

**“A Snapshot of ICT use at Second Level
10 Years after IT 2000”**

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Submitted to the University of Limerick, April, 2010

Declaration

"I hereby declare that this is entirely my own work and that it has not been submitted for the award of any degree at any other university."

Signed _____

Abstract

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“A Snapshot of ICT use at Second Level 10 Years after IT 2000”

It is generally agreed that ICT influences most aspects of life today. Wise use of technology is a great support to teaching and learning. This research project examined how ICT is currently integrated into second level education to see what progress has been made in implementing DES initiatives since the launch of *IT 2000*.

A review of literature pertaining to contemporary pedagogy, technology and language teaching was undertaken as a preliminary step. A mixed methods case study was then carried out in one large secondary school to investigate the attitudes, perceptions and practice of teachers with regard to ICT integration. Quantitative data was obtained from an online survey and this was complemented by qualitative data from a review of school documentation, IT diaries, interviews and record keeping.

The study examined integration by teachers of all subjects focusing in particular on the use of ICT by language teachers, including teachers of Irish. It also researched the factors which influenced teachers to integrate technology. Research carried out in this study was of benefit to individual teachers, to the school in general and to language teachers in particular. The project raised the profile of ICT use in the school, promoting discussion and teacher collaboration.

The study found that *IT 2000* and subsequent Government interventions have impacted on education. A majority of the case-study teachers are integrating a variety of technologies but integration by teachers of Irish is below the average for all teachers. Although the principal has been instrumental in facilitating ICT integration by providing resources and planning for integration, some barriers still exist. The study concludes by making recommendations to overcome these barriers.

Acknowledgements

This thesis would not have been completed without the help, support and guidance of a number of people.

I would like to thank Ms. Maureen O'Brien, my supervisor, for her help and guidance over the past year. It was greatly appreciated.

To the Principal, Board of Management and teachers who facilitated and contributed to the research in many ways, I am very grateful.

To all my family and good friends, for your patience, encouragement and support – thank you.

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List of Abbreviations

BECTA (Becta)	British Educational Communications and Technology Agency
CERI	Centre for Educational Research and Innovation (OECD)
CoE	Council of Europe
CPD	Continuing Professional Development
ICT	Information and Communications Technology
CAL	Computer Assisted Learning
CALL	Computer Assisted Language Learning
DES	Department of Education and Science
GCSE	General Certificate of Secondary Education (UK)
IT	Information Technology
ICT	Information and Communications Technology
IWB	Interactive Whiteboard
L2	Second Language
MALL	Mobile-Assisted Language Learning
MFL	Modern Foreign Language
NCCA	National Council for Curriculum and Assessment
NCTE	National Centre for Technology in Education
OECD	Organisation for Economic Co-operation and Development
PC	Personal Computer
PDA	Personal Digital Assistant (Palmtop Computer)
SEN	Students with Special Educational Needs
TALIS	Teaching and Learning International Survey (OECD)

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1 Introduction

1.1 Background/ Context to the Study

This case study investigates the reported low rate of integration of Information and Communications Technology (ICT) in education, with particular reference to integration in Irish secondary schools. The importance of ensuring that all students are familiar with and competent in using a variety of modern technologies is universally acknowledged.

The Irish Government continues to invest considerable funds in this regard. In her foreword to *Investing Effectively in Information and Communications Technology in Schools 2008 – 2013* Minister Mary Hanafin emphasised that ICT “is now an integral part of our personal and working lives” (Department of Education and Science (DES) 2008a). She stressed the importance of lifelong learning and keeping up with technological developments in order to achieve digital competence.

Technology has benefitted Ireland’s economy. The knowledge economy impacts on our schools, our students and our teachers. Students need new 21st century skills to adapt to technological change and succeed in the global economy. Teachers need to be able to facilitate the learning of these skills by students. It is accepted that ICT can contribute positively to both teaching and learning. “When used well, ICT enriches learning and enhances teaching. It invigorates classroom activities and is a powerful motivational tool that encourages learners to progress in more personalised and self-directed ways” DES (2008a).

For this to happen, teachers need to change their teaching and integrate technology into the normal daily experience of students. As technology is developing and changing at a rapid pace, students must be taught how to cope with this rate of change. Schools must provide an education which will encourage lifelong learning (OECD/CERI 2001).

This section outlines developments in ICT use in schools in order to establish the background to the current research.

1.1.1 The Global Picture

The 1970s saw the first introduction of computers in education. Since the 80s, student computer use has been fostered in the United States through the provision of government funding. Other countries followed this lead, including Great Britain (Harrison et al 2003).

Computer ownership and internet access worldwide are increasing. The percentage of UK households with broadband access to the internet in 2008 reached 61.5%, while for the US it was 50.8% (OECD, Broadband Portal). The corresponding figure for Ireland is 42.9%. This figure is expected to rise.

The initiatives implemented by the Irish government to keep Ireland abreast of world technological developments by investing in technology in schools will now be outlined.

1.1.2 National Policy

Initially, Ireland was behind other countries in the levels of ICT infrastructure and use in schools (OECD/CERI 2001, Mulkeen 2004).

The steps taken by the Irish Government were as follows (DES 2008b):

- In 1997, the DES initiated the Schools *IT 2000* Project. The National Centre for Technology in Education (NCTE) provided initial training in the use of ICT to over 20,000 teachers and developed mechanisms to support schools.
- Following the success of *IT 2000*, the *Blueprint for the Future of ICT in Irish Education Three Year Strategic Action Plan 2001-2003* was drawn up.
- In 2004, the Schools Broadband Programme was introduced, “a significant step forward for all schools” (DES, 2008a).

The Government continues to invest in ICT in schools, even within the context of educational cutbacks in other areas. In June 2009, it was announced that 78 post-primary schools would be provided with 100mpbs high-speed broadband connectivity. In November 2009, a new €150m action plan was announced to provide every Irish classroom with a teaching laptop and a data projector (DES Smart Schools 2009). This

funding will initially be used to provide ICT in primary schools and then secondary schools.

It was hoped that these initiatives would encourage use of technology in education. However, although most teachers in Ireland have had some training in the use of technology, only a small number have incorporated it into their lessons on a regular basis. The *Benchmarking Access and Use of ICT in European Schools* study found that only 30.2% of teachers in Ireland had “access, competence and motivation” to use computers and the internet in their teaching (Empirica 2006). Ireland was the fourth lowest of the fourteen countries surveyed, with only half the percentage of the UK which topped the list at 60.2%.

In July, 2009, the Irish Government announced a new strategy for digital and clean technology in Ireland, targeting 30,000 jobs, *Technology Actions to Support the Smart Economy* (Department of Communications, Energy and Natural Resources Press Release). A lack of ICT integration in education has serious implications for Ireland’s economy and this will now be reviewed in the context of global ICT integration.

1.1.3 Integration of ICT in education – progress to date

Despite investment by governments worldwide to this end, the evidence indicates that many teachers do not make regular use of technology in their classrooms (Cuban, 2001; Mumtaz, 2000). More recent research reveals that, in the US, due to better access to resources and skills acquisition, more teachers were using ICT (Ertmer 2005).

The Empirica 2006 study found that almost 100% of EU teachers used computers either for work or outside work. Almost 89% of EU teachers used a computer for preparing lessons and an average of 74% of EU teachers used a computer in class. The British Educational Communications and Technology Agency (Becta) (2008) has classified schools into four categories depending on their level of effective integration of ICT, i.e. e-enabled, enthusiastic, ambivalent and late adopters. Only 25% of secondary schools in the UK are in the e-enabled category while 43% are enthusiastic. This leaves a sizeable number, 32%, as ambivalent or late adopters. Based on the data

reported by Empirica, it is reasonable to infer that e-enabled schools in Ireland are also in the minority.

1.2 Research Problem

The *Education at a Glance* report stated that, in Ireland...

“less than one-third of teachers use computer applications, one-quarter or less use the Internet, and 13 per cent or less use e-mail for educational purposes at least once a month.” OECD (2003)

Recently the DES report, *ICT in Schools*, also found that while most teachers use ICT in planning and preparing for lessons, a majority of teachers do not use ICT regularly in their teaching (DES 2008b).

In many cases, students do not have regular access to computers. The inspectors evaluated student competence in using ICT and found that students were able to perform basic ICT tasks, but generally required help with more complicated tasks (DES 2008b).

The NCTE 2005 Census also measured ICT integration in Irish schools and found that there has not been extensive uptake of technology use by teachers. One possible reason for this is insufficient broadband provision. The DES has recognised that the current provision of bandwidth is not adequate for many schools (DES 2008a). It is stated Government policy to improve broadband access throughout the country as an economic necessity and this will benefit schools.

Research on the use of ICT in second-level schools was carried out by the DES (DES 2008b). High levels of integration were found in science, applied science and some social studies subjects. The report found that teachers of Modern Foreign Languages (MFL) and Irish were least likely to have ICT facilities in their classrooms and that teachers of Irish had the lowest level of ICT skills and the lowest use of ICT (DES 2008b). Recent studies that have been carried out on the teaching of Irish at second level include Ó Laoire’s (2007) study on students’ language awareness and the DES Inspectorate Report (2007) on the teaching of Irish at Junior Cycle.

1.3 Aims of this study

This study examines current ICT use by teachers of all subjects at second level, with a particular focus on the use of ICT in modern language learning and in the learning of Irish.

The following issues are explored:

1. How can ICT use facilitate the adoption of a modern pedagogy and a better learning experience for second-level students?
2. How can ICT further the teaching of Modern Foreign Languages?
3. How can ICT further the teaching of Irish?
4. What factors facilitate or hinder teachers in their use of ICT?

1.4 Research Approach

It was decided to carry out a case study in order to obtain a detailed picture of current practice. The literature review carried out as a preliminary step examines the issues involved in ICT integration. A mixed methods research methodology was chosen to conduct the study. The history of ICT provision, integration and use in the school was investigated through examination of documents, an online survey of teachers, examination of IT Diaries, interviews and the recording of relevant comments and researcher observation. The research project is described in detail in Chapter 3.

1.5 Scope of the Study

The research has been confined to one secondary school. This was judged the most practical option given the limited time available. The research school is mixed, has 750 students and over fifty full-time teachers and is situated in a large town in the south of Ireland. In 2007, out of a total of 734 post-primary schools, 291 had more than 500 students. Over three quarters of larger schools were at post-primary level (DES, 2008a). Therefore the study school is representative of a considerable number of Irish schools and the results are of general interest.

1.6 Structure of Thesis

The thesis is structured in chapters under general headings.

Chapter 2 is concerned with reviewing the literature available relating to the area of ICT use in education and in language learning in particular.

Chapter 3 outlines the methodology employed in conducting the research project. It describes the setting, the methodology and the procedure used in the data collection. It also discusses the strengths and limitations of this study, along with the ethical issues which directed and guided the process.

Chapter 4 presents the findings of the research.

Chapter 5 discusses the findings with reference to the literature review carried out in Chapter 2.

Chapter 6 presents a summary of the main issues which emerged during the course of the research project and makes recommendations for the future.

2 Technology and Education – A Review of the Literature

2.1 Introduction

In order to carry out this study a wide-ranging literature review was undertaken to ascertain what has already been written about the integration of ICT in education, with a particular focus on second-level education and language learning. Modern pedagogical approaches and the benefits of technology use from the perspectives of both the teacher and the student were researched. Uses of technology in second language acquisition and in the learning of Irish were investigated. This chapter ends with a review of the factors which influence teachers to integrate or not to integrate ICT in their teaching.

2.2 Information and Communication Technology (ICT) and Education – Background Information

2.2.1 Technology, Change and the Role of the Teacher

The Learning Society

The OECD has been promoting the notion of lifelong learning since the 1990s (OECD, 1999). Then Minister for Education, Mícheál Martin emphasised that the foundations of lifelong learning for all citizens must be laid down during the years of compulsory education, that learning “must become a way of life” and that all organisations should become learning organisations. ICT and particularly the internet can be a means of facilitating a Learning Society in Ireland (Martin 1999).

ICT is now part of life. ICT digital skills are one of the key workplace competencies which all members of a knowledge economy workforce must have (DES 2008a). Companies require workers to have a range of personal and ICT skills as well as academic or technical qualifications (OECD 2001b).

Ubiquitous use of technology by students is now the norm at home, on their mobile phone, ipod or other device. A considerable amount of time is spent on the internet or using mobile technology. Much informal learning takes place through Web 2.0

interactive social networking sites (Gee 2003 and Williams & Facer 2003 in Becta, 2007).

It is important that school and life are not in opposition and that links are made between what is happening in school and what is happening in the outside world. Schools need to give young people the knowledge and skills needed to interact with a range of technologies, to use technology safely and to discriminate in their use of it. Stuart, Mills and Remus 2009, citing Tearle 2003, stress the importance of successful implementation of ICT in schools.

Teachers must provide opportunities for students to use technology. If they ignore the need for technological literacy, they will fail in their duty to prepare students to take their place in the world. Atkinson argues that ICT implies a

‘new literacy or a fifth skill in language use ... the ability to access information, to assess meaning and validity, to process and adapt language, to create meaning and to communicate using increasingly diverse media’ Atkinson (2001, in Taylor et al 2005).

It is incumbent on teachers to be aware of the opportunities afforded by the different and emerging technologies and to utilise those that can contribute to better teaching, a more favourable educational experience for students and the development of a wide range of technical and analytical skills. The next section will examine the potential benefits for both students and teachers of using ICT.

2.3 Benefits of Integration of Technology

2.3.1 Contemporary Pedagogy

Contemporary pedagogy is grounded in constructivist, student-centred theory. Despite this emphasis, traditional behaviourist theory still underpins the pedagogy used by many teachers and much classroom learning is still firmly teacher-based. Much of the research in the use of Computer Assisted Language Learning (CALL) promotes the use of computers because of the possibilities of fostering constructivist learning.

National policy on education has seen many developments in recent decades with DES initiatives designed to modernise the Irish educational system and incorporate new

practices which will lead to better learning for all students, especially those for whom traditional teaching methods are not always suitable (Callan 2001).

Policymakers, academics and practitioners all accept that the crucial influence in the classroom, however, remains the individual teacher. Teachers in the classroom determine how they will deliver the curriculum to their students. The decision as to whether to use technology or how to use it rests with them (Koehler and Mishra 2008, Ertmer 2005).

