Computer studies module is being introduced into senior cycle classes in the school year 1980/81, but this is only the beginning. Courses in computer Studies will be introduced formally into the curriculum. The level structure and content of these courses and the provision to be made for them, will depend on the recommendations of the Advisory Committee on the use of computers at second level, set up by the Minister of Education. (Department of Education, 1980, p. 51)

The module did not have a set syllabus but schools opting to teach this module were required to submit a syllabus with the application form to the Department of Education. The syllabus was required to include issues such as: Careers in computing, structured diagrams, problem analysis and programming languages. This type of content was typical of the computer use in schools in the early years of the decade as the focus, at that time, was exclusively on learning about the new developing technology. While the CESI had a limited role in the design of this curricular initiative, it welcomed the development. Reflecting on its introduction a founding member of the society recalled the arguments made by the Department of Education;

a delegation was invited to an official meeting with Departmental personnel in October 1979...We heard of the plans for the "Leaving Certificate option," formalised not long afterwards and introduced for the academic year 1980-81. We had reservations about the fact that the option was to be part of the Mathematics course — CESI had done its best to de-emphasise supposed links between computer education and mathematics; but there was power in the argument that everyone takes Maths ... In any case, we were naturally delighted that Computer Studies was making an appearance in the curriculum. (CESI, 2008, p.1)

Continued growth of computer use in post-primary schools in the early eighties saw numbers and use increase. By 1981 there were over 600 computers across the over 800 post-primary schools. In June 1983 the Irish Times reported that through a bulk purchase by the Department of Education 37% of all post-primary schools were provided with a 64K microcomputer and a further 25% of schools had existing equipment upgraded. Yet, while computer resources were increasing, changes in syllabi did not ensue. Being an optional module, the computer-based section of the mathematics syllabus did not have any notable impact on computer use in post-primary schools. Towards the mid eighties several questioned its relevance. In 1983 O'Shea noted;

The computer studies option has now been in existence for three full years. No assessment has been carried out to determine its success or otherwise...the present computer studies option as part of Mathematics is in (some) cases, not being monitored at all. The teacher simply sends a list of names and in due course certificates are sent back to the school. (O'Shea, 1983, p.22)

In his critique of the status of computers in post-primary schools at that time O'Shea further argued that the optional computer module in Mathematics was originally intended to be a stop-gap measure while a full computer subject was developed.

Despite the introduction of a computer-based subject at Intermediate Certificate level (12 – 15yrs) in 1985 computer use remained optional and adoption was largely depended on teacher interest and school resources. Rinn's comments at this time sums up the opinions among computer enthusiasts at the time, 'what seems to be lacking at the moment is a fully worked out comprehensive and integrated national plan for computing in schools' (Rinn, 1983, p.25).

The Keyboarding stage

Within this policy vacuum Kelly (1985) noted 'there must be considerable variation throughout the country as to what is taught, by what methods and to whom' (p.158). While the most vocal interest groups, such as the CESI, called for a computer science subject an alternative use appeared to be developing in schools. A survey in 1984 of 215 schools by the Association of Secondary Teachers of Ireland (ASTI), the countries largest teachers' union, commented;

It is interesting to note the tendency to use, or to favour the use of, all kinds of applications packages, most particularly word-processing and educational software. This might represent a relatively recent shift of emphasis away from programming as the central feature of computer studies. (Breathnach, 1984, p. 17)

Breathnach concluded that teachers seemed to favour a broad course in computers that focused on computer literacy rather than the current computer options which had a strong emphasis on computer science. He further concluded that the concern with computer literacy may be 'at variance with the preferences of some of those who are prominent in the computer education movement' (Breathnach, 1984, p. 18).

Although the development of computer use up to this point leaned towards the introduction of a discrete subject the newly established Curriculum and Examinations Board (CEB), whose role was to oversee the design of new curricula, changed the course of its direction. The establishment of this partnership model of curriculum development placed the responsibility of the development of computer policy in the new board. It appeared to favour the integration of the computer across the curriculum in relevant subject areas. Evidence of this new approach was apparent in a 1987 discussion paper, which stated;

Information technology should be developed on a cross- curricular basis, and be manifest in every subject. Information technology should be an essential element of the learning experience of all young people throughout the period of compulsory schooling ... it is important that schools incorporate it into the everyday educational environment of their students (CEB, 1987, p. 17)

This policy led to changes in several curricula revised towards the end of the decade but these changes were confined to business and technological subjects, the rationale for its inclusion in these subjects tended to be on vocational rather than educational grounds. However, despite the introduction of computer elements in these areas no further curricular changes occurred.

