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The Introduction of Computers in Irish Schools

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Abstract. This chapter is a reflection on the introduction of computers and computer education in schools at primary and secondary level in Ireland. It is based on a review of the policy documents from that time and a series of interviews with teachers who were involved in the early stages of the use of computers in schools during the late 1970s, 1980s and 1990s. The use of computers in schools has developed over those last forty years, this is s reflected in Irish Government policy and is referenced.

Keywords: computers in education, ECDL

1. Introduction

This chapter discusses the early days of the use of computers in Irish schools and contains anecdotes from people involved in computing in those early days. Teachers involved in the introduction of computing were interviewed. The interviewees were asked to describe their experiences with introducing computers into schools and in teaching using technology. The finance available for computers and the role of parents in funding the early adopters were examined.

The European Computer Driving Licence (ECDL) was created by a European Esprit project which started in 1995 and resulted in the launch of ECDL in 1997 [1]. Pilot studies were run in Ireland in 1996 and the concept was introduced to the Irish Minister for Education. Initially the ECDL was not considered suitable as a module to be presented in schools, however today ECDL is used in more than 50% of secondary schools.

The Irish Department of Education and Skills [2] is introducing a new Junior Cycle Curriculum in 2014/2015 which has been created by the National Council for Curriculum and Assessment. This defines six key skills as follows; Managing Myself, Staying Well, Communicating, Being Creative, Working with Others, and Managing Information and Thinking. It is interesting to note that working with digital technology is seen to be an integral part of each of the skills.

2. Policy

The report *Computers in Ireland* [2], which was published in 1971, proposed that a national IT strategy should be developed by a newly created Central Computing

Council. The report identified 'training and education' as an area which needed attention. This training was described as being needed for management and computer specialists and would assist in understanding the potential of the computer. In 1971 computer studies had not been introduced into primary or secondary level education. Trinity College Dublin installed its first computer in 1962, an IBM 1620, and began offering computer courses in 1965. The first undergraduate degree programme in Computer Science began in Trinity College in the late 1960s [4].

The Irish Government set up the Industrial Development Authority (IDA) as an autonomous state-sponsored organization in April 1970 [5]. The brief of the IDA was the furtherance of industrial development in Ireland. This was very new for Ireland as it had always depended on agriculture and the perceived wisdom was that there were no natural resources in Ireland and that industry was very weak. The IDA carried out extensive promotional programmes worldwide and provided grants and other financial incentives to attract new and existing manufacturing and technical service industries. It provided training grants towards the costs of training workers and in general provided an environment conducive to Industrial Development and in fact attracted many industries to Ireland.

The IDA promoted the electronics industry in Ireland and by the late 1970s this industry was seen as an area of great potential growth. Initially the IDA attracted computer component manufacturers; this was followed by the mainstream computer manufacturers. Eventually these assembly type operations moved to lower cost areas of the globe and the IDA set about attracting the newly developing software industry to set up in Ireland. It was against this background of Government Policy that the initial consideration of education in computing began in Ireland in the early 1970s. At that time there were mainframe computers and mini computers in business, but access to computing was rather expensive for schools. In most cases, it was beyond the resources and finance available in schools. However, some enthusiastic teachers became interested in computer programming and borrowed time on computers belonging to local businesses, local authorities or universities. Programs were usually recorded on punched cards and compiled or assembled in batches on the available machines. It was a slow and cumbersome process as compared to the methods used today. This gave much valuable experience to the small group of enthusiasts and indeed the beginnings of a group named the Computer Education Society of Ireland (CESI) started in 1971 [6]. This was a group of teachers and academics who set the group up with an affiliation to the Irish Computer Society; the latter had been founded in 1967 [7].

Today Ireland is recognised as a major hub for ICT companies with nine of the top ten US companies having a presence in the country. Some of the largest ICT companies such as Intel, Microsoft and Google have major centres located in Dublin.

3. The Introduction of Computers in Irish Schools

The need for teacher training was recognized as being a necessary initial step towards the introduction of computing in schools. Summer courses in computing for second level teachers were introduced by the Department of Education in 1971. These were

one week courses during the summer holidays. The early courses were geared towards programming in BASIC, COMAL, PASCAL and LOGO [8].

Primary school teachers started involvement in IT education in the early 1980s. The Curriculum Unit of the Department of Education established a pilot project in 1984 [9]. This project was a major curriculum development initiative which had the aim of exploring possible uses of computing as it was available at the time. Thirty four schools took part in the pilot project. One of these schools was Taney Parish Primary School where one of the authors is currently Chairman of the Board of Management.

The colleges of education and the universities also provided in-service education in computing. There were a number of diploma courses in 'Computers in Education' available as well as shorter courses. By 1992 over 1,000 teachers had completed diploma courses provided by various colleges.