The emphasis in integrating ICT in education has shifted in recent years from skills acquisition to pedagogical use (Buettner 1997 in McGarr and O'Brien 2007, DES 2008a). Simmons (1995 in Wilhelm 1997) argues that "teachers tend to teach as they were taught". However, changes have occurred in schools and in teaching in recent decades. This section will discuss some developments in contemporary pedagogy and consider how integrating ICT can contribute to providing a more constructivist, personalised and student-centred learning experience for students.

Technology Scaffolding Learning

Reviews of ICT and pedagogy refer to technology as a scaffold to classroom learning. "Scaffolding means that pupils build up knowledge and understanding by linking new concepts to those previously understood through a mental framework of linked concepts" (Cox et al 2003). The concept of scaffolding learning is Constructivist (Austin et al 2003). Constructivism is based on Vygotsky's (1978) "zone of proximal development" (ZPD) theory. The ZPD refers to the difference between what the learner could accomplish independently and what the learner could accomplish with the guidance of an adult or a more skilled peer (Warshcauer 1999, Wood et al 1976 in Taylor et al 2005) and could be seen as a student's "capacity for new learning" (Taylor et al 2005). Technology can be used to scaffold all subjects. Examples of scaffolding in language learning will be given in Section 2.4.2.

Some practical examples of technology scaffolding classroom learning

Scaffolding science teaching with simulation software

ICT can be of practical benefit in the science classroom. Using graded software resources, such as the *Ecolab*, the student can build, activate and observe a simulated

ecological community of plants and animals and can complete certain activities at different levels (Luckin 2003). Scaffolding is provided for learners in the graded help available, by providing hints, and by allowing the user adjust the difficulty level of the activities. The second generation *Ecolab 11* added a metacognitive level of scaffolding to foster thinking skills.

'Model Answer' scaffolding

Luckin (2003) describes the content of the DVD *Galapagos* which provides learning material on Darwin's theory of evolution. Supportive scaffolding includes a 'Model Answer' feature which is only available after students have completed a certain amount of work themselves. The Model Answer provides formative feedback on work completed and guidance towards further work. The Model Answer is an example of scaffolding easily provided by teachers of all subjects in classrooms equipped with a data projector and computer. Model answers once developed are easily saved, ready to be revised and reused.

Scaffolding writing using writing frames

Taylor et al (2005) reported on the *InterActive Education: Teaching and Learning in the Information Age* project which used technology to scaffold learning. It focussed on seven curriculum subjects and showed that technology contributed to improvement in students' writing skills. Writing frames are useful in supporting learning in many subject areas and are commonly used in subjects such as history, geography and science, as well as languages.

Multimedia and Multiple Intelligences

A further pedagogical concept which influenced the direction that this research has taken is Howard Gardner's theory of Multiple Intelligences (MI). MI theory, first published in 1983, has had a profound effect on the teaching profession. Teachers have recognised that students have different learning styles and that a variety of methodologies are necessary in the modern classroom. This is an additional forceful pedagogical argument for the integration of technology in education.

Technology, multimedia and hyperlinks can introduce real, authentic situations into the classroom. Modern pedagogy dictates that teachers should teach to as many learning

styles as possible. Learners generally learn in their predominant style but their learning is enhanced if they can use different cognitive ways of learning the same material (Gardner 2006). ICT can assist teachers in this through the use of multimedia presentations combining both visual and audio material. The visual nature of animations, simulations and film, because students engage with the action, can lead to better conceptual understanding. Passey et al (2004) reported that the “visual and kinaesthetic forms of ICT” contributed to greater student engagement, as did the auditory form to a lesser extent.

Gardner (2006) further developed his theory positing that learners need Multiple Representations of Key Concepts in order to commit learning to long-term memory. Using ICT to present material for revision or to provide drill and practice exercises provides the teacher with a novel way of revising material to be learned. Schulman (1986, in Koehler & Mishra 2008) stated that effective teachers transform the subject matter as they interpret it, find multiple ways of representing it, adapt and tailor the material to alternative conceptions and students’ prior knowledge. Gardner (2006) cautioned about simply repeating material in the same way as learners may find this boring. One advantage of using technology is that it allows for infinite variations in the presentation and practice of material to be learned. Presentation of material remains the most frequent use of ICT in education (Smith et al 2008a).

A particularly valuable use of ICT in schools is the provision of resources for students for whom traditional textbooks are unsuitable, including students with special educational needs.

Students with Special Educational Needs (SEN)

The benefits of technology for SEN students have been widely accepted (OECD/CERI, 2001a, Smith et al 2008b, p.200). Specially developed computer-based software programmes are beneficial in enabling them to become more independent learners. Feedback in such programmes is instant and encouraging. Students are no longer embarrassed by having to constantly ask for assistance. An Individual Education Plan can be drawn up using differentiated resources often available online which students can access from home if they wish. SEN students can perform tasks using ICT that they would otherwise be unable to do (Abbott et al 2004, citing Hegarty et al 2000).

Active Learning

National education policy has emphasised that teachers should create active learning opportunities and activities for students and that using ICT can lead to more student-centred, active learning (Callan 2001, Eurydice 2001). ICT can afford pupils the opportunity to engage in their own learning through a variety of active and interactive learning tasks (Futurelab Report 14, 2006).

Technology can help develop higher level thinking skills and skills needed to participate in the information economy. Active learning is based on Constructivist pedagogy, as described above. Following on from this is the notion of social constructivism. Social constructivists believe that learning is influenced and facilitated by taking place in a social context.

The DES, in introducing the new primary school curriculum in 1999, emphasised that pupils should be actively involved in their own learning and that learning is a collaborative activity. Primary school pupils now spend much time actively working in groups, guided by the teacher acting as a facilitator of learning.

Collaborative Learning

Collaboration has been defined as “A systematic process in which we work together, interdependently, to analyze and impact professional practice in order to improve our individual and collective results” (Dufour, Dufour & Eaker 2002, in Fullan 2008). Teachers often work together to develop class materials and ICT can help in this collaboration through the use of email (Becta 2007), Google Docs, etc. The research shows, however, that email collaboration between teachers and pupils is not widespread (Becta 2007). Little (2005) quotes Nunan (1988) who defines a learner-centred curriculum as ‘a collaborative effort between teachers and learners’. This implies a change from the traditional view of the teacher as the sole owner and imparter of knowledge.

Warschauer (1997) found that Computer-Mediated Communication was a potentially useful tool to promote social interaction and collaborative language learning but that further research was needed. Gross Davis (1993) found that students appear to learn better and be more satisfied when they work as a group. When introducing group work,

the teacher must develop his/her own collaborative skills and invest time in developing these skills in their students (Dornyei 1997). Teachers who integrate collaborative ICT work into the classroom must also develop their technology skills.

It must be noted that technology integration will not automatically cause learning to take place, but it has been found to enhance learning (John and Sutherland 2005). Working together using ICT can lead to “better class and group dynamics. The less able learn from the more able and a stronger sense of pupil teamwork and co-operation prevails” (Abbott et al 2003, citing Austin et al 2003). Cox et al (2003) cite Eraut (1995) who pointed out that “group work is a complex process which limits the ability to generalise on its benefits, but his study...offers strong support for a Vygotskian...explanation of the benefits of group work among pupils.”

Finally, in relation to student collaboration, it must be noted that group work is not always involved, as students working individually on a computer software resource can be said to be working collaboratively with the software (Luckin, 2003).

In addition to promoting collaborative learning, contemporary pedagogy aims to foster student autonomy in learning.

Learner Autonomy

“The term learner autonomy has been generally defined as a developing capacity on the part of learners to accept responsibility for their learning” (Dam 2003, in Little et al 2003). The teacher’s role in helping to develop this capacity is onerous. As students can access material wherever, whenever and as often as they wish, technology can help students become autonomous learners. Technology can also enable students to access learning materials outside of school hours at a time that suits them. Just-in-time learning is an emerging trend which can be facilitated by ICT (Becta 2008a). One way of accomplishing this is for schools to develop a learning platform (or Virtual Learning Environment) which students can access online. This technology can facilitate learner autonomy by enabling students to assess their progress and work at their own speed (Underwood et al 2009).

Learning Platforms

All schools in the UK are now urged to introduce a learning platform (Becta 2008b). A well-planned learning platform will help students to access e-resources from home at any time and will contribute to the development of self-directed learners. Learning can be personalised and students can be allocated their own email address and online storage space for their work. A learning platform will also foster improvements in many administrative areas such as evaluation, links with parents, school management and the wider community. A learning platform affords teachers the opportunity to present material in new ways and to add links to extra optional material thus catering for different abilities and different learning styles. A learning platform allows students review the material as often as they wish and pursue links to study in a way that suits them individually. Learning platforms are also being used to engage difficult-to-reach students.

Online learning

Broadband technology has facilitated the delivery of traditional courses in new formats, e.g., blended learning. In blended learning online resources are used as a supplement to traditional face-to-face teaching (O'Dowd n.d.). This model is used mainly in third level environments, but is developing at second level in a limited way. Zabata and Sagarra (2007) refer to 'Hybrid instruction' which also combines face-to-face teaching with ICT, in this case the use of online workbooks. Many secondary school textbooks now incorporate a website with further examples or practice.

Much informal learning can occur as students browse the internet. New generation mobile phone technology has led to a phenomenal increase in the use of social networking sites, blogging, etc. As technology has got smaller and more powerful it has become more attractive to young people and opens up possibilities for educational applications.

Mobile Learning

Mobile learning is increasing as the capabilities of third generation mobile phones for multimedia use and learning increase and notebooks, tablets and laptops become lighter, more portable and, importantly, cheaper. The availability of broadband connections throughout the country means that knowledge can be accessed from

almost anywhere. The potential of mobile learning is considerable (Comas-Quinn, Mardomingo and Valentine 2009). Condie et al (2007) state that students are more impressed by PDAs (Personal Digital Assistant/Palmtop Computer) and mobile phone technology than by laptops which they perceive to be less manageable.

Young people nowadays are buying multiple use technologies, particularly mobile phones. The latest phones can be used as a digital media player, camera, video camera, internet browser, to send messages and emails, and are still very compact. Mobile learning will be discussed in more detail in Section 2.4, ICT and Language Learning.

The pedagogical advantages of integrating ICT in teaching are accepted by teachers who use these modern tools. The advantages for students will now be examined.

2.3.2 Students' Perception of ICT in the Classroom

Increased motivation and engagement of students

One of the benefits of using technology in the classroom is that students have said that they are more motivated to learn when they are using technology (Passey et al 2004). Other studies have likewise cited increased motivation and engagement of students due to ICT. Baylor and Ritchie (2002) reported that students are motivated by computerised drill and practice exercises which provide instant feedback. Mulkeen (2003b and 2004) also reported increased student motivation. Passey et al (2004) studied the motivational aspects of ICT in 17 schools in the UK. They found that both pupils and teachers widely reported that ICT had a positive motivational effect on students' 'desire to learn and to undertake learning activities', that student attitudes towards schoolwork and homework were 'more positive' and that students' confidence in their ability to complete schoolwork and homework 'was enhanced'. They also reported that students were motivated to improve the 'writing, appearance and presentation' of their work when using ICT, as they could correct mistakes more easily on the computer. Head teachers in the study stated that ICT had a positive effect on boys, enabling them 'to attain at the same level as girls'.

Students who are difficult to motivate in a classroom situation often benefit from using computer-based resources if they can work individually (OECD 2000). They can

correct mistakes without others knowing. Passey (2004) found little evidence that ICT use had a positive effect on school attendance, but did find that ICT use was 'motivating pupils and affecting attendance positively in some lessons', e.g., the last lesson of the day. He reported that educational welfare officers stated that the attendance of pupils who did not attend school regularly had improved when ICT was used. Underwood et al (2009) reported that underachieving learners are more interested in learning and spend more time on task when using software that gives frequent feedback. They added that even able learners are more motivated by technology use and that boys find video games highly motivating.

A number of studies reported that students were motivated by using laptops or the newer smaller tablet PCs (Personal Computers), particularly when students had sole ownership (Cunningham et al 2004, in Condie et al 2007, Becta 2005c, Becta 2005d, Becta 2007).

Felix (2008) studied Computer Assisted Language Learning (CALL) and posited that ICT can engage students and "add value to face-to-face instruction", that "glossing and visual annotations" were useful for learning vocabulary, that the use of multimedia "appeals to different learning styles" and that student attitudes and participation improved when technology was used. He said that researchers were beginning to see positive effects on reading, writing and spelling from the use of CALL, but he found that these positive effects were not reflected in higher achievement. This contrasts with findings from research carried out by Harrison et al (2003).

Improved student attainment

Harrison et al (2003) described major research carried out in 60 schools to assess the effect of ICT on pupil learning and attainment. Integration of ICT in the study schools showed a small, but measurable improvement in achievement in most school subjects. At Key Stage 4, equivalent to Junior Certificate, there was a "significant positive association" between ICT use and results in GCSE science, design and technology and modern foreign languages. Passey et al (2004) found some evidence of improved attainment where technology use is embedded in classroom practice. Becta (2010a) reported that schools that use ICT across the curriculum and wider school life achieve more A to C grades at GCSE level.

It is clear that students enjoy and benefit from using ICT in their learning. The next section will examine how teachers can benefit from using ICT.

2.3.3 Benefits for Teachers

Section 2.3.1 above has described how technology can be of benefit to teachers as a teaching tool. There are other benefits for teachers accruing from ICT use and they are now outlined.

Personal use of technology improves teachers' confidence and skills in the classroom. Digital resource materials can be prepared, saved, improved, reused and adapted as needed. More attractive materials can be prepared using multimedia. Developing a professional learning community with a culture of collaboration within a school can be facilitated by using email or Google Docs, for example.

Continuing Professional Development (CPD) helps teachers remain energised and motivated in their teaching. Teacher professional development websites make 'always on' CPD available to all teachers regardless of their subject. Websites also provide excellent interactive tutorials in all areas of technology use (Appendix A).