A large-scale EU commissioned evaluation of the use of computers in second level schools was undertaken in 1993. The report was the first national study, which examined the levels of resources and use of computers in Irish post-primary schools. The research reported high usage of standard software applications including Desktop publishing, Word processing and CAD in informatics-type subjects. The report also found little emphasis on programming with few schools studying the Leaving Certificate option and little use of Computer Aided Software. It also found high usage of CAD software in Junior Certificate Technical graphics and estimated that second-level schools had an average of 16 computers which, for logistical and security reasons, were contained in a computer lab;

The norm for second level schools is to have a dedicated computer laboratory which is timetabled for specific groups at designated times. This is for organisational and security reasons but does not help to promote the integration and acceptance of computers as an ordinary aspect of school work. (McKenna et al, 1993, p. 56)

The report also found that many of the computers used by schools were 'poorly specified by today's standards' (*ibid.*, p. 46) and highlighted several barriers which were identified as affecting the adoption of IT, they included a shortage of funding, a lack of standardisation of equipment and a shortage of suitable software. However it also highlighted other barriers which were not resource related, it found that the lack of explicitly stated policy and the initial emphasis on programming greatly affected schools ability to develop resources and use in this area;

One major constraint has been the lack of an explicitly stated strategy for developing IT activities in schools. It is clear from the number of activities that have been initiated and supported by the inspectorate that the department of education implicitly favours the promotion of IT in schools but no definitive policy has been articulated. While the lack of an articulated policy has given

freedom to individuals to experiment, schools have found it difficult to develop and sustain their own long-term IT strategies in the absence of an overall guiding plan. (ibid., p.40 –41)

A further large-scale study conducted in 1995 by Drury revealed more detailed findings regarding resources and use. Drury found that schools had an average of 22 computers per school which were primarily located within PC cluster rooms. The research revealed that 33% of all usage was for Computer Studies/Informatics classes. Heavy usage was also reported in the Junior Certificate technology and business subjects where ICT was a mandatory element. The research concurred with the McKenna *et al* (2003) survey highlighting little use of computer aided learning. The findings also revealed that schools had begun to develop informatics courses in the absence of a national policy. These IT skills courses or applications-type courses predominantly focused on common computer applications software. Further case studies into the use of ICT by IT-rich schools in the Dublin area by Mulkeen in 1997 found that all schools taught IT skills courses (informatics) however the eight schools differed in the level the courses were targeted at. Some began teaching computers to students on entry to the school while others limited the courses to specific year groups. Mulkeen concluded that this type of use was the predominant use within the majority of schools examined. He further concluded;

Unfortunately in many schools IT appeared to be the preserve of the enthusiastic teachers. In some of the schools there are only a very small number of teachers involved. A few of the schools have made some efforts to provide training for the staff, but the reality was that in most schools IT is a minority activity, often driven entirely by one person. In some cases the area of specialism of the school reflects the personal interest of the school IT guru, rather than a wider view of the student's needs. (Mulkeen, 1997, online)

Three successive studies throughout the mid 1990s revealed that in the absence of a national policy computer use had evolved in schools to become largely confined to informatics classes. Little integration of IT existed in other subject areas with no educational use of IT within existing subjects despite the focus on integration outlined by the CEB over a decade earlier. This trend was recognised by the Department of Education;

*the fact that most usage of IT in post-primary schools occurs in informatics (i.e. classes timetabled as "computer studies" or similar) rather than in other subject areas, means that most study is **of** (emphasised in original) rather than **with** the technology. (Department of Education, 1996, p.4)*

The integration Stage

The third stage of ICT use in post-primary schools is marked by the launch of the Schools IT2000 initiative. In 1996 an International Data Corporation (IDC) report ranked Ireland in the third division in terms of its state of preparedness for the information age. Influenced by trends to integrate ICT in teaching and learning globally and fears about Ireland's economic competitiveness in a global information based society, the Department of Education and Science launched the *Schools IT2000* initiative in November 1997.