3.1 The Growth of Computers in Schools

In 1982, in discussing 'Tomorrow's Classrooms' [10], the inventor of the programming language Logo, Seymour Papert, stated: "*In this written chat I use a series of encounters between children, computers and powerful ideas to build up a dream about how children might one day learn*." Ireland has been moving along this track. In a report 'New Information Technology in the Irish School System', which was published in 1992, the growth in the use of technology in Irish schools was examined and the following results were documented [8]:

1. The children in Primary Schools gained many benefits from interacting with computers and that computers were helpful in dealing with individual educational needs.
2. It was found that children with mild mental handicap gained from their experience in using a computer.
3. Teachers working with visually impaired children found that most software packages were too highly visual.
4. Children with profound hearing impairment were found to be motivated by using a computer.

A computer studies module was introduced into the Leaving Certificate examination in 1980 as part of the mathematics syllabus. The module was optional and was monitored separately from the main mathematics course. A computer studies syllabus was introduced in 1985 into the Junior Cycle Curriculum. There was no formal examination although sample examination papers were provided to indicate the depth of knowledge expected. The technical drawing syllabus required the students should have an awareness of the developments in computer graphics. Computers were also mentioned in the Physics syllabus.

3.2 Some Experiences

Discussions were held with teachers from several schools. The experiences of three of these schools are described in three minor 'case studies' below; general comments

from other teachers follow the case studies. From these discussions, it became clear that the schools that were successful in introducing computing to schools invariably had a teacher who was interested in technology. This was not always the science or the mathematics teacher, but could be anyone with this interest. The examples below are fairly typical of what happened in many schools during the 1980s:

Case Study 1: Taney Parish Primary School

Taney Parish Primary School, located in south Dublin, is one of the larger national schools in the Republic of Ireland, with 446 pupils. There are 21 class teachers and the staff includes a further 14 staff providing various extracurricular activities. In March 1984 a teacher representative to the Parent Teacher Association (PTA) proposed that should the parents be willing to assist with fund raising then the teachers (18 in all at that time) would prepare themselves to introduce the topic in the classroom.

By the end of June 1984 the school possessed 2 BBC Model B microcomputers with associated hardware and a little software. In September 1984 the school was selected to participate in the pilot project 'Microcomputers in Primary Education' set up by the Department of Education [11]. By March 1985 the school had 3 BBC computers, together with an Amstrad CPC 464 and an Atari 800.

By this time all the teachers had taken an introductory course in computers and they decided to organise an open day where parents could see what their children had been able to achieve with the computers. In addition a computer club was set up so that those enthusiastic pupils (and teachers) could pursue their interest outside school hours. The success of the introduction of computers to the school was greatly assisted by very enthusiastic and generous parents.

A report prepared in 1985, made available by one of the interviewees, outlined the results of the pilot project and contained the following comments from pupils [12]

1. *"My opinion of computers is mixed, they can be a great help and a great nuisance"*
2. *"Some boys and girls don't have computers and have never seen them. In Ireland I think there should be a course for kids and adults. My Dad only knows how to load a disc and do a few programmes for the Apple, whereas I can do graphics, sound, music and so on. If there were no computers in school I wouldn't know anything about them and I'd feel a bit old-fashioned"*
3. *"I think computers are good because you can have fun learning, not like class, which is sometimes boring"*
4. *"If computers went away there would be no fun anymore"*

In 1994, a local benefactor gave a large donation to the school which was used to set up the first dedicated computer room. This room was equipped with 10 Apple computers and all classes had an opportunity to spend time using this facility.

In the late 1990s the discussion about the relative merits of PCs versus Apples gained traction. While grants from the Department of Education were used to buy more Apples when it came to updating the facilities and moving to a bigger and better computer room the pressure from the parents, who were providing the funds, came down in favour of the PC. Today the school is fully networked and all classrooms

have interactive whiteboards and all teachers have laptops. Some of the resource teachers who deal with special needs children also use iPads.

Case Study 2: Newpark Comprehensive School

Newpark Comprehensive School was established in 1972 [13]. In 1981, the Irish Department of Education decided that second level schools should have access to a computer and if there wasn't one already in the school, they would provide one. Newpark requested and were granted an Apple II. When this was delivered the box was put in a small room beside a science laboratory. While it was given to the Mathematics department in the school, only one of the teachers was interested. One of the senior mathematics pupils was aware of the computer and requested to be allowed to use it. The computer was set up and was made operational due to the knowledge and enthusiasm of the mathematics teacher and the interested pupil.