Studies have reported that using ICT can save time for teachers once they become competent users. Baylor and Ritchie (2002) found that computerised drill and practice exercises "automate direct instruction" and thus free up teacher time. A study carried out for the British Government by PricewaterhouseCoopers estimated that "effective use of ICT could save teachers on average between 3.25 and 4.55 hours per week" (PwC 2001 in Selwood and Pilkington 2005). Selwood and Pilkington concluded that "teachers believed that ICT can assist in reducing their workload and in making them more productive". This has been supported by Condie et al (2007) and Kitchen et al (2007) who reported that around half of secondary teachers said that they saved time by using ICT for lesson planning (47%) and lesson delivery (50%).

2.3.4 The Digital Divide

An important pedagogical reason for integrating ICT into teaching and learning in schools is to promote equality of educational opportunity. Smith et al (2008a) state that

there is still a digital divide in the UK, with an estimated 30% of students of all ages who do not have home access to a computer. There is a real danger that students who are already disadvantaged educationally may be further disadvantaged because of their lack of access to technology at home. Schools must provide access to technology for these students. Dunshaughlin Community College, Co. Meath, for example, provides “Open Access” hours where students with no home computer can use the school computers (www.ncte.ie).

The digital divide also concerns some teachers. It was hoped that the digital divide would disappear in time with the increasing availability of broadband. However, Becta (September 2008c) states that broadband access to the internet in the UK is “somewhat stalled at between 70 and 75 percent of the population.” It is possible that teachers who do not use technology in their personal life are older teachers. However, Jones (2004) found that age was not a significant barrier in affecting ICT use by teachers. Barriers to ICT integration will be discussed in detail in section 2.5.2.

The next section discusses the process of learning a language and examines how ICT can be employed by the teacher and the student to maximise learning.

2.4 ICT and Language Learning

The process of learning a second language (L2) is a challenge for students and for teachers. It is not a simple linear process. Language is “the chief means by which we think – all language activities, in whatever language, are exercises in thinking” (Little 2003). An L2 is learned within a specific cultural and social context. Students not only have to learn the vocabulary, structures, grammar and pronunciation of the new language; they also have to familiarise themselves with the culture of the country and the different registers of language used in specific contexts.

Language teaching focuses on authentic communication and concentrates on developing the skills of listening, speaking, reading and writing in as natural a way as possible. Time and considerable exposure to the target language are needed; language learning is a prolonged process which students can find frustrating at times.

Using computers to learn a foreign language (MFL)

Technology in basic forms has been integrated into language teaching for many years. Vinyl records, tape recordings, films and latterly CDs and DVDs have been in regular use in all language-learning environments. Such resources provide an authentic, easily-managed encounter with the language. The advent of ICT has opened up exciting possibilities for teachers in their efforts to engage learners but at the same time poses problems for teachers due to the skills required in order to use them confidently.

Technology can provide variety in revising and rehearsing basic language skills such as vocabulary acquisition and practice in using tenses and grammatical structures. Teachers can use multimedia technology and hyperlinks to introduce engaging, authentic situations into the classroom. Ó Laoire (2005) in his overview of third language learning in Ireland refers to the importance of the support of the natural language domain in facilitating language acquisition. Use of authentic language materials from digital TV stations, film, etc. can help provide domain support in the receptive skills for language learners.

It has been shown in Section 2.3.2 above that using technology contributes to student motivation. It is useful at this stage to examine the question of motivation in second/foreign language learning.

2.4.1 Motivation and Language Learning

Theories of motivation abound in educational literature. Dörnyei (1998) posits that while motivation to learn is a key factor in student achievement, it is a multifaceted factor and difficult to define.

Motivation to learn an L2 is even more complex due to the function and roles of language itself, as the learner has to develop a type of L2 identity and has to incorporate some of the L2 culture. It is logical, therefore that language cannot be learned purely as an academic subject; it must be learned within the context of the culture and life of the people who speak it. Multimedia resources can help to show students the cultural context within which they are learning a language.

Learning cannot take place unless learners engage with the material in a sustained manner. ICT can help keep underachieving learners interested: “Software with frequent feedback and rewards has been shown to increase time on task” (Underwood et al 2009). Computers have been used for many years to facilitate L2 acquisition and some ways in which this has been done will now be examined.

2.4.2 Computers and Second Language Learning – Historical Background

Computer Assisted Learning (CAL) and Computer Assisted Language Learning (CALL) software programmes have been developed both on CD/DVD and on the internet which are widely used in language teaching and learning. These interactive programmes and exercises can be helpful and motivating for students in the early stages of learning an L2.

Many studies have been carried out on the use of CALL, e.g., Warschauer (1996). Warschauer divided the evolution of CALL into three trends, Behavioral CALL, Integrative CALL and Communicative CALL. By communicative, Warschauer means communicating or collaborating with others online in meaningful activities (The History of CALL n.d.).

Barr et al (2005) refer to the generally accepted notion in CALL research that using ICT leads to increased student motivation, but they point out that the improving motivation of students “does not mean that CALL is an effective pedagogical tool”. Belz (2002), cited by Warschauer (2004), found that using technology does not always lead to better learning. This may be because the learners are not familiar with the technology and some time is taken up in learning how to use it (Barr et al 2005).

Benefits of using writing frames in language teaching

Taylor et al (2005) reported on a project which used electronic writing frames using Microsoft Word technology as a scaffold to help students improve their writing skills in German. Using this framework helped students gain a deep understanding of the structure of writing in German, which differs considerably from writing in English. The use of computer-based or Interactive White Board (IWB) writing frames as a

scaffold is particularly helpful to language learners as they can be designed in a way that makes the structure of the sentence very clear visually.¹

Online language learning

Zapata and Sagarra (2007) carried out a study over two semesters of students studying Spanish in a large American university. They found that using an online workbook along with face-to-face tutorials had a positive impact on student motivation and grammar accuracy.

Online resources are accessible relating to all the various elements of MFL learning - vocabulary acquisition, pronunciation, listening, reading, writing skills, even oral skills can be honed with the help of the internet.

Comas-Quinn, Mardomingo and Valentine (2009) describe a UK Open University Spanish language learning pilot project where students used mobile phones, digital cameras and MP3 players to record visual and auditory material which they then uploaded to a blog. The project had disappointing outcomes as the students did not participate as much as expected, thus illustrating the need for extensive preparation when introducing ICT. In this case while much time was spent in preparing the technological structure and support inherent in the project, not enough time was spent preparing the students to interact with the technology and to become self-directed in their learning.

Broadband connectivity has enabled a range of both synchronous and asynchronous learning activities to take place in the language classroom. Payne and Ross (2005) carried out a limited study on the benefits of using chatrooms as synchronous conversation simulators to develop L2 oral proficiency and found that the chatroom may provide a unique form of support to learners with low-span working memory. Email, Boards, Blogs, Google Groups, etc. can be used for asynchronous communication (Warschauer 1996, 1997, O'Dowd n.d.).

¹ For a glossary of teaching activities to scaffold language learning see Pauline Gibbons (2002), 'Scaffolding Language, Scaffolding Learning', pp. 141-152.

Warschauer (1996) listed some of the benefits of using computer-mediated communication for language learning. He said that there was a greater amount of student participation, less teacher talk and more equality of participation because the silent students increased their participation online. Warschauer (1997) noted that asynchronous communication through emails was suitable for more complex writing.

Tandem Learning

There exists now a proliferation of educational websites which provide the opportunity for learners to engage with one another and build up a relationship in an authentic setting and so improve their language skills. E-mail has been used extensively to facilitate L2 acquisition and many organisations such as the International Email Tandem Network link classes or individual students. In tandem learning “two people who are learning each others’ language work together to help one another” (Lewis 2005 in Benson 2006). This practice blends the concepts of collaboration and autonomous learning. Students can also use Skype to practise their oral skills. Well-organised and structured collaborative e-twinning projects can enrich the learning experience (O’Dowd 2009).

Teaching the Irish language is not directly comparable to teaching a MFL for a number of reasons. The next section deals with the specific situation of the Irish language and how Irish is taught in schools.

2.4.3 ICT and the teaching of Irish

Background to Irish in the schools

The teaching of Irish has been a source of much discussion since before the establishment of the State in 1922. Ó hÉallaithe (2004) chronicles the history of the language from the initial attempts to revive it, when it was hoped that Irish would replace English as the language spoken generally, to the current hope of creating a bilingual society. The school system has been charged with this task.

It is accepted that the teaching of Irish is challenging. Historically, because obtaining a pass in Irish in state examinations was compulsory and because learning Irish in primary and secondary school remains compulsory, many students have a negative attitude to learning Irish (Ó Croidheáin 2006).

Notwithstanding promising developments such as the increase in Gaelscoileanna, the decline in the percentage of speakers who use Irish on a daily basis, from 2.9% in 1996 to 2.6% in 2002 according to recent Census reports, is of concern to many. The Government has made efforts to redress this decline. A new communicative curriculum at primary level was introduced in 1999. At second level, despite the fact that a communicative syllabus has been in existence since 1989, teaching in the classroom is geared towards the state examinations. In 2007, the DES increased substantially the marks for oral examinations from the 25% currently awarded to 40%, so that more emphasis would be put on teaching spoken Irish (DES 2007d). This is now impacting on the teaching of Irish at second level.

Cummins (1993) asserts that that a large body of research shows that becoming competent in two languages can lead to deeper metalinguistic awareness and facilitate learning other languages. Ó Laoire (2007) also says that noticing seems to be an important factor in promoting student language awareness. Thus, it can be argued that learning Irish is of positive benefit in the subsequent learning of a third language. Cummins (1993) quotes Fishman (1991) who suggests that schools alone do not ensure the revitalisation of a declining language. Ó Laoire observed that his class of “self-reported low achievers” seemed to associate language learning exclusively with the classroom.

Promoting language awareness is one strategy which can be used to help students become more self-directed and autonomous learners. ICT animated or interactive presentations can be used to make students more aware of how a language works. Internet resources can help students to become aware of the possibilities of learning outside of the classroom. The next section will examine some aspects of the teaching of Irish pertaining to ICT highlighted in recent inspectorate evaluations, other reports and new developments.

DES Report 1: Irish in the Primary School (2007)

The new curriculum for primary schools was circulated to schools in 1999. The principal aims of the new Irish curriculum are “the development of the natural use of the spoken language in communication” and fostering a “communicative approach” to

learning with enjoyable activities so that pupils will develop a “positive attitude to Irish”. In-service seminars in 2001/2 and 2002/3 introduced teachers to new active learning methods and teaching activities, including the integration of ICT, related to the new Irish language curriculum. Evaluation inspections were carried out in 2005 and a report was published.

The report outlined the challenges facing primary schools in trying to raise the standard of spoken Irish. The inspectors recommended that a collaborative whole school plan should be drawn up to guide the teaching of Irish at the various levels (DES 2007a). Using ICT and a school network could facilitate such collaborative planning.

DES Report 2: Looking at Irish at Junior Cycle

This report expressed concern at the growing numbers of students who do not study the Irish language in school. The inspectors praised schools where ICT facilities were situated in the Irish classroom and recommended that more stimulating and a greater variety of resources be used in teaching the language. The inspectors recommended the following:

- authentic audio-visual resources to be developed and shared between teachers
- teachers of Irish to be trained in using ICT and up to date resources (DES 2007b).

Integrating ICT internet resources, e.g. TG4 or Web 2.0 applications such as podcasts, into the teaching and learning activities would be a valid response to these recommendations.

Other Reports and Developments

It has long been recognised that there is a lack of digital resources for the teaching of the Irish language (NCTE 2001, DES/CoE 2008, etc.). Access to appropriate software for teaching Irish is limited (DES 2008b). The *Schools for the Digital Age Progress Report 1998-2002* placed Irish last in the list of subjects where ICT was integrated into teaching and learning in post-primary schools (Mulkeen, 2004). Many internet resources available are aimed at adult learners. Scoilnet developed and identified digital resources for a range of subjects, including French and German.

An important pilot project was launched in 14 schools in February 2010, the interactive site www.abairleat.ie. This is a welcome resource for second-level teachers of Irish. It is hoped that it will soon be fully available countrywide. Scoilnet initiated the ImageBank in 2006 and this remains a valuable resource for all language teachers.

In recent years advances have been made in developing materials for adolescent learners using technologies which they use outside of school. The benefits of using these technologies in language learning will now be outlined.

2.4.4 Mobile-Assisted Language Learning (MALL)

The use of mobile technology is increasingly being advocated for language learning. Young people are generally very motivated by new technology or new uses of technology. The trend among young people for ‘ubiquitous computing’ has been identified as the trend most likely to influence ICT in education in the future (Becta, 2008c). Becta TechNews (January 2010) reports on research which argues that mobile computing will overtake the use of PCs by 2013 and that “smartphones will become the most common browsing platform”. This confirms the trend to smaller and smaller devices.

A ten-week pilot project, MALL – Mobile-Assisted Language Learning – was implemented, in 2007, in one school in Co. Meath to teach oral Irish to second year students (National Council for Curriculum and Assessment (NCCA) n.d.). Students used mobile phones to call an automated system and respond to prompts relating to curriculum topics. Teachers used laptops to download the students’ responses and give feedback to students. Teachers sent their students daily text messages with vocabulary to be learned and the students used the new vocabulary in a supervised text-based chat-room. The project was very popular with students and teachers. One outcome was that teachers found that the quieter students participated equally in the chat, supporting previous findings by Warschauer (1996). Fón, a larger project with 400 students from 6 schools was implemented in 2008.

Section 2.4 has demonstrated how ICT can be used to enhance teaching and learning for all subjects, including languages. The next section reviews the literature concerning the factors which facilitate or deter integration of ICT.

2.5 Factors which influence the integration of ICT in the classroom

The literature review has identified a number of factors which facilitate the integration of ICT in the classroom. Mumtaz (2000) in her review of the factors affecting teacher integration of ICT identified three interlocking factors – the institution, resources and the teacher. These factors will all be examined in this section under two headings, firstly, the factors which facilitate integration, and, secondly, the factors perceived by teachers as barriers to their integration of ICT.

2.5.1 Factors which enable ICT integration

This section will review the institutional factors which facilitate integration, the issue of resources and finally teacher-based factors. Institutional factors include the leadership role of the school principal, whole school planning, provision of resources and training. Resources are also a teacher-based factor, as are continuing professional development (CPD), teachers' personal use of ICT, teachers' pedagogical beliefs and teachers' competence in using ICT.