Ireland lags significantly behind its European partners in the integration of information and communication technologies (ICTs) into first and second level education. The need to integrate technology into teaching and learning right across the curriculum is a major national challenge that must be met in the interests of Ireland's future economic well being (Department of Education and Science, 1997, p.1)

The initiative aimed to ensure that all students achieved computer literacy and that teachers were supported in renewing skills which would enable them to integrate ICT in the learning environment. The initiative involved the distribution of IT resources to schools, the provision of IT in-service courses to teachers and the provision of support to schools through the establishment of the National Centre for Technology in Education (NCTE). The support also included the provision of regional IT advisers, the development of internet-based learning resources and the implementation of pathfinder projects to explore models of best practice.

The initiative significantly raised the profile of ICT in education across the country (Freeman, Hinostroza, Guzman, and Tangney, 2001). However towards the end of the decade the initiative appeared to lose momentum. Additional funding, announced two years after the launch of the initiative, was not distributed. In 1999 Trench (1999) commented, 'Schools IT2000 is in a hiatus ... Very little of the £81 million committed to the programme in late 1999, has been called down' (p.43). Two years later an editorial from the CESI journal in 2001 claimed that the project had "*run out of steam*" due to the departure of the previous Minister who spearheaded the initiative. Similar to Trench's observation the CESI noted;

... £81 million was allocated by the Government to continue the aims of Schools IT 2000. That sum appears to be lying idle since, with no sign of a plan to use it. In fact the year 2000 saw a slow down in training as money to continue the programme, already embarked upon, ran out and many teachers having been encouraged to seek ICT training found it no longer available to them ... neither the ICT advisors in Education Centres nor indeed the National Co-ordinators in the NCTE know if they will be in place after the coming summer. They do not know if their contracts will be renewed. This is the second time they have gone through this uncertainty in the last 12 months. It was almost the end of 2000 when they learned that the contracts were to be extended to August 2001 ... What kind of planning and policy making is possible in these circumstances? (CESI, 2001, p.1)

An evaluation of *Schools IT2000* was conducted in 2001. It reported substantial increases in IT infrastructure and computer use within schools. In addition it also found that a very high percentage (59%) of the teaching workforce had availed of the training offered. However the report also identified the need for a more clearly defined policy in relation to ICT. The findings also indicated that the use of basic software applications within informatics classes remained the predominant type of use. Comparable types of use was also found by O'Doherty *et al* (2000) in a study commissioned by the NCCA into the feasibility of introducing a computer based subject at Leaving Certificate level. The study reported that 80% of the schools offered a specific computer course. These courses included Computer Studies (28.7%), European Computer Driving Licence (ECDL) (24.6%), Introduction to

Computers (22.1%), and Information Technology (11.5%). While only 13% of schools offered no specific computer course. Similarly, research by Gleeson, O'Grady, McGarr, and Johnston (2001) into computer innovation in three IT rich post-primary schools, which was part of an international OECD study on the impact of ICT in teaching and learning, found that while there was some evidence of computer usage across the curriculum, the predominant use was in computer studies type classes and among teachers of technology and business subjects.

In December 2001 the new Minister for Education, Michael Woods, announced details of a new three-year plan which aimed to invest €109 million in ICT in primary and post-primary schools. Among the plans aims were to lower the computer/pupil ratio, develop the networking infrastructure in all schools, introduce broadband access, further develop teachers' skills and to develop multimedia resources for use in schools.

The most recent national census of ICT in schools was conducted in 2005. This found that ICT resources had increased in schools but the rate of increase had slowed from 2002. In 2005 the computer to pupil ratio in post-primary schools was 7 to 1 (falling from 16:1 in 1998; 13:1 in 2000; 7.5:1 in 2002 (Shiel and O'Flaherty, 2006)). The census also found that 56.7% were less than four years old suggesting that a significant amount of the resources from the initial Schools IT2000 initiative were still in use. In 2006 the NCTE reported that 96% of schools had been provided with broadband access.