In due course, the PTA (Parent Teacher Association) became interested and bought about a dozen Apple IIs or maybe IIes. The school provided a large room at the top of a Victorian house adjacent to the mathematics teaching room. As the Apple IIs became obsolete, again the PTA became involved. This time, many of them being in business and more used to IBM PCs, they insisted on going for the PC platform. Although teachers felt the Apple system was more user-friendly but the Parents were paying. In fact, one of them later confessed that the teachers had been right. As it turned out, the PCs soon moved on from needing to know DOS to operate them. This time the school converted what had been the Language Laboratory for use as a computer room. Again this was located adjacent to the mathematics teaching room.

The Department (of Education) introduced a one-year diploma course in Computers as part of the Leaving Certificate for Fifth Year students. That was taught for many years, concentrating on programming. Later, encouraged by Trinity's Spin A Web competition, the teaching included building a website. The school also included a 10-week computer module into Transition Year. For that the focus was on using a word processing package to develop their CVs.

Case Study 3: Dundalk Grammar School

The Principal of this school has a particular interest in developing information technology in schools and prior to holding his current position he was on a number of advisory committees making recommendations to the Irish Department of Education. He did not restrict his expertise to Ireland but also contributed to Educational development in Canada, Cyprus, Estonia, Lithuania and the UK. He carries on his deep interest in ICT in Education in his current role and the computer facilities in Dundalk Grammar School are very impressive.

Although the early technology was from Apple, this changed when the parents became involved in fund raising and decision making. The Principal noted that it was not always the mathematics teacher that was involved but in some cases chemistry. The main driver was the enthusiasm of the individual teacher. The PC versus Apple debate has been solved by having two computer laboratories, one for Apple and one for PCs. In addition there is a computer graphics laboratory for woodworking design, and even a 3D printer. Dundalk Grammar School is very involved in technology and competitions involving technology; they won the F1 in schools competition in 2010

and 2011. This is a competition to design and build the fastest racing cars powered by compressed air. It is sponsored by the Irish Computer Society.

Other Anecdotes

Other teachers discussed the progress made during the 1985s and 1990s. The following list contains some of the experiences:

1985 – There was a course for primary teachers in Applesoft Basic.

1986 – School used an electronic typewriter with word processing capabilities, had an 11 character display.

1990 – School of 900 primary pupils had 4 BBC Micro Computers, 2 Acorn computers were added, using the RISC OS, eventually the BBCs were retired and school had 6 Acorns. These had no hard disk and were booted by a 3 ½" floppy disk. Major use was by the 'Remedial' teacher. The office also had a computer and an early version of Facility as a student database.

1991 – School had: Hardware – IBM compatible (an XT), amber screen, Double 5¼" floppy disk drive, Black and white printer, continuous feed paper. Software – Wordstar, Letterex (to modify fonts and styles), a label generator, Print Shop to make banners and posters.

1992 – Purchase of first PCs, Additional software: MS Works, Type to Learn, Serif PagePlus desktop publisher.

In the mid-1990s, the Irish Department of Education supplied every school with a Gateway computer - many boxes remained unopened for months, and most ended up in the office for occasional use. Schools also got a modem and one extra telephone line for a dial-up connection to the internet. The 'holy grail' was an ISDN line.

In the late 1990s, Tesco launched a 'Computers for Schools' project. A voucher was given by Tesco for every pound spent in the store. Parents collected these and the schools used them to get free computers.

4. ECDL

The use of technology was becoming more common in business and even in the home in the early 1990s. The World Wide Web was beginning to be used and the Worldwide Web Consortium (W3C) founded in 1994. At this time, there was concern in the European Union about the lack of computer skills for all European citizens, acknowledging that these skills were needed to take advantage of potential opportunities and to minimise the risks of the new technologies [14].

4.1 ECDL History

The Council of European Information Processionals (CEPIS) set up a project in 1995 to define the skills and knowledge needed to examine how to raise IT skill levels in industry in Europe. At first, the CEPIS team consisted of Norway, Finland, Sweden, Denmark, and Ireland. An extended project team, consisting of the original countries

plus representatives from Austria, France, Italy, The Netherlands and United Kingdom, came together to develop the initial work and the concept. This task force looked for a skills model or syllabus definition [15].

The Finnish Computer Driving Licence had been introduced in Finland in 1988 and by the end of 1994 had been achieved by 10,000 people in Finland. The CEPIS project team examined the Finnish CDL and other skills' definitions in detail. There were similarities between the different definitions; some consisted of an outline syllabus and some consisted of tests. The Finnish model consisted of theoretical and practical tests, in seven modules. Having completed all seven modules and having passed all tests, a candidate would be given a certificate called the 'Computer Driving Licence'. The project team decided to update the Finnish CDL, develop it further and to create a syllabus.