School Leadership

“The School Principal is a key person in the successful use of ICT in learning and teaching” (DES 2001). It is generally accepted that the role of the school principal is critical in implementing change of any sort (Fullan 1991). All the research on integrating ICT supports this view (OECD/CERI 2001, Becta 2003, 2005, 2008b). In a study of the pedagogical effects of using interactive whiteboards in the primary school, Cogill (2003) suggested that school leadership and support seemed to be important factors in ensuring that the best pedagogical use was made of the technology. Scrimshaw (2004) noted the central role of school leadership “in enabling teachers to engage in innovative practice”. Baylor and Ritchie (2002) emphasised the influence of leaders modelling technology use.

The administrative use of ICT in schools is critical in promoting ICT use. Mulkeen (2003a) found that one of the factors which had a positive influence on ICT integration was the principal's use of email. However, the 2005 NCTE Census (Sheil & O'Flaherty 2006) found that very high percentages of schools never used email to communicate with parents, teachers, pupils or Boards of Management. Just over 30% of schools provided email addresses to teachers in 2005 and just 17% of schools

provided an email address for pupils. Roughly a quarter of second level schools had some email communication with the DES.

To encourage teachers to integrate ICT, a principal must first be ICT competent him/herself. Stuart, Mills and Remus (2009) conducted a study of the relationship between the ICT competence of 64 primary school principals in New Zealand and their role as champion of ICT in the school. Their results showed that the principals were knowledgeable about ICT, that they lacked practical experience of ICT projects but that they were enthusiastic champions of ICT and that their championing role was related to their ICT knowledge. A champion can have a major influence if other supports are in place. An ICT champion in each subject department, along with coaching and personal mentoring contributed to one school winning a Becta award (Becta 2008d).

Condie et al (2007) stressed that it was not enough for a school principal to be a champion of ICT. A champion alone cannot change the school culture. They emphasised that a “whole-school commitment” was essential to bring about organisational change and that “strong leadership and strategic planning” were essential elements of implementing new developments.

Whole school planning

Condie et al (2007) report that the schools which have made most progress in integrating ICT have adopted a whole-school approach. They emphasise the importance of having a whole-school e-plan with short-term goals that can be evaluated on a regular basis.

In schools where technology leadership is diffused there are others besides the principal who can and do provide leadership. Technology leadership can be demonstrated by any teacher who has an interest in championing technology and is confident in using it.

The DES established the *School Development Planning Initiative* in 1999 to “stimulate and strengthen a culture of collaborative development planning in schools” and thus to improve school effectiveness. Fullan (2010) stresses the importance of developing

collaborative practices in schools and says that this leads to better student achievement. Whole school planning must relate to all areas of school activity and should include subject-based planning for ICT integration.

“A whole-school shared vision recognises the capacity of ICT to motivate and inspire students and to build a cooperative and interactive learning environment in the school” (DES 2008a).

Planning should address issues such as the location of computers and other resources so as to facilitate teacher use and integration. Mulkeen (2003a) found that long-term access to computers encouraged integration of ICT in subject teaching in primary schools, but not in second-level schools, possibly because the majority of computers in second-level schools at that time were centrally located in computer rooms, and thus teachers did not have sole access to them.

Access to resources

Access to their own personal laptop was the most influential factor in enabling teachers to integrate ICT into their classrooms according to Scrimshaw (2004). The *Laptops for Teachers* initiative in England and Wales (2002 – 2006) helped many teachers acquire their own laptop and thus spend more time using the technology. Feedback from that initiative showed that teachers used a wider range of sources in preparing lessons due to increased access to the internet and that “their ICT competence and confidence markedly increased” (Condie et al 2007).

Having good quality resources and full access to hardware and software at all times was also highly important. This supports the findings of Becker (1999, in Mulkeen 2003a) who found that long-term access to technology contributed to the integration of ICT in the US classroom. Where an IWB was available, this also encouraged teachers to integrate the technology into their teaching (Scrimshaw 2004).

DES (2008b) gives details of the access that post-primary teachers have to computers. While 90% have access to a computer at home and 85% have access to a computer in the staff room, only 34% of post-primary teachers have access to a computer in their classroom. When the 34% of teachers were analysed by subject, it emerged that classroom access was highest for teachers of science, applied science and mathematics. Teachers of Irish were least likely to have access in their classroom (14%).

Once teachers are provided with ICT resources, a plan to provide adequate technical support for teachers must be put in place.

Technical support

Teachers need support to use ICT. Because of the nature of technology, on-going technical support is needed. Research has shown that where there is a high level of technical support in the school, i.e. where a technician is available every day, teachers are more likely to use ICT (Smith et al 2008a). This supports Scrimshaw's (2004) finding that a high level of technical support is an enabling factor.

Continuing Professional Development

Another enabling factor cited by Scrimshaw (2004) is access to relevant training. This supports the findings of Mulkeen (2003a) which indicated that curriculum-based or subject-based ICT courses led to better integration. As teachers must make fundamental changes in their classroom pedagogy, they need sustained support by the provision of Continuing Professional Development (CPD) (Callan 2001). Regular specific training must also be provided as new technology is introduced.

CPD is essential in order to effect change in the school culture. A more collaborative culture is now required in order to facilitate change and improve teacher learning, including learning about ICT. Fiszler (2004), in his book *How Teachers Learn Best*, refers to the culture of "traditional isolation" and argues for CPD that is schoolwide and ongoing. He recommends a new ongoing learning culture of "peer observation", "reflective dialogue" and "feedback". He cites the benefit of this: "Collaboration-inspired dialogue provides ongoing support, which makes the job of teaching easier and more pleasurable".

Teacher Design Teams (TDTs) have been piloted by the DES Second Level Biology Support Service through the local Education Centres and have been valuable in successfully implementing the new curriculum for Biology teachers (DES 2007c, Simmie 2007). This is another model which could be used to promote subject ICT integration.

Teachers' pedagogical beliefs and ICT skills

Teachers who use technology in their personal life are aware of its potential as a pedagogical tool. Despite the undoubted influence of the positive leadership of the principal and the importance of sole access to resources, Veen (1993, in Mumtaz 2000) found that the most important factors enabling teachers to integrate ICT were teacher factors – teachers' subject pedagogical beliefs, their classroom skills and their technical skills. The central role and influence of the individual teacher in the classroom is undisputed (DES 2001, Pajares 1992, in Ertmer 2005, etc.).

Evans-Andris (1995) cited in Mumtaz (2000) identified three styles of technology integration by teachers – avoidance, integration and technical specialisation. Evans-Andris studied teachers over an 8-year period and found that teachers who integrated technology were those who 'embraced' it. Teachers who avoided using ICT used computer exercises in a limited way; those who embraced technology were more creative and pedagogically-minded.

Cox et al (1999, in Mumtaz 2000) found that the teachers who already used technology at home were confident users, perceived it to be useful for their teaching and planned to extend their use of it.

The importance of the teacher's own motivation and attitude towards integrating technology was also found to be the most critical factor by Eteokleous (2008). Stuart et al (2009) in their study of ICT use by primary school principals in New Zealand found that technology use was "significantly linked to both ICT knowledge and ICT experience". Cuban (2001) believed that teachers only used ICT if they found it beneficial. Gillespie and Barr (2002) and Barr et al (2005) found that university staff and tutors were also pragmatic in their attitude to integrating ICT.

Cogill (2003) suggested that the IWB may help teachers integrate ICT more easily because it is designed for whole-class teaching and is teacher-centred. For many teachers using IWB technology relates well to their teaching style and allows them to gradually build up their ICT confidence and skills.

2.5.2 Barriers to the integration of ICT by teachers

ICT has the potential to transform teaching and learning when effectively integrated into education. Few teachers currently achieve this as they do not have the access, skills and motivation to use it (Empirica 2006). Teachers have been slow to adopt new technology. Teaching is complex and teachers are unwilling to add further complication (Koehler & Mishra 2008). This occurs particularly at post-primary level where constraints of examinations and short class periods militate against innovation (Mulkeen 2004). The barriers to ICT integration by teachers have been the subject of much research and the main barriers identified are now outlined.

Lack of access to technology

Just as sole access to resources, especially a laptop, has been shown to facilitate ICT integration, so a lack of sufficient numbers of computers in schools has been cited as a barrier to integration (OECD 2003). Lack of computers in classrooms in Irish secondary schools has hindered integration (Mulkeen 2004). Only 4% of computers in secondary schools were located in general classrooms and 60% were located in computer suites (NCTE 2005 Census). Lack of internet connectivity in classrooms has also hindered integration (Mulkeen 2004).

In Britain, the pupil: computer ratio in secondary schools has come down to 3.6:1 (Smith et al 2008). In Ireland, the NCTE 2005 Census showed that, in second-level schools, the pupil: computer ratio had improved to 7:1. This is behind the internationally recommended ratio of 5:1 (DES 2008b).

Lack of teacher technology skills

Studies have found that while many teachers have participated in ICT-related CPD, teachers' lack of knowledge and skills is a serious obstacle to integration of technology in the classroom (Mulkeen 2001, OECD 2003). Mulkeen (2004) said that the areas where post-primary teachers requested further training were in "using digital media" and "subject specific" areas.

The TALIS report identified Ireland as one of the countries with a "particularly pronounced" need to develop teachers' skills in using ICT (OECD 2009). This has

been recognized by the DES: “The focus of ICT CPD is now firmly on the pedagogical use of ICT in learning and teaching” (DES 2008a).

Teachers’ digital literacy skills reflect their level of use of technology outside school. Home access to a computer and broadband connectivity has been increasing, but Ireland still lags behind the frontrunners in these areas (OECD 2009).

Teachers need practice in order to develop skills. McGarr and O’Brien (2007) state that short-term courses, such as those provided through *IT 2000*, do not provide teachers with the support they need in order to integrate ICT.

Research has revealed that though teachers are now using ICT, they often use it purely as a presentation tool and not in a transformational way. They use ICT to do their traditional teaching. Ertmer (2005) has examined teacher use of technology in the US and concludes that teachers are integrating technology but that it will take more time for the learning experience of students to be transformed. Ertmer says that it takes five to six years for teachers to become competent users of technology in education.

Age and Gender of Teachers

Research into whether age is a barrier to ICT integration in education is not conclusive. Jones (2004) reported that younger teachers were no more likely to use technology than their older colleagues. However, this was not supported by Empirica (2006) which found that “the younger the teachers, the more use they make of ICT in schools and the more confident they feel in its use.” This is confirmed by a recent study in Jordan which found that younger teachers were more likely to use ICT (Afshari et al 2009). Jones (2004) found that gender did seem to make a difference, however, with more male teachers than female teachers using ICT and female teachers reporting more anxiety about using ICT.

Lack of technical support

A lack of school-based technical support can be a barrier to teachers in integrating ICT. The NCTE 2005 census found that provision for technical support and maintenance was reported by 89% of schools as a very high or high priority. The EU Empirica (2006) study reported that “better technical ICT maintenance and support” was a “key

issue” for two thirds of the European schools and for 85% of Irish schools. Lack of technical support continues to impede integration by teachers (Condie et al 2007, DES 2008b).

Lack of ICT subject-based pedagogical knowledge and resources

Teachers must have the confidence and skills needed in order to use technology in a pedagogically beneficent manner and be able to support pupils in their learning. Koehler & Mishra (2008) emphasise the role of the teacher as “curriculum designer” in the classroom. When integrating technology, the teacher needs to develop technology knowledge and be able to integrate technology into their existing knowledge of their subject (content) and pedagogy. Koehler & Mishra developed their “technological pedagogical content knowledge” (TPCK) framework which illustrates all the overlapping knowledge needed by teachers using ICT.

Mulkeen (2003b) studied the pedagogical impact of access to satellite internet provision in 9 schools in 2002-03 where the teachers involved in the project received extra training, support and encouragement to integrate ICT. Even after a full year’s participation in the project, teachers still reported barriers to integration. The barriers cited by Mulkeen were “ideas, curriculum and access”. Teachers still lacked knowledge of pedagogical uses of ICT. They needed more time to identify suitable resources for their subject, to decide how ICT could be integrated and they needed more access to computers.

This is still the case in the UK according to Becta 2007 *Harnessing Technology Review*. This study states that “ICT is still a major professional development need” and further states that “Using ICT in teaching” remains the most requested topic for CPD in the General Teaching Council survey (Hutchings et al 2006, in Becta 2007).

The findings of Mulkeen (2003a) underline the slow process of natural integration of ICT in the classroom and the need for teachers to be able to avail of sustained CPD. The issue of curriculum pressure is particularly relevant in post-primary schools. Mulkeen, in his study of the NCTE Census data 1998-2002 *Schools for the Digital Age*, found that ICT was primarily used in non-examination areas in post-primary schools (NCTE 2004).

Cuban (2001) has studied why there is such a low rate of integration of technology by teachers. He compared the use of technology by engineers to that of teachers and found that engineers did not integrate technology into their working practice unless they found it beneficial either in doing the job better or in doing it more efficiently. So, too, teachers who have developed an efficient way of teaching their curriculum are unwilling to adopt new technology unless they perceive an advantage in it.

Negative attitude of the school principal was one of the constraints cited by Van Braak (2001) in his list of the human factors which impede the integration of ICT.

Just as technology leadership is effective in promoting ICT integration, so does a lack of clear leadership impede integration. In many secondary schools, the role of ICT co-ordinator is given to a Special Duties Teacher who has no reduction in teaching duties. Most of the co-ordinator's time is taken up with systems administration, maintenance and troubleshooting problems for other teachers leaving very little time for collaboration and development of ICT pedagogies (DES 2008b). As a result, teachers often have no opportunity to share experiences and learn how colleagues have made changes using ICT. The next section will examine the change process in education.

Teachers and educational change

It is generally accepted that "there can be no change in education without a change in the attitude of teachers" (Martin 2001 in Callan 2001). Eurydice (2001) noted that ICT had not changed "traditional teaching methods and the way that schools normally operate". Teachers are motivated to change their traditional teaching methodology if they feel that it is an improvement on their current practice. 'Teachers act based on what they know has worked in the past and what they are reasonably confident will work in the future' (Fiszer 2004). Fiszer states that teachers need to be immersed in a 'culture of ongoing learning' in order to implement any new idea.