Despite the relatively high levels of ICT resources reported at that time no further policy announcements were made throughout this time. The period from 2002 to the present saw a significant decline in ICT investment and general ICT activity in schools. A school principal, writing in the Irish Times, noted;

It is simply inexcusable that schools which should be preparing children for tomorrow's world have only a basic access to technology ... This sorry state has come about primarily because of a complete lack of policy and a funding strategy by the Department of Education to ensure the development of technology in our schools. There has been no direct investment in software and hardware in schools since 2002 ... This is a lifetime in terms of technology. Although most schools now have broadband, they are now forced to use clapped-out computers, many of which cannot access the information superhighway (Monaghan, 2006, p. 14)

In February 2007 the Minister for Education and Science announced the allocation of €252 million for investment in ICT in education over a 6-year period. At the time of writing a strategy group was appointed to advise the minister on areas of priority.

Discussion

The policy vacuum

According to Buettner (1997) the use of computers in education in several countries has followed a distinct pattern from a focus on programming and computer technology (The Techno ghetto stage) to a focus on basic applications and

keyboarding skills (the keyboarding stage). The most recent focus, reflected in the aims of the *Schools IT2000* initiative, has shifted towards an emphasis on the integration of ICT in teaching and learning. This third focus is reflected in a global push to integrate ICT across curricula in most education systems. While it appears from policy documents and national initiatives that computer use in Ireland has followed this path, on closer analysis the reality of its use in schools is different. Rather than being guided in a specific direction, the use of computer technology has instead evolved within a policy vacuum. The various policy nudges throughout the past three decades have had limited impact on the nature of its use. Only within subjects where an ICT component plays a part in state examinations has it become commonly used, however this use tends to be learning about the computer than learning with it. The predominant use of the technology lies within discrete informatics subjects. Being devised and constructed within schools suggests that this use is deeply rooted. Even after the launch of the *Schools IT2000* initiative, the most significant ICT initiative in the state, the use of the technology within schools largely remained unchanged. For example, research by Mulkeen (2002) evaluating the use of ICT in Irish schools following the *Schools IT2000* initiative, found that it had only a minor impact on use within schools. His research found considerable variation in the use of ICT in post-primary schools, which he attributed to 'the absence of clear guidelines or regulations about how ICT was to be used' (p.3). In his analysis he noted that within this policy vacuum the use of the technology in the schools reflected the attitudes and beliefs about ICT within schools.

The absence of clearly defined national policy has been an ongoing problem in Irish post-primary education since the initial use of computer technology almost 30 years ago (Rinn, 1984; Kelly, 1985; McKenna *et al.*, 1993; NCCA, 1993; Mulkeen, 2002). As the historical review has shown, ICT in schools is typified by short-term initiatives. These initiatives tend to 'tinker with the edges' having limited impact on mainstream education since adoption is optional. In addition, since they have no association with state examinations, which largely determine what is taught and how it is delivered, schools do not adopt them. The lack of long-term planning is a feature of the Irish education system. According to Gleeson *et al.* (2001) the adoption of 'pet projects' by ministers has been a feature of various administrations over the past 15 years. However, as the OECD noted as far back as 1991 'most ministers have held office for too short a time to grow into the post let alone to initiate long-term strategic plans' (p. 39). At the time of the *Schools IT2000* initiative a new minister had been appointed. In September 1997 the Irish Times noted;

At 37 the new Minister for Education is the Cabinet's youngest member. Micheal Martin has the energy and idealism of a young politician still untouched by the cares and hard-won compromises of office ... Computer literacy, another Programme for Government commitment, is a key area for the new Minister (Irish Times, 1997)

Yet within three years a cabinet reshuffle saw a new minister take office, with different priorities the emphasis on ICT declined. In this environment, typified by short-term initiatives with little concrete direction for schools, the use of the computer technology remains predominantly within discrete informatics subjects far removed from the use presented in the media. This gap between the rhetoric and the reality is not unique to the Irish context. Ottesen (2006) notes that there seems to be a

considerable gap between intentions expressed in educational policies and the use within schools. Research by Hayes (2007) for example found that teachers were largely incorporating computers into their existing practices. Commenting on the ImpaCT2 evaluation of ICT use in UK schools Somekh (2004) notes;