In order to evaluate the changes made to the Finnish set of tests and to assess whether other changes were needed, pilot tests were carried out in Norway, Sweden, Denmark, France and Ireland. The project team decided to name the certification, 'the European Computer Driving Licence' or 'ECDL'. The task force created the first syllabus, re-structured and updated the questions and defined ECDL, similar to the Finnish model, as a seven-module set of skills and competencies. Module 1 was a theoretical module and modules 2 – 6 were skills based. As not every country had Internet access at the time, Module 7 was created as a theory or a practical test. Guidelines for test administration and quality assurance requirements were defined.

In order to obtain an ECDL, a candidate had to pass seven modules. As each test was passed, a 'skills card' was updated. This card could be used as proof of a specific skill and could be exchanged for a full ECDL when all seven were completed. The ECDL Syllabus version 1 was published in October 1996 and was launched in Sweden. It was planned that the Syllabus would be updated once per year.

The support of the European Commission helped the development and acceptance of ECDL. Funding was made available through the European Social Fund and Commissioner Martin Bangemann included ECDL in the Information Society Action Plan in 1994. Outside Europe, countries began to recognize the value of ECDL. In 1998, South Africa launched ECDL as the International Computer Driving License (ICDL) and presented the first ICDL to a young girl in Port Elizabeth in 1990 [16]. ECDL and ICDL are the same and adhere to the same syllabus, quality assurance standards and testing methods.

4.2 ECDL in Schools

As ECDL became more popular in Europe, many schools in Europe decided to examine ECDL, recognizing that the skills defined within ECDL were necessary for all people. In 1997, Martin Bangemann stated in 'The Information Society and the Citizen' that "greater efforts were needed in schools to prepare the next generation to participate and benefit fully from the Information Society" [17]. He said that it was vital to encourage European citizens "to create new services in education, entertainment and business in order to keep Europe at the forefront of technology" and that "greater efforts must be made in our schools, to prepare the next generation to participate and benefit fully".

Initially, ECDL was not accepted in schools in Ireland. The Minister for Education said, in 1996, that it was not appropriate at that time to be incorporated into a school syllabus. However, this has changed; in Ireland ECDL is offered in approximately 50% of the schools [18].

4.3 Issues for Teachers

Schools have progressed from the days when one computer was available in schools, to the expectations a student will have in this Information Society. As the European Commission stated in 2000, 'learning to use technology' and 'learning to learn' with technology is necessary for today's students, who need access to technology and need to know how to use technology [19].

Teachers can help if they are trained to teach the technological skills required. This has been recognized for almost twenty years. Martin Bangemann [20] stated "Preparing Europeans for the advent of the information society is a priority task. Education, training and promotion will necessarily play a central role". It could be argued that he was saying that teachers should be rewarded for obtaining technical skills and that they need to continue to develop skills with ever changing technology. Awouters et al. [21] believe "Teaching and learning with ICT requires specific competencies for teachers and lecturers" and "using a Virtual Learning Environment like Blackboard or Moodle demands more didactical than technical skills". Teachers need to understand technology, to use technology as a pedagogical tool, and perhaps, to teach programming or use of IT applications. Teachers should look at the use of technology as a teaching methodology. John & Wheeler [22] discussing the needs of learners in the classroom identify the change that technology brings - "There is a need, for example, for students to engage with digital media in a number of ways, transcending those which are required to learn from paper-based text or images".

5. Summary

The teaching profession took a leading role in the introduction of computers into schools in Ireland in the 1980s. This was supported by the parents and the Government. Government grants were often the starting point of initiatives but fund raising by parents generated the resources which allowed for widespread adoption. There were, however, a number of perceived constraints to the adoption of IT, these were;

1. The lack of a clearly stated policy by the Department of Education. There were many separate initiatives but each school was open to follow different directions.
2. The lack of funding was another constraint. When funding was available it was insufficient to provide adequate hardware and software to make a real impact. Thus, parents had to bridge the gap. This was workable in some schools but not in others.

3. The lack of standards was another constraint. Schools were faced with an ever growing number of computer manufacturers with a variety of software. There were no guidelines and this inhibited certain schools which were unwilling to invest for fear of ending up with equipment which was not approved by the Department of Education.
4. The initial concentration on programming led to disillusionment for some teachers. The lack of software in the early days made it inevitable that to use the hardware the teachers had to program. While most teachers took courses, only a proportion was suited to programming.

However, in spite of the above constraints the use of computers in the classroom in Ireland has developed and in a report produced in 2012 by European Schoolnet and University of Liege [23] it was stated that the students benefit from an infrastructure and a level of connectivity which are close to the EU27 (as it was then) mean. This same report also noted that the use of ICT by teachers is considerably above other countries; their level of confidence in using ICT is high.

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