McGarr and O'Brien (2007) state that "cultural and systemic factors within the post-primary system continue to curb (ICT) integration" and they say that change will be "evolutionary" since "long-held beliefs and traditions hinder change". Condie et al (2007) agree, saying that effective use of ICT in schools is about "more than changing resources; it is about changing practices and cultures".

Fullan outlines the complexities of the change process, the need to engage with others and to build relationships in order to change the existing culture and promote change. He states: “There are no shortcuts, and there is no substitute for directly engaging in improvement projects with others” and “...in order to get better at change we have to practise it on purpose” (Fullan 1991). He stresses that change takes time and effort and that on-going support is necessary in order to embed any change in the culture of the school (Fullan 2007). Mueller et al (2008) argue that teachers need to see examples of improvement and effective integration and “experience positive events” in order to use ICT. This supports Fullan’s (1991) belief that people need to experience the innovation in order to fully understand it. Rogers’ Diffusion of Innovation theory sought to explain the process of implementing an innovation and defined diffusion as “the process by which an innovation is communicated through certain channels over time among the members of a social system” (Rogers 1995 in Said Al-Senaidi, Lin Lin, Poirot 2009). Other researchers also argue that the process of integration of ICT takes time (Mumtaz 2000, citing Sandholtz et al 1997, etc.).

Mumtaz (2000) notes that some researchers refer to “teacher resistance” to change and that this phrase stereotypes teachers and does not in fact properly represent the actual situation. She suggests that teachers “selectively welcome” suitable change but that they must first overcome some barriers. Teachers are not willing to implement change in their teaching methods without good reason.

The art of teaching requires many skills, including the ability to be flexible and creative. Koehler & Mishra (2008) have defined teaching as a complex “ill-structured” and “context-dependent” discipline and argue that introducing technology, because it is constantly changing, further complicates teaching. They note the “protean” nature of technology and refer to teaching with technology as a “wicked problem”, one which has “incomplete, contradictory and changing requirements” and where each situation is “unique and novel”. They suggest that “integration efforts should always be custom-designed for particular subject matter areas in specific classroom contexts”. This approach also underlines the need for comprehensive planning for the changes in practice and culture inherent in successful ICT integration.

Lack of planning for integration

Lack of a clear school philosophy, lack of policies, procedures and a school ICT plan can also impede ICT use in classrooms. Only 56% of schools had an ICT plan according to the NCTE 2005 Census. More recently, it has been found that only 46% of post-primary schools had an ICT plan, some staff members were unaware of the plan and ICT plans often did not refer to pedagogical issues (DES, 2008).

2.6 Summary

The literature review has outlined the global and national background to the current research. It has shown the pivotal importance of modernising education for students, for teachers, for administrators and for economic progress. It has reviewed contemporary pedagogy and has examined the particular situation with regard to modern language teaching and the teaching of Irish. It has outlined enabling factors and barriers to integration. As there is no up to date data available on ICT integration in Ireland, this research project set out to fill a gap by examining integration of technology in secondary education ten years after *IT 2000*. The next chapter outlines the methodology used in this project.

3 Methodology

3.1 Introduction

The review of the literature has raised several issues for research with regard to the integration of ICT. In order to examine those issues and learn from them, it was decided to conduct a case study of one second-level school. This chapter describes the methodology used in the research, justifies its choice, shows how the research was carried out and provides assurance that ethical issues were appropriately dealt with.

3.2 ICT integration in second-level schools

The Literature Review has shown the necessity and the benefits of integrating ICT in education. ICT has the potential to completely revolutionise schools for teachers and students, for administrators and managers.

Notwithstanding this, and the necessity of preparing young people for participation in the smart economy which it is anticipated will provide the job opportunities of the future, teachers generally have been slow to change their traditional practice. Much of the research (Cuban 2001, Mulkeen 2004, OECD 2003, DES 2008b, Becta 2007, Empirica 2006) points to the fact that only a small proportion of teachers have successfully integrated ICT in classroom activities. As integration is a process which takes time, it was decided to research current ICT integration in one school, focusing particularly on MFL and Irish language teaching.

There has been no dedicated research done on how teachers of Irish integrate ICT. The report *ICT in Schools* (DES 2008b) has identified the teachers of Irish as the group of teachers with the lowest use of ICT. It has shown that, of all subject teachers, teachers of Irish are least likely to have a computer in their classroom or to use peripherals such as data projector or IWB.

This research documented current use of ICT by teachers of all subjects in one school, identified factors which influenced the teachers to integrate or not to integrate ICT. The researcher then narrowed her focus and examined the use of ICT by MFL teachers and Irish teachers.

The next section outlines more fully the aims and objectives of this research project.

3.3 Aims/ objectives/ research questions

The following Research Questions were explored:

- How is ICT used in teaching and learning in general in the study school?
- What are the attitudes of teachers to using ICT in their personal life, in their classroom and with their students? What benefits do they perceive in using ICT? Are teachers skilled, confident and motivated to use ICT?
- What use is made of ICT by teachers of Modern Foreign Languages?
- What use is made of ICT by teachers of Irish?
- What factors facilitate or hinder teachers in their use of ICT?

Data was gathered on the integration on technology by teachers of all subjects with a view to comparing use in different subject areas. Section 3.4 outlines the research methodology.

3.4 Research Methodology

This section outlines the approach taken in this study, describes the setting where the study was conducted, how the sample was chosen and discusses the ethical issues which governed the procedures used.

3.4.1 Research Approach

An examination of educational research literature was necessary in order to properly plan and implement the research project. The necessity of adopting a systematic approach to conducting the investigation was critical in devising the form of the project (Bell 2005). Bell supports Cohen, Manion and Morrison (2000) who state that:

‘The particular value of scientific research in education is that it will enable educators to develop the kind of sound knowledge base that characterizes other professions and disciplines.....’ (Cohen, Manion and Morrison 2000)

Several research paradigms were investigated including quantitative and qualitative research, the case study, action research and mixed methods research. Due to the context of the study and the short time available, action research was deemed impractical.

A case study approach was chosen because the case study 'provides an opportunity for one aspect of a problem to be studied in some depth' (Bell 2005), it 'can combine a wide range of methods' and because the wide range of methods used 'will provide the data you require to produce a complete piece of research' (Bell 2005). A further advantage is that they 'present research or evaluation data in a more publicly accessible form than other kinds of research report' (Adelman et al 1980 in Bassey 1999). Cohen et al (2000) state that 'Case studies can establish cause and effect...'

Within the case study paradigm many types of case study have been identified. A 'descriptive' case study was chosen as the project model. A descriptive investigation, according to Best, concerns:

'conditions or relationships that exist; practices that prevail; beliefs, points of views, or attitudes that are held; processes that are going on; effects that are being felt; or trends that are developing.' (Best 1970, in Cohen et al 2000)

Yin adds to this: 'A descriptive case study presents a complete description of a phenomenon within its context' (Yin 1993 in Bassey 1999).

Mouly's definition of research guided the process:

'Research is best conceived as the process of arriving at dependable solutions to problems through the planned and systematic collection, analysis and interpretation of data.' (Mouly 1978, in Cohen et al 2000)

A mixed methods methodology was chosen because using a range of approaches to gather data would yield as accurate a picture as possible of ICT integration in the study school. This would also provide triangulation and thus aid reliability and validity. An online survey, examination of documents, recording of relevant comments by teachers, interviews, diary keeping and researcher observation were the methods used, thus incorporating both quantitative and qualitative methods. The project was planned bearing in mind 'the purpose of the study, the type of information needed, *and* the willingness of the respondents to spend the necessary time completing diaries, questionnaires or being interviewed' (Bell 2005).

Quantitative methods, such as surveys, generate comparable data across people or across sites (Cohen et al 2000). Qualitative methods gather 'unique, non-standardised,

personalised information about how individuals view the world' (Cohen et al 2000). Qualitative data was collected through diary recording, interviews, face to face surveys and by observation and recording of relevant matters.

It was decided to design the survey using the online resource, SurveyMonkey. Disseminating the survey through an email link had two immediate benefits: the researcher encouraged ICT use by teachers and information was obtained about teachers' use of email technology.

3.4.2 Setting

The setting chosen was a large second-level school. There was a history of strong management support for the integration of ICT, and it was ascertained at an early stage in the study that permission to conduct the study would be readily obtained.

3.4.3 Sample

As it was not possible to survey all second-level schools, the researcher opted for a non-probability or purposive sample school for this study (Cohen et al 2000). A school known to the researcher was chosen where the researcher had access to the staff and it was practicable and convenient to conduct the research. This is also referred to as convenience or opportunity sampling (Cohen et al 2000, Bell 2005).

A purposive sample was also used to conduct the other methods of research. For example, the teachers chosen to complete the IT Diary or be interviewed were chosen from the list of those who volunteered further help when completing the survey. The interviews were conducted with the teachers who had been identified by the principal as high users of technology. As the project progressed the researcher particularly focused her research on language teachers. This approach, i.e. deciding exactly how to narrow the focus of the study, is referred to as 'internal sampling' by Bogdan and Biklen (2007).

The research school was deemed 'fit for the purpose' for a number of reasons (Cohen et al 2000). It is a large mixed school with a good cross section of teachers of all ages, both male and female. The school is situated in a large town and has a mix of students.

The study school is typical of many other second-level schools in Ireland and the information obtained would be representative of similar schools (Cohen et al 2000).

All full-time teachers who were on the principal's email list were asked to complete the survey. The advantages of choosing these participants were that the researcher had easy access to them by email and in person. There was flexibility in the timing of the research and suitable times to approach individuals were readily identified.

3.4.4 Ethical Considerations

Ethical considerations were to the fore at all times while the research was being carried out, to protect the research participants, the researcher and the research study itself, in accordance with best practice (Cohen et al 2000).

The first consideration was to obtain 'access and acceptance' from the Principal and the Board of Management of the school (Cohen et al 2000). The author first outlined the project to the principal and 'informed consent' was requested (Cohen et al 2000, Bell 2005). The practical benefits to the school (including raising the profile of ICT with the staff and providing a vehicle for teachers to make comments on their use of technology in school) were discussed. The researcher undertook to keep the principal informed as the project developed and to provide a copy of any questionnaire, letter, etc. to the principal before it was disseminated. The researcher also undertook to incorporate any school-based questions or concerns into the research, if possible. A letter was drafted and sent to the Board of Management seeking their permission to conduct the research. Both the Principal and the Board of Management sanctioned the study (Appendix B).

The second consideration was to obtain the 'informed consent' of the teachers. An explanatory email was sent to teachers along with a link to the online survey (Appendix C). Teachers were invited to contact the researcher if they had any concerns. It was also stated that the results of the research would be shared with the staff at a future date, thus benefitting all involved.

A third consideration related to the issues of confidentiality and anonymity. It was explained at a staff meeting that the research was being conducted solely for the

purposes of the University of Limerick Master's course of study, that the study would be conducted adhering to proper ethical guidelines, that survey responses would be confidential and that anonymity would be preserved.

3.5 Research Procedure

A review of methodology literature relating to educational research was carried out to ensure that correct procedures were used and that the research process would be effective. 'The process of *operationalization* is critical for effective research', according to Cohen et al (2000). The research instruments chosen are detailed in chronological order.

3.5.1 Online ICT Survey

Cohen et al (2000) point out that surveys 'gather data at a particular point in time with the intention of describing the nature of existing conditions....' They add that surveys are useful in gathering data 'on a one-shot basis' and therefore are 'economical and efficient'. Trochim (2006) states that a "one-shot survey" is "probably one of the most common forms of research" and for descriptive research, such as this project, "is clearly a strong design". An online survey instrument was chosen as befitting the technology promotion aim of the research and for economic and environmental reasons. An additional advantage was that each question could be programmed. For example, where a "single-option variable" (Trochim 2006) response was desired, it was possible in SurveyMonkey to ensure that respondents filled it in correctly.

In designing the survey sensitive questions were not included. Bell (2005) has identified age as in the 'sensitive category'. Therefore, respondents were not asked for their age. However, length of teaching experience was included.

Care was taken to ensure that the appearance and layout of the questionnaire were appropriate (Bell 2005). The range and format of questions available within the basic free version of SurveyMonkey were deemed appropriate.

The questions referring to use of ICT featured five-point Likert scales (Cohen et al 2000, Trochim 2006). In all cases the scaling was "bipolar", with a neutral central point and the two ends of the scale at opposite positions (Trochim 2006). The last

section thanked respondents and requested volunteer teachers to help further in the research. Ten questions were used, following the basic free version of SurveyMonkey. A further consideration in designing the questionnaire was to use a variety of question formats in order to illustrate the versatility and possible pedagogical use of the online survey (Appendix D).

The questionnaire was piloted (Bell 2005, Cohen et al 2000) by distributing it to teachers outside of the study school and it was amended as a result of feedback received. The final version was clearer in its purpose, easier and quicker for respondents to complete and designed to yield data suitable for analysis. By programming the questions it was possible to ensure that specific questions were not left unanswered.

The survey was distributed to 56 teachers. One week later, only 19 teachers had completed it, a response rate of 34%, and a reminder email was sent. Hoinville and Jowell, 1978 (in Cohen et al 2000) identified the initial follow-up letter as the 'most productive' factor in maximising response rates to written surveys. Only 3 more teachers filled in the survey in the next week. These rates of return, at 39% overall, are lower than the rates outlined by Cohen et al (2000) for postal questionnaires with one follow-up reminder. Therefore, the researcher decided on further action.

A paper copy of the email was distributed to all staff. It became apparent, from comments made, that the paper reminder was the first time a considerable number of teachers had heard about the survey.

In this reminder, the researcher offered to provide a paper version of the survey. No teacher requested a paper version. The researcher concluded that those who had not filled it out already did in fact intend to complete the survey online. While the vast majority of teachers expressed a willingness to complete the survey, the response rate was slow.

The researcher identified reasons why teachers may not have returned the survey, including not accessing school email and illness. The researcher then diplomatically approached individual teachers, bearing in mind the advice of Bell (2005) that 'some

effort should be made to encourage respondents'. Finally, 48 surveys were completed with 44 valid fully-answered responses. During this time the researcher helped two teachers access their school email for the first time. Several teachers required information on using the email hyperlink.