Had ImpaCT2 asked students about their use of computers in specialist ICT lessons the answers would have been different, because there was considerable evidence that ICT was being used by schools mainly to teach ICT skills. This is, in itself, a disturbing finding, particularly as the evidence suggests that much of this use in ICT lessons is for teaching low-level skills such as how to use office software (p. 167)

What makes the Irish situation unique however, is the absence of a national syllabus for the provision of basic ICT skills in discrete informatics-type subjects. In this context, schools devise their own syllabi for such programmes or purchase ‘off the shelf’ accredited programmes such as the ECDL. It is unknown as of yet what the long-term effect of these successive ‘short burst’ initiatives will have on schools’ willingness to participate in future ICT initiatives but it is reasonable to suggest that future initiatives may be treated with a level of scepticism.

ICT specialists within schools can also play a conserving role. Since their initial introduction into schools the direction of ICT has tended to be influenced by a small community of computer enthusiasts. Speaking about the use of technology in schools a decade ago Goodson (1998) claimed that a small group drove much of the debate surrounding the use of ICT in schools with little consultation with the wider education community. The same is true of the Irish context where mathematics teachers drove initial interest in computers. Their calls, along with representatives of the computer industry, for the introduction of an independent computer subject throughout the late 1970s and early 1980s did not appear to be congruent with the actual use that was emerging within schools. At that time schools appeared to favour a skills-based subject with a focus on basic software applications rather than the computer science option promoted by the CESI. A decade later, despite the significant investment and profile of the *Schools IT2000* initiative, which aimed to integrate ICT across the curriculum, there remained a focus on ICT skills subject within schools (Gleeson *et al*, 2001; O’Doherty *et al*, 2001). Indeed throughout its use within schools there has remained a significant difference between the aspirations and wishes of ICT enthusiasts and Industry and the actual use within schools. The role of informatics teachers is quite significant in this context. Being teachers of discrete informatics subjects they are unlikely to fully support initiatives that encourage the use of ICT across the curriculum, which could ultimately erode the status of their specialist knowledge and the need for their specialist subject (McGarr and O’Brien, 2007; Kennewell, Parkinson and Tanner, 2000; Galvin, 2000; Goodson, 1998). As the computer specialists within their schools, they strongly influence how ICT initiatives are realised. Without guidelines it is inevitable that the realisation of such initiatives will have a minimal affect across the curriculum and instead are used to meet the needs of existing use. As far back as 1984 Mackey (1984) noted this cultural influence;

To many educators the arrival of the computer signifies just another subject to be taught. It is natural, I suppose, when we have spent our lives, both as

pupils and teachers, in a curricular and examination based system, that we tend to think within the narrow confines of that system (p. 5)

A contributing factor to the absence of a national policy was the economic circumstances of the country that prevailed throughout the 1980s and for a significant part of the 1990s. These financial constraints prevented the introduction of compulsory ICT initiatives since the curricular changes would involve substantial investment.

Conclusion

The exploration of the development of computer technology/ICT in the Irish post-primary system has been a valuable exercise highlighting the interaction between ICT initiatives and the prevailing ICT use in Schools. Having traced the development it is apparent that, despite the wishes of different interest groups and the aims of different curricular initiatives throughout the previous three decades, the nature of ICT use was ultimately constructed within schools to meet their needs and interests. This resulted in the emergence of ICT as a discrete subject. Although the recent *Schools IT2000* initiative focused on the integration of ICT across the curriculum it had little impact on changing use of ICT in discrete informatics subjects. More recently the absence of ongoing investment has also had an affect on the integration of ICT in schools. Much can be learned from this investigation, some of the key issues include:

- Given the conserving influence of the prevailing ICT use it is unlikely that the recent announcement of future investment in ICT in schools will have any significant effect across the curriculum and instead may play a role in preserving its use within existing discrete subjects.
- It is evident from this investigation that future ICT policy needs to be cognisant of the past, particularly in relation to how national ICT initiatives are mediated within schools and the powerful influence of existing uses of the technology on external ICT initiatives.
- In recognising the failures of past initiatives future initiatives should not be presented as ICT initiatives but instead as initiatives in teaching and learning with relevance for all teachers.