As the survey was proceeding, other research instruments were also used concurrently.

3.5.2 Review of Documents

The researcher sought access to documents relating to ICT use in the study school. Some documents were available in the ICT planning folder, such as procedures for computer rooms, acceptable use policy, resources available. Other policies and documents, such as the school e-learning plan, were being revised and were supplied as they were updated. The researcher was very conscious throughout the research process that she was relying on the goodwill and availability of others (Bell 2005). The documents requested were all primary source documents (Duffy 2005 in Bell 2005). In addition to the above, an IT Diary was used to gather data.

3.5.3 IT Diary

Researchers often use diaries when collecting data (Bell 2005). The last question in the survey asked if respondents would be willing to help further by completing an IT Diary or by being interviewed about their ICT use. Bell warns that there can be problems in gathering diary evidence. This occurred in the current study. One of the main problems is the time required. Though fifteen teachers offered such help, five of them when approached said that they could not commit the time required to ensure the diary was accurate. Ten teachers offered to complete a one-week diary. Four diaries were completed on time and six were received altogether. The researcher had to be flexible and fit in with the exigencies of school life.

When the researcher had to remind the teachers to complete the diary, she negotiated with them (Cohen et al 2000). Some teachers wrote down the information requested in a once-off way or completed a diary for one or two days. Others offered to do a short interview instead. This was a satisfactory outcome as the researcher was still able to obtain the information sought.

The interviews focused on teachers who were identified by the principal as high technology users, and Irish teachers.

3.5.4 Structured Interviews

The researcher conducted structured interviews (Cohen et al 2000) to gather data on individual teachers' use of ICT. The questions were presented in written form to the volunteers in advance of the interview. This was done in order to facilitate teachers and make best use of the time available. The structured interview was used due to its 'fitness for purpose' in gathering factual information. Lincoln and Guba maintain that:

'the structured interview is useful when the researcher is aware of what she does not know and therefore is in a position to frame questions that will supply the knowledge required...' (Lincoln and Guba 1985, in Cohen et al 2000).

The wording and sequence of the questions were predetermined, with open-ended responses (Appendix D).

Teachers were more comfortable with the interview when they knew the questions. The researcher explained the research and the purpose of the research to all interviewees (Hitchcock and Hughes 1989 in Cohen et al 2000). Teachers who were low users of technology were concerned that they would be unable to make any contribution to the research and the researcher explained to them that she wished to document ICT use and lack of use.

Some teachers provided written information and the researcher was able to add to these notes during the interview. The researcher's focus was on obtaining relevant information and she was able to elaborate or ask questions if necessary. The researcher asked the participants' permission to take notes summarising the responses as the interviews proceeded. This was judged to be a satisfactory way of recording the responses (Cohen et al 2000). The interviews were generally short, from five to twenty minutes duration, as the researcher was conscious that teachers had already contributed to the research by completing the online survey and she did not wish to make excessive demands on their time. Nine teachers were interviewed, including all the MFL and seven Irish teachers. Some teachers provided the information required through their use of the IT Diary or provided written replies to the interview questions. This facilitated both the respondent and the researcher, as it was often difficult to arrange a

suitable time for interview or appointments made could not be kept due to unforeseen circumstances. Further data was collected by the researcher in the form of comments made by teachers when discussing the research.

3.5.5 Teacher Comments`

The researcher discussed the research project with all those teachers who offered to give extra help and with other teachers who expressed interest. During these conversations many pertinent comments were made. On such occasions the researcher asked permission to quote the comment, reminding the teacher that confidentiality and anonymity would be preserved in the report. In all instances the teacher gave permission. These comments were noted in a special diary by the researcher. The researcher also documented her own observations. This research project, therefore, is the result of data gathered from multiple sources and provides “thick description” (Bogdan and Biklen 2007, Cohen et al 2000). This methodology was used in order to provide triangulation and to ensure the validity of the study.

This was a small case study and as such had inherent strengths and limitations which will now be discussed.

3.6 Strengths and Limitations of the Methodology

This researcher studied the relevant literature and followed recommended procedures in order to produce valid and effective research. The steps taken to establish validity are now outlined.

3.6.1 Validity

“Validity is an important key to effective research” and “is ... a requirement for both quantitative and qualitative/naturalistic research” state Cohen et al (2000).

Triangulation of research methods were used to validate the research. Triangulation is defined by Cohen et al (2000) as “the use of two or more methods of data collection”. They add, citing Campbell and Fiske (1959), that “Triangulation is a powerful way of demonstrating concurrent validity, particularly in qualitative research”. They cite Lin (1976) who states that reliance on one method of data collection does not give the researcher the confidence in the findings that is provided when data from one source are supported by similar findings from another source. This mixed methods

methodology was used in order to contribute to the validity and the trustworthiness of the study. The survey was used to obtain data from the whole staff and the other methods were used to obtain data from individual teachers. Smith (1975), cited by Cohen et al (2000), identifies six levels of analysis of data: two levels were used in this study, the individual and the organisation. Cohen et al say that, "Where possible, studies combining several levels of analysis are to be preferred".

One strength of the case study is that it can supply very detailed data. This is referred to as "thick description" by Geertz 1973 (in Bogdan and Biklen 2007). Cohen et al say that case studies provide the "thick description" that "can catch and portray to the reader what it is like to be involved in the situation" (citing Lincoln and Guba 1985). They suggest that "validity might be addressed through the honesty, depth, richness and scope of the data achieved". This contributed to the choice of methodology.

A further consideration in choosing this methodology was that 'case studies allow generalisations either about an instance or from an instance to a class' (Adelman et al 1980 in Bassey 1999). Cohen et al (2000) agree with Adelman et al and refer to the description of a case study by Nisbet and Watt (1984) as 'a specific instance that is frequently designed to illustrate a more general principle'. Cohen et al argue that there can be several types of generalisation. They cite the generalisation that case studies allow as one of the possible advantages of this methodology. One example of generalisation given by them is 'from the single instance to the class of instances that it represents'. This would indicate that generalisations could be made in the case of this research project, i.e., this large second-level school might act as a case study to catch significant features of other similar schools.

Though some researchers argue that generalisations cannot be made from the study of one single case, the study school used in this particular project was chosen because of the fact that it had the same characteristics as many other schools (DES Statistics). It is likely that research in any of the large public second-level schools would yield similar results because all those schools have been integrating ICT from the same time, with the same funding, training and constraints. Generalisation in the context of this research would be classified by Bassey (1999) as 'fuzzy generalisation', which he views as a 'qualitative measure' as opposed to a strictly scientific or statistical

generalisation. This researcher has striven “to minimise invalidity and to maximise validity” (Cohen et al 2000). The next section will discuss some of the limitations of the present study.

3.6.2 Limitations

This was a small research project and thus limited in what it could achieve. The study was limited by the size of the sample, the subjectivity of the researcher and the fact that the researcher was a participant researcher, which could lead to observer bias and lack of objectivity. These limitations will now be discussed.

The researcher wished to investigate the use of ICT in second-level schools, but it would have been impossible to conduct a study of all second-level schools in the country or even in a county. Therefore a sample school was chosen. The questionnaire/survey was distributed to all 56 teachers in the school. While this is a large staff, it is a small sample for a survey. Cohen et al (2000) say that the attractions of a survey are its “generalizability..., its ability to make statements which are supported by large data banks and its ability to establish the degree of confidence which can be placed in a set of findings”. They add that sample size varies according to the style of research and that “a survey style usually requires a large sample”. They note that there is no clear-cut answer as to how large the sample must be for a research project but that “a sample size of thirty is held by many to be the minimum number of cases if researchers plan to use some form of statistical analysis on their data”. In this case, the researcher received 44 fully-completed responses to the survey which is still a small number from only one school and this would lead to problems in generalising findings to all teachers in second-level schools. However, due to factors already mentioned in Section 3.6.1, the researcher anticipated that it would be possible to make fuzzy generalisations in analysing the data and that the study would therefore be worthwhile.

An additional limitation of the current study is that it was shaped by one individual with a particular set of experiences and interests who also participated in the research. Bogden and Biklen (2007) assert that “all researchers are affected by observers’ bias”. They state that “Questions or questionnaires, for example, reflect the interests of those who construct them.....” They add that it is impossible for a researcher to eliminate

their past experience and interests and that they should not attempt to do so, but that they should aim to become more reflective and realise that past experiences “can help shape and enrich” current research. They add that the researcher should be “open to be shaped by the research experience” and that his/her thinking should “be informed by the data”. In order to avoid subjectivity and to obtain some objective data, this researcher used the survey to initially gather information.

The fact that the researcher was also a participant in this study meant that she had a very clear appreciation of the issues involved and could understand the factors which influenced the different behaviours of the teachers. Cohen et al (2000) state that “researchers inhabit the world that they are researching” and that their activity may sometimes cause the Hawthorne or halo effects. This researcher approached the research in a scientific manner at all times in order to minimise such effects.

An additional limitation in the collection of survey data is that this involved self reporting, which relies on the respondent giving accurate information. In order to minimise the “observer effect” (Bogdan and Biklen 2007) or the “reactivity effect” (Cohen and Manion 2000), the researcher explained at a staff meeting that the purpose of the research was to obtain a picture of normal, everyday use of ICT. She also observed ICT use and interviewed teachers. In this way findings were supported by triangulation.

Notwithstanding the limitations mentioned above, the methodology used in the study was practical in the circumstances and led to a worthwhile project. However, a number of problems were encountered during the process.

3.6.3 Problems encountered

One problem encountered related to the issues of confidentiality and anonymity. The researcher promised that neither the school nor any individual teacher would be identified in the report. Therefore both the school and the teachers were referred to in general terms. The researcher was careful at all times not to include anything in the report which would contribute to it being recognised. It was also decided to provide the principal with a copy of the report before it was finalised so that any concerns would be identified.

Another problem related to the teachers' lack of use of their school email facility. This became apparent from the paucity of surveys completed and was confirmed by the reaction of several teachers to the paper reminder, "I never use my school email", "I only go into my school email every two or three weeks", "I didn't know about your survey", "You know me and technology, I'm not good at doing email" (Teacher Comments).

The complex nature of school and the busy lives of teachers meant that many teachers did not initially complete the survey. This became apparent when the researcher asked teachers if they had completed the survey. Many teachers were encouraged to complete the survey when they heard that it would only take around 5-10 minutes to complete and that it was mainly a 'tick-the-box' survey. Nine teachers subsequently mentioned to the researcher in conversation: "You were right; it only took 5 or 6 minutes".

Technical problems caused a delay for two teachers as their school email address was not working. The fact that it was an online survey was an additional deterrent for some teachers, as they did not know what to expect.

In the other parts of the research, it became apparent that the busy lives of teachers meant that some of those who had offered to complete an IT Diary or to be interviewed had difficulty doing so.

The findings of the research are presented in Chapter 4, which follows.

4 Findings

4.1 Introduction

This chapter presents the main findings from the case study research project which has been described in Chapter 3. It draws from all the data gathered through the online ICT survey, the interviews, the IT Diaries, the review of documentation, observation of ICT usage in the school and comments from teachers. This section begins with a detailed description of the study school followed by the main findings from the case study.

In order to facilitate discussion of the findings in Chapter 5, the findings are presented in sections which reflect the issues which emerged in the literature review. These issues are grouped under the headings of institutional or school-based issues, resources and teacher-based or personal issues. Institutional issues include level of integration of ICT, school planning and ICT training. School-based resources are then outlined, including hardware, software and technical support available to teachers. Finally, findings relating to teacher-based issues are presented, including personal resources and use of technology, teacher ICT skills and confidence in using technology, pedagogical beliefs and time available.

4.2 The Study School in Context

This study was conducted in St. Paul's, a co-educational public secondary school with 750 students in a large town in the south of Ireland. All ICT funding comes from the DES. There is a history of management support for ICT. In the mid 1990s, the principal began developing ICT infrastructure by setting up a dedicated computer room. Initially this was used by a very small number of teachers, predominantly maths teachers. Under the *IT 2000* initiative, in-house Phase 1 and Phase 2 training was provided for all staff (School Documentation). Management provided participating staff with Office 2000 software to encourage them to develop ICT skills. The principal has been increasing the number of computers and other resources available as funding allowed. Under the Schools Broadband Programme the school was equipped with a partly wireless broadband network and computers were installed in offices and specialist classrooms. In 2007/2008, all teachers in the school were provided with a school email address. Further in-house training courses have been planned and

organised as needs were identified. Staff members have always been encouraged to attend ICT courses held in the local Teachers' Centre and these courses are well publicised in the school.

Data projectors have recently been supplied to all teachers who requested them, bringing the total to 35. The school has been accepted for inclusion in the DES 100Mbps Project and is currently improving the existing school network, equipping all classrooms with a data projector, acquiring laptops for students and introducing the ePortal administration system. A school e-plan has been drawn up by the ICT planning group who regularly review progress (School Documentation /Interviews /Observation).

There is a good demographic mix of teachers in the study school. Of the 56 full-time teachers, 64% are female and 36% are male. This is broadly in line with statistics nationally (OECD 2009).

Statistical data was gathered about ICT use by all teachers in the study school through an online survey which yielded rich quantitative data. The demographic mix of the 48 respondents reflected the entire staff: 69% were female and 31% were male. 36% of respondents had less than ten years teaching experience, 31% had between ten and twenty-five years teaching experience and 33% had more than twenty five years teaching experience. This mirrors closely the profile of the staff. 44 surveys were fully-completed and 4 were incomplete. Replies were received from teachers of all subjects taught in the school with one exception and the findings are therefore representative of a full school staff.

The research findings which relate to the school as an institution are outlined in the next section.

4.3 School-based findings relating to integration of ICT

4.3.1 Integration of ICT by all teachers in the study school

The online survey was the instrument used to quantify the level of integration of ICT by all teachers in the study school. Teachers were given a list of technologies in

Question 4 and asked to indicate how often they used them in their teaching. A range of five responses was available from “Most days” to “Never”. A large number of teachers reported that they are frequent users of a variety of technologies: computer (82%), personal laptop (80%), internet (80%), printer (80%), data projector (69%) and email (56%). This data is supported by comments made by DES inspectors following Subject Inspections. The inspectors praised the “seamless way” in which ICT was integrated (DES Inspectorate /School Documentation). Observation by the researcher also confirmed teacher collaboration and high use of the above technologies in classrooms and in the staffroom.

As part of the School Development Planning Initiative (DES 1999), some time is allocated by the principal for Subject Department meetings three or four times per year. This time is used for administrative planning but also for collaboration on programmes of work, resources, etc. Several subject departments now collaborate to develop and share resources, including ICT resources (Teacher Comments, Interviews).

Some technologies are not often used in teaching: digital cameras, camcorder, scanners and IWB are generally not used by most respondents. The researcher noted, however, that digital cameras are used extensively to record school activities. This observation is supported by data from Question 3 where 45% of teachers indicated that they frequently use a digital camera outside of school. A majority of respondents (82%) reported that they rarely or never use an IWB and only one teacher reported using an IWB “Most days”, again confirming the researcher’s observation.

Extensive use of technologies by teachers outside of school is reported. There is frequent use of a personal laptop (91%), email (86%), and printer (85%). The internet is extensively used: 89% of respondents browse and 62% frequently bank or purchase goods or services online (Survey, Question 3). Teacher Comments confirm this data.

42 teachers (93%) frequently use a mobile phone outside of school. As the use of mobile phone technology by students is currently not allowed in the school, this technology was not listed in Question 4 in the survey (Technologies used in teaching).

Comment [MoB1]: ...in the survey.

4.3.2 Integration of ICT by teachers of Modern Foreign Languages

Four of the five MFL teachers completed the online survey. Answers to Question 4 confirmed significantly higher levels of use in the classroom by MFL teachers than the average for all teachers for personal laptops (100% versus 80%) and the internet (100% versus 80%) and slightly higher levels of use for data projectors (75% versus 69%). Lower levels of use were reported for computers (50% versus 82%); possibly reflecting the fact that all four MFL teachers have a personal laptop and only one has a computer in the classroom. Lower levels of use were also reported for email (50% versus 56%). These teachers confirmed that they normally use school email to send resources to one another or to themselves and only occasionally to send resources to students or receive queries from students absent from school. One teacher commented later that he has started to use email to collect homework from 6th year students. However, it emerged that only a small number of students (less than 10%) used email. MFL teachers frequently collaborate to develop and share digital resources (Observation by the researcher/ Interviews).

Question 3 of the online survey gave information about MFL teachers' use of ICT outside of school. This confirmed high use of personal laptops and the internet by all MFL teachers and higher use of email and digital camera outside of the classroom.

All four MFL respondents are frequent mobile phone users.

4.3.3 Integration of ICT by teachers of Irish

Seven of the eight Irish teachers completed the online survey. Data from Question 4 showed that Irish teachers' use of ICT in the classroom was significantly lower than the average for all teachers. Only 57% frequently used their own laptop (versus 80% for all teachers, 100% for MFL teachers); only 43% used a data projector (versus 69% for all teachers, 75% for MFL teachers) and only 29% used email (56% for all teachers and 50% for MFL teachers). While only one Irish teacher has a computer in the classroom, five have a data projector but only three use it frequently. One teacher has not identified resources and the other teacher has no personal laptop. This data was supported by information from the Interviews, Written Submissions and Researcher Observation.

Question 3 of the online survey gave information about Irish teachers' use of ICT outside of school. This data presented a somewhat different view of their use of ICT, with high use reported. All seven Irish teachers (100%) frequently use a laptop (one teacher uses her husband's laptop at home), 85% frequently use email. 71% often use a home computer. 71% frequently browse the internet while 29% are occasional users. All Irish teachers use a mobile phone most days.

4.3.4 Training

59% of all teachers indicated that they had not had enough training (Survey, Question 7). As outlined in Section 4.2, training is regularly provided, on a needs basis, by the school. Recent training includes sessions on the use of data projectors and ePortal. Training takes place during staff days, at lunch time and after school, depending on the topic and the time needed. When consulted regarding the development of the survey, the school principal said that he would like information on staff training needs, thus illustrating the importance attached to training.

A third of teachers indicated that they need more training (Question 9). Those who specified the type of training needed noted a number of different areas, including revision courses (7 teachers). One teacher noted that she "got lost in the large classes" on the original course and "It was survival of the fittest". In the same question only 18 of the 44 respondents indicated that they were "very confident" in using ICT with their students. In comments made to the researcher a number of teachers mentioned that they lacked skills and intended to do a course in the future.

4.4 Findings relating to resources

4.4.1 School-based Resources

This section will examine the range of school-based resources identified. It will include hardware, software, time and technical support.

As revealed in Section 3.2, the school has been adding to its ICT resources as funding became available. A new school website is currently under construction, the ePortal administration software is to be introduced and it is planned to develop a learning platform at a later stage (School Documentation).

Resources include two dedicated computer rooms, one with 24 computers, printer, scanner and data projector and the second with 20 computers, printer and data projector (School Documentation). These rooms can be booked. There are three computers, a printer and a photocopier in the staffroom, all connected to the school network. All science laboratories, most specialist rooms and some general classrooms are fitted with a networked computer and data projector. 75% of classrooms are now fitted with a data projector. Some teachers have a school computer in their classroom, while most use their personal laptop. There are two bookable IWBs in the school. A digital camera, a portable data projector and four camcorders can also be booked. Two laptops are available for teaching purposes (School Documentation).

These resources are considerable. However, in the context of a student population of 750 students and a staff of 56 teachers, teachers do not feel that these resources are adequate. Teachers were asked in the survey (Question 7) to identify factors which deter their integration of ICT in the classroom. From the range of ten possible reasons suggested, teachers identified a lack of computers as the main reason. 50% of teachers said that it was “Very true” or “True” that “There are not enough computers available in the school”. A further 25% said that it was “Somewhat true”. Only 25% of teachers said that this was “Not very true” or “Not at all true”.

This data from the online survey is supported by comments from teachers during the interviews. Some teachers said that they did not have enough access to a computer in school themselves, e.g. “I use the Irish Department laptop but it is not always available” (Interview). Another teacher said: “I have no computer or data projector in my classroom and don’t have a laptop” (Teacher Comment).

Other teachers said that there were not enough computers in the computer rooms for students, e.g. “1 computer per student is the ideal for computer room, students must share at the moment” (Interview), “Not enough working computers” (Interview). One teacher noted that while teachers had been given a school email address, there was no arrangement for students to be given a school email address (Interview).

Some software resources are purchased by the school. The survey showed that only 20% of teachers found that the statement that there was “a lack of suitable software programmes/online resources” in their subject was “Very true” or “True”.

The IT Diaries and Interviews provided further information about software resources used by teachers. Many teachers said that they used Microsoft Word and/or PowerPoint in planning, writing notes for students, to present material, to prepare worksheets, to revise and to set tests. All staff who attended the *IT 2000* Phases 1 and 2 school-based in-service courses were provided with a free copy of Microsoft Office 2000, since updated to Office 2003, which is used by many teachers (School Documentation). Some teachers use Excel to track students’ progress or Publisher to prepare class newsletters (Teacher Comments).

In the MFL department four of the five teachers now have a data projector in their classroom. All four teachers confirmed that they use these in many ways. PowerPoint and Word are the software programmes most used by MFL teachers (IT Diary, Interviews).

All Irish teachers commented that the recent in-service courses in teaching Irish (a one-day course each year for three school years) were excellent and provided motivation and pedagogical inspiration to integrate ICT. One Irish teacher noted that the in-service courses had helped her integrate ICT in preparation of class materials and in accessing suitable websites (Interviews).

4.4.2 Subject-based resources

Most respondents (80%) to the survey indicated that they could locate suitable software programmes/online resources for their subject (Survey, Question 7). MFL teachers said that they access and share attractive and motivating digital resources online and that this facilitates their integration of technology. They also produce and share a variety of materials in order to cater for the different learning styles of students. Teachers of other subjects reported that they develop resources together and share them through the school network. Teachers involved in Project Maths collaborate extensively (Teacher Comments).

Teachers use the internet to access up-to-date information, to find images to enhance presentations, to compose Photostories with their class or for illustrative purposes (IT Diaries).

School and educational websites were used to access interactive exercises for students, e.g., Web 2.0 sites which allow students progress through a variety of exercises on a topic and give the students instant feedback. Some websites provide explanations to pupils who have made mistakes and allow them redo the exercises to achieve awards, e.g., the Quia and IXL Maths websites (Interviews).

By comparison, the teachers of Irish report few such interactive resources. However, one MFL and Irish teacher said that she has adapted MFL digital resources accessed online for her Irish language classes (Interview).

4.4.3 Technical support

Technical support emerged as a critical issue for many teachers. Question 7 in the survey asked teachers to indicate which factors from a list of ten impeded their integration of ICT in the classroom. A majority of teachers (68%) said that it was true or somewhat true that they needed more technical support while only a third of staff (32%) indicated that they did not feel such a need. This was the second most frequently noted barrier to integration.

This finding was closely mirrored by the answers given to Question 8 where 32% of respondents said that it was “Very true” or “True” that they “needed more technical support to use ICT in school” and a further 34% said that this was “Somewhat true”. This finding was further supported by comments made by teachers, e.g., “I can’t troubleshoot”. The school has a contract for outside technical support on a needs basis but the ICT co-ordinator continues to be asked for help.

This data was supported by comments made to the researcher by many teachers, including high users of ICT.

4.5 Findings related to Teachers

This section is divided into two inter-related sub-sections. Firstly, findings relating to the factors which have influenced teachers to integrate ICT in the classroom are presented. These include the teacher's pedagogical motivation, their own ICT resources, skills and confidence. Secondly, factors which hinder integration are presented, which are often the converse of the facilitating factors.

4.5.1 Factors which have encouraged integration of ICT by teachers

Pedagogy

An important motivational factor for many teachers was the pedagogical aim of ensuring that all students would be familiar with computers. 93% of survey respondents agreed with the statement "All students need to become computer literate" (Question 6). Comments from all teachers supported this notion, as did the fact that 98% of respondents disagreed with the statement: "I don't see any pedagogical benefit in integrating ICT into my teaching" (Question 8).

Teachers view ICT multimedia as an aid in catering for multiple intelligences and different learning styles (Interviews, IT Diaries, Teacher Comments). ICT is used as a teaching tool to revise material to be learned visually, orally and interactively, in multiple ways, to present attractive, authentic material and to aid student motivation (Interviews, Teacher Comments). Many teachers use images to help visual learners; "The visual aspect is very helpful for students" (Interviews). One teacher found that using the data projector to give notes "keeps students interested. Students prefer taking notes to getting paper and forgetting about it" (Interview). A Geography teacher uses camcorders to promote active learning by recording interviews (Teacher Comment). MFL teachers organised an email penpal project in 2007/2008 and found that students were very motivated by communicating with real French teenagers (Interview).

Digital Divide

Many teachers are conscious of the digital divide and this motivates them to provide opportunities for students to use computers (Teacher Comments). One teacher provides access for her students in the computer room several evenings after school (Interview).

Student motivation

98% of teachers said that students like using ICT and 74% of teachers thought that students work better when using ICT (Survey, Question 6).

Personal use of technology

Teachers' personal use of ICT outside of the classroom was surveyed (Survey, Question 3). A large number of teachers frequently use the internet (90%) and email (86%) and 91% of teachers use mobile phones "Most days" outside of the classroom.

Many teachers identified ownership of a laptop as the turning point for them in starting to integrate ICT. When high use teachers were asked what advice they would give to teachers beginning to use technology, they always included the importance of having a personal laptop to develop skills, confidence and digital resources (Interviews, Teacher Comments).

Teacher motivation

77% of respondents agreed with the statement "Using ICT motivates me to improve my teaching". Some teachers added their own comments, e.g., "It is wonderful to be able to access material to enhance one's teaching", ICT "varies teaching methods", "interactive excellent visuals" (Survey, Question 6).

Online resources available

Teachers of various subjects stated that they used the internet to get up-to-date information or resources for their subject. One teacher said that she was able to access the "latest facts" and "real life examples" to help teaching and learning in the classroom (Interview). French teachers said they were able to access "the latest news items in language accessible to their students" (Interviews). Irish teachers could also access relevant material for advanced students but reported a lack of suitable material for students with limited knowledge of the language (Interviews). One teacher, a high user of ICT, commented that she could "see pedagogical uses for online surveys" such as SurveyMonkey (Teacher Comment).

Time saved

Teachers who have integrated ICT stated that they can save time in class preparation and when teaching and that it is easy to revise and update work saved, e.g., "ICT saves

a lot of time” and “I can easily reuse lessons prepared for one class with another class” (Interview). Teachers who use interactive exercises with their classes said that they have more time to help weaker students when the class is working on computers (Interviews, Teacher Comment). 86% of respondents said that ICT was useful for preparation of lessons and tests (Survey, Question 6).

4.5.2 Factors which hinder ICT integration

Lack of skills and confidence

A critical issue which emerged was lack of teacher confidence in using a range of technologies, e.g., hyperlinks. Some teachers freely admitted not having the confidence to access the emailed hyperlink. This contributed to the initial low survey response rate, as the researcher had to reassure several teachers that it was easy to access and to fill in (Section 3.5.1). This was supported by data from the online survey. 41% of respondents said that it was true or somewhat true that they lacked confidence (Question 7). This finding was supported by answers to Question 9 where 36% of teachers said that they needed more skills training. One teacher expressed a desire “to observe more skilled colleagues deliver classes using ICT in order to pool our knowledge and skills” (Survey Comment). Some teachers are not confident bringing students to the computer room. Only 40% of respondents said that they were “very confident in using ICT” with their students (Question 9).

Lack of use of technology, including school email

A second issue that emerged was teachers’ lack of use of a variety of technologies, e.g., their use of email. During the research, it emerged that a large number of teachers were not using their school email at all, despite the fact that the Principal had previously stated that information would be generally communicated by email. The researcher observed teacher use of email during the research period. One teacher sent an email to all staff at the beginning of the year to check that the email addresses were correct and asked teachers to reply. This teacher only received 8 replies. However, due to continuing use of email by the Principal, the researcher noted an increase in the use of email by staff during the research period.