In addition, other aspects will aid the integration of ICT in the future. The proliferation of ICT in society, for example, will aid this transition from ICT as a technology to be studied to one that plays an important part in the learning across the curriculum. As the review has shown, changes in ICT use are often more incremental than sudden and significant systemic changes are required before more integrated ICT use can occur.

The extent to which ICT is integrated for the promotion of teaching and learning will greatly depend on cultural and structural changes in the broader context of Irish education (Gleeson et al, 2001, p. 7).

Bibliography:

- Baek, Y, Jung, J., & Kim, B. (2008). What Makes Teachers Use Technology in the Classroom? Exploring the Factors Affecting Facilitation of Technology with a Korean Sample. *Computers & Education*, 50, 1, 224-234.
- Brady, M. (1987). Computers in Secondary Schools. *COMPASS*, 16, 1, 46 - 53.

- Breathnach, P. (1984). Computer Studies Survey, *ASTI journal*, 14 -18
- Buettner, Y. (1997). In-service teacher education - a way to integrate information technology into secondary level curricula, In: Passey, D. & Samways, B. (1997). (Eds) *Information Technology : Supporting change through teacher education* London: Chapman and Hall.
- CEB (1987). *Science, Technology and the Post-Primary School*. Dublin: Curriculum and Examinations Board.
- CESI (1998). Those were the days – 21 years ago. *CESI Newsletter* (Spring 1998). URL: Retrieved online 20/01/08 at: <http://ireland.iol.ie/~cesi/spring.htm>
- CESI (2001). Schools IT 2000 - Where to now? *CESI Newsletter*, May 2001. URL: Retrieved online 20/01/08 at: <http://www.cesi.ie/news/newsmay2001.html>
- CESI (2008). History So Far - Recollections of a Founder Member. Retrieved online 20/01/08 at: <http://www.cesi.ie/about/history.htm>
- Cohen, L. , Manion, L. & Morrison, K. (2007). *Research Methods in Education* (6th edition), London, Routledge
- Department of Education (1980). *White Paper on Educational Development*. Dublin: Stationery Office.
- Department of Education and Science (1996). *Submission to the Information Society Steering Committee*. URL: Retrieved online 18/05/01 at: <http://irlgov.ie/educ/publications/243a33a.htm>
- Department of Education and Science (1997). *Schools IT 2000. A Policy Framework for the New Millennium*. Dublin: Department of Education and Science.
- Donovan, L., Hartley, K. & Strudler, N. (2007). Teacher Concerns During Initial Implementation of a One-to-One Laptop Initiative at the Middle School Level. *Journal of Research on Technology in Education*, 39, 3, 263-286.
- Drury, C. (1995). *Implementing Change in Education: The Integration of Information Technology into Irish post-primary schools*, Unpublished M. Sc. Thesis, University of Leicester.
- Ertmer, P. (1999). Addressing first- and second-order barriers to change: Strategies for technology integration. *Educational Technology Research and Development*, 47, 4, 47-61.
- Ertmer, P. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational Technology Research and Development*, 53, 4, 25–39.
- Freeman, E., Hinojosa, J., Guzman, A., & Tangney, B. (2001). *Policy and Evaluation: An ongoing international cross-analysis*. Unpublished paper, ITTE Conference, Swansea, July 2001.
- Galvin, C. (2000). *Sharing innovative practice The NCTE's Schools Integration Project 1998-2000*. Proceedings of the Schools Integration Project Symposium, Portmarnock, Dublin, December 2000.
- Gleeson J., O'Grady, D., McGarr, O. & Johnston, K. (2001). *ICT and School improvement: Executive summary for Ireland*, OECD/CERI ICT PROGRAMME.
- Goodson, I. (1998). *Subject knowledge: readings for the study of school subjects*. London: Falmer.
- Hayes, D. (2007). ICT and learning: Lessons from Australian classrooms. *Computers & Education*, 49, 2, 385-395.

- Hennessey, S., Ruthven, K., & Brindley, S. (2005). Teacher perspectives on integrating ICT into subject teaching: Commitment, constraints, caution and change. *Journal of Curriculum Studies*, 37, 155–192.
- Higgins, S. & Moseley, D. (2001). Teachers’ thinking about information and communications technology and learning: beliefs and outcomes. *Teacher Development*, 5, 2, 191-210.
- Irish Times (1997). *Martin’s Way*, 2nd September 1997
- Kelly, J. (1985). The curricular impact of “Computers in Education”. *Irish Educational Studies*, 5, 1, 156 – 168.
- Kennewell, S., Parkinson, J. & Tanner, H. (2000). *Developing the ICT Capable School*. London: RoutledgeFalmer.
- Levin, T. & Wadmany, R. (2005). Changes in educational beliefs and classroom practices of teachers and students in rich technology-based classrooms. *Technology, Pedagogy and Education*, 14, 3, 281 – 307.
- Levin, T. & Wadmany, R. (2006). Teachers’ Beliefs and Practices in Technology-based Classrooms: A Developmental View. *Journal of Research on Technology in Education*, 39, 2, 157-181.
- Loveless, A., DeVoogd, G. & Bohlin, R. (2001). Something old, something new... Is pedagogy affected by ICT? In: A. Loveless and V. Ellis (Eds) *ICT, Pedagogy and the Curriculum* (pp 63 – 83) London and New York: RoutledgeFalmer.
- Mackey, B. (1984). Computer literacy- A modular approach. *Education Ireland*, 1, 3, 5-7.
- May, T. (2001). *Social Research: Issues, methods and process* (3rd Edition), Buckingham: Open University Press.
- McGarr, O. & O’Brien, J. (2007). Teacher professional development and ICT: an investigation of teachers studying a postgraduate award in ICT in education. *Irish Educational Studies*, 26, 2, 145-162.
- McKenna, P., Brady, M., Bates, P., Brick, J. & Drury, C. (1993). *New Information Technology in the Irish School System*. Luxembourg: Office for Official Publications (EC).
- Mulkeen, A. (1997). *Information Technology in Irish Schools*. URL: Retrieved online 18/05/01 at: <http://www.may.ie/academic/education/SchoolsIT/index.htm>
- Mulkeen, A. (2002). What can policy makers do to encourage integration of information and communications technology? *Technology, Pedagogy and Education*, 12, 277-293.
- Murphy, C. (1980). Preparing for Technology. *Irish Times*, 8th October 1980.
- NCCA (1993). *Education and the New Technologies of Information and Communication*, Discussion Paper. Dublin: NCCA.
- O’Doherty, T., Gleeson, J., Moody, J., Johnston, J., Kiely, L., & McGarr, O. (2000). *An investigation into the interest and feasibility of introducing and computer-based subject to the established leaving certificate programme*. Report commissioned by the National Council for Curriculum and Assessment.
- O’Shea, F. (1983). Computers in Schools. *Education Ireland*, 1, 4, 20-26.
- Ottesen, E. (2006). Learning to teach with technology: authoring practised identities. *Technology, Pedagogy and Education*, 15, 3, 275-290.
- Provenzo, E., Brett, A. & McCloskey, G. (1999) *Computers, curriculum, and cultural change: An introduction for teachers*, Mahwah, New Jersey.
- Ringstaff, C. & L. Kelley, L. (2002). The learning return on our education technology investment: A review of findings from research, WestEd, San

Francisco. URL: Retrieved online 20/01/08 at:
<http://www.wested.org/cs/we/view/rs/619>.

- Rinn, S. (1983). Is there life beyond computer studies? *Education Ireland*, 1, 1, 25-26.
- Scott, J. (1990) *A matter of record*. Cambridge:Polity Press.
- Shiel, G. and O'Flaherty, A. (2006). NCTE 2005 Census on ICT infrastructure in schools. Report prepared for the National Centre for Technology in Education by the Educational Research Centre, St Patrick's College, Drumcondra, Dublin 9. URL: Retrieved online 07/04/08 at:
http://www.ncte.ie/documents/NCTE_2005_Census_on_ICT_Infrastructure_in_Schools.pdf
- Somekh, B. (2004). Taking the sociological imagination to school: an analysis of the (lack of) impact of ICT on education systems. *Technology, Pedagogy and Education*, 13, 2, 163 – 179.
- Trench, B. (1999). Computers in the Classroom; a Question of Control. In: *Education in the 21st Century (97-112)* Dublin: Oak Tree Press.