Lack of resources

A lack of computers in the school was reported as the main factor which impedes ICT integration (See Section 4.4.1). One survey respondent stated that a reason for not using technology was a lack of “Relevant material to the topic being covered”. Some subjects are better served than others as regards the availability of suitable software. Even though resources are available for many subjects, the time involved in designing and developing suitable digital resources was mentioned by a number of teachers, particularly teachers of Irish who reported a lack of suitable resources. One Irish teacher had “spent a lot of the summer” developing digital resources for school (Interview). Another teacher said that “more time should be devoted to subject planning, identifying and developing new resources and sharing them” (Interview).

Lack of time

The time needed to gain skills and confidence in using ICT and to identify or develop resources emerged as an important issue for teachers. 52% of teachers said that it was “Very true”, “True”, or “Somewhat true” that “It takes too much time to prepare classes using IT” (Survey, Question 7). This was borne out by comments made to the researcher. Teachers who were beginning to use ICT spoke of the time required to become confident in using technology, e.g. “I am setting aside half an hour every night to practise” and “I don’t have the time to spend every night at it” (Interviews). Some teachers said that they were aware of resources available for their subject but that they did not have enough time to use them, e.g., “I lack confidence. I need to spend more time working at it and practising” (Teacher Comment).

An Irish teacher mentioned “time in setting up” as a difficulty she encounters, particularly when her classroom is not free the period before she wishes to use ICT.

Lack of technical support

Lack of technical support was identified by a large number of survey respondents as an inhibiting factor (See Section 4.4.3).

4.6 Summary

The findings from the research reveal that a large number of teachers are integrating ICT in the classroom and that some teachers are using a variety of technologies. There

is access to technology now in many classrooms but there is a lack of computers for students to use. Teachers in the study school are at all stages of integration, from high users to late adopters. All teachers agree that they must integrate ICT in their teaching for pedagogical and motivational reasons and that all students must be technology literate. Schools must facilitate students without computer facilities at home to minimise the effects of the digital divide.

Many teachers with their own personal laptop have developed materials and resources for school. Teachers of most subjects can access resources to provide variety in teaching methodology and cater for different learning styles. Teachers use the internet in many ways. Teachers acknowledge the need to have a personal laptop and access to ICT resources in their own classroom in order to practise using them and gain confidence. ICT skills training and technical support are needed on an on-going basis. Teachers recognise that they must devote much personal time to becoming skilled and confident in using ICT.

Only 40% of the teachers reported that they are confident in using ICT with their classes. This study revealed that a number of teachers lack familiarity with a range of technologies and that their integration of technology is limited. Irish teachers' use of ICT is lower than the average in the school.

The principal and the ICT co-ordinator confirmed the veracity of the data contained in the above section in discussions with the researcher.

5 Discussions

5.1 Introduction

This chapter discusses the findings outlined in Chapter 4 with reference to the literature review in Chapter 2. The issues which emerged are divided into sections which mirror Chapter 4. Section 5.2 will discuss school-based issues including leadership, how ICT is integrated by different teachers, school-based training and support. In Section 5.3 resources will be discussed and Section 5.4 will discuss teacher-based factors such as resources, personal use of ICT, competence and confidence.

5.2 School-based factors

5.2.1 Integration of ICT

High levels of use of some technologies

It is clear from the findings that much progress has been made in the study school since the introduction of computers in the late 1990s. Technology is evident throughout the school, from the surveillance cameras at the entrances to the computers and data projectors now located in many classrooms. The survey reported that ICT was being integrated by large numbers of teachers of all subjects and confirmed higher use of ICT by teachers outside of the classroom.

High usage of ICT in teaching is contrary to research, which generally reports low levels of integration (Cuban 2001, Mumtaz 2000, Empirica 2006, DES 2008b). However, these high levels are consistent with Ertmer (2005) who found that US teachers were integrating technology. This is possibly because of the time that has elapsed since Mumtaz and Cuban published their findings. Furthermore, in the Irish context, the connectivity provided by the Schools Broadband Programme (2004) was not fully in place at the time the Empirica study was carried out or the inspections on which the DES (2008b) *ICT in Schools* report is based.

Teachers of Irish have high levels of use of technology in their personal life, but some are low users of technology in school, for a variety of reasons, e.g., lack of digital resources available (NCTE 2001, DES/CoE 2008), lack of data projector in the

classroom and lack of practice and skills in using technology (Mulkeen 2004, DES 2008b). The school is installing data projectors in all classrooms, ePortal is imminent and 100mpbs high-speed broadband will be provided. Consequently, ICT integration should be further facilitated.

Pedagogical reasons for integrating ICT

The pedagogical benefits of using ICT were voiced by many teachers. Teachers wish to motivate their students by introducing attractive materials and variety of teaching methods. Teachers wish to teach to the different intelligences and cater for different learning styles (Gardner 2006). Web 2.0 applications were identified as emphasising the interactive nature of learning. Use of visual and auditory material, blogs, podcasts, Microsoft Office software or photostories authored by students with teachers' help, were examples of catering for different learning styles.

Pedagogical motivation is also illustrated by the teacher who said presentation software enabled her to keep the students actively working on the material, to discuss any difficulties and to move around giving individual help as needed. This methodology demonstrates how teachers can promote more active (Callan 2001) and interactive (Warschauer and Healey 1998) learning and a high degree of collaboration (Warschauer 1997, O'Dowd n.d., Fullan 2010) between students and teacher by using technology.

Teachers are also conscious of the digital divide (Smith et al 2008a) and that young people leaving school must have 21st century technological and analytical skills. This finding appears to contradict the Empirica (2006) finding that only 30.2% of Irish teachers are motivated to integrate ICT.

Comment [MoB2]: Have you mentioned this in findings?

Student motivation

It emerged from all sources that teachers believe using technology motivates students. This concurs with the findings of Passey et al (2004) who reported that students said that they are more motivated to learn when they are using technology (See also Baylor and Ritchie 2002, Mulkeen 2003b & 2004). DES (2008a) also stressed that when used well ICT is a powerful motivational tool.

Integration of multiple technologies

The findings reveal that while teachers are integrating ICT, they often have mastered only one technology application and are not familiar with a range of possible uses. This became clear when the survey was distributed. SurveyMonkey was selected as it is an online resource freely available which has possible pedagogical applications. Teachers had to access the survey through their school email account and this caused problems. Completing an online survey was a new experience for many teachers. This research procedure helped teachers see possibilities of another way of integrating technology. This was mentioned by one English teacher at the time and by other teachers since. The school network is not yet being used by all subject departments. This gradual integration of ICT supports the literature which says that successful integration takes five or six years (Ertmer 2005).

Leadership

Findings from this case study have concurred with the findings of previous research which found that school leadership is pivotal when introducing any innovation (Fullan 1991, DES 2001, OECD/CERI 2001, Becta 2003, 2005, 2008b, etc.). The leadership of the principal is critical in focusing on learning and cultivating a learning organisation (Martin 1999). The school principal is a high user of technology, has always been an ICT champion and has provided resources as finance became available. However, the provision of resources alone has not encouraged all teachers to use ICT.

Strategic planning to ensure that all teachers gradually integrate ICT is necessary (Condie et al 2007). This is what has occurred in the study school. The distribution of the questionnaire through an email link was particularly relevant, as the principal had just announced that email would be used as the main method of communication with staff. The principal's use of email has been found to drive forward the use of technology in the school (Mulkeen 2003a). This has proven to be the case in the study school as time went on. More teachers are accessing their school email more regularly and more teachers are using it as a means of communicating with staff. Communication with outside organisations, e.g., local primary schools, is now often by email also.

A whole-school approach is necessary to make best progress (Condie et al 2007). School leaders must consider how best to facilitate teachers in developing their technology use in a carefully planned way. The introduction of the ePortal system in the school will progress whole-school integration of ICT as class reports, etc., will have to be completed online by all teachers. The literature review has shown that teachers learn best from their peers (Fischer 2004). The case study has shown that a number of teachers collaborate and share resources. The principal has given time regularly for subject department planning meetings and this facilitates collaboration and promotes CPD.

Continuing Professional Development

Teachers must become life-long learners in order to keep up to date with advances in technology. The case study found that CPD has been regularly provided by management in accordance with the DES initiatives. Comments from teachers revealed that further training is needed in revising topics covered and in new areas such as Web 2.0 and ePortal. The existing subject department system can facilitate collaboration in this by identifying and supporting an ICT champion in each department (Becta 2008d). Teachers prefer to learn from their peers (Fischer 2004). It is important that there is at least one ICT confident teacher in each subject department. If teachers are encouraged to focus on beneficial/successful teaching applications in their own subject area, they will be more favourably disposed to devoting the time needed to integrate ICT into their teaching.

CPD and planning are inextricably intertwined. Management must plan strategies which will enable school culture/professional culture to change and become more collaborative (Becta 2007, Fullan 2010, Fischer 2004). One teacher wished “to observe more skilled colleagues deliver classes using ICT in order to pool our knowledge and skills” (Survey Comment). An audit of staff skills could be carried out as a first step in this direction. Specially trained staff mentors could then provide coaching and sustained support to others.

5.3 Resources

Infrastructure

When asked in the survey (Question 7) to identify factors which deter their integration of ICT, teachers identified a lack of computers as the main reason. This is consistent with research findings (OECD 2003, Mulkeen 2004). The recommended student: computer ratio is 5:1 (DES2008b). Including single computers in classrooms, the ratio in the study school is 12.5:1, compared to a national average in secondary schools of 7:1 and the British figure of 3.6:1. A student sharing a computer may not have time to get tasks completed, particularly in a single 40 minute class period. The recommendation that all classrooms should have 6-8 networked computers is impractical in many classrooms due to lack of space (DES 2008a). As outlined in Section 4.2, the school is now acquiring laptops and these could be made available for classroom use.

Technical support

Lack of technical support emerged as the second most frequent reason given for not integrating ICT. This is also consistent with findings from the literature review (Scrimshaw 2004, Smith et al 2008a). Several teachers said that they do not have troubleshooting skills and that this deters them from bringing a class of thirty to a computer room for 20-24 students, particularly given that many of the computers in the school are over 6 years old and some may not be working.

Broadband connectivity problems were mentioned by many teachers. The DES initiative to provide increased bandwidth to schools is eagerly anticipated.

Teachers' access to resources

Access to resources in the teacher's own classroom emerged as a factor in using ICT. Teachers who do not have a computer and data projector said that they would use them if they had them in their classroom, (Interview/Teacher Comments). This supports Mulkeen's (2003a) findings that sole access to resources can facilitate integration. Government plans to provide a teaching laptop and a data projector in each classroom are welcomed.

Students' access to computers

Teachers are conscious that student access to computers is restricted. A solution has been found by one teacher who provides access after school for students who do not have a home computer. These "open access" hours could be expanded. The provision of a student email address or a secure space to store students' work was also recommended by some teachers. This could be incorporated into the proposed learning platform (Becta 2008b).

5.4 Teacher-based factors

Personal laptops

The frequent use of personal laptops by 91% of the online survey respondents supports previous research findings (Scrimshaw 2004) that ownership of a laptop is one factor which facilitates integration of ICT. Several teachers observed that they knew they must have their own laptop to become skilled. While others did not mention this, the researcher observed that many teachers only started integrating ICT when they got their own laptop.

Competence and confidence

One of the issues that emerged from the case study was teachers' lack of familiarity with a range of technologies and their need for sustained support. It became clear that those teachers who did not use technology extensively outside of school lacked confidence in using it, except for one or two applications which they had spent time practising. Some teachers are collaborating to practise using a small number of ICT applications (MFL teachers). Often the ICT co-ordinator or skilled teachers are asked to troubleshoot between classes and this can support teachers beginning to use ICT. Familiarity with one technology will engender confidence to try another and gradually skills and competence will be built up. Teachers often said that they needed to put in time to practise skills and become more confident in using a greater variety of ICT. This concurs with the research which states that to embed educational change takes time (Fullan 1991, Rogers 1995, Mumtaz 2000, McGarr and O'Brien 2007, Mueller et al 2008, etc.) and with Ertmer (2005) who says that successful ICT integration takes time.

Time

Time is needed to keep up to date with new technology and online software available. However, too many online resources available can overwhelm teachers by the complexity and the time needed to pick out what is required. Time to meet in groups is very difficult to find in a busy school day, despite teachers' best intentions. The local Education Centre, subject associations and the Second Level Support Service can provide courses which help teachers identify the most useful applications and software. As professionals teachers must devote the time required to keep up to date with modern ICT pedagogy in their subject.

Skilled teachers reported that they used ICT to save themselves time and be better organised, consistent with the findings of Baylor and Ritchie (2002).

5.5 Summary

This section has identified the main issues arising from the research project. It has highlighted the high use of technology by teachers in the classroom. All teachers in the study school are motivated to integrate ICT as a pedagogical tool to improve the educational experience of their students. Equally, teachers recognise that new technological skills are necessary to equip students for the knowledge economy.

The leadership and strategic planning of the principal is progressing the integration of technology. All the DES initiatives regarding ICT have been supported by the school. The principal has focused on using email for communicating with staff and the introduction of the ePortal system for administration is imminent. Many teachers are collaborating in their subject departments and sharing resources.

However, there are difficulties to be overcome. These include the unfavourable student: computer ratio in the school, the age of computers and the lack of student access to computers. Some teachers still do not have access to a data projector in their classroom. Sustained peer support and technical support are also required.

6 Conclusion

6.1 Introduction

The aim of this research project was to investigate ICT pedagogical practice, with particular reference to its use in MFL teaching and the teaching of Irish. The research was carried out by conducting a small case study which provided extensive useful data and a focus on ICT integration in the study school.

6.2 Review of Investigation

At the outset, three areas of interest were identified for study – the benefits of integrating ICT in the second level classroom, contemporary student-centred pedagogy, and the pedagogy of integrating ICT in language teaching and learning. Although it was not possible to definitively check all ICT use in the study school, the mixed methods methodology used for this Case Study was invaluable in providing thick description of the range and level of ICT integration. In order to increase validity, the researcher emphasised to participants that the purpose of the research was to obtain a picture of their normal, everyday use of ICT, and also observed ICT use and interviewed teachers. In this way findings were supported by triangulation. Following discussion of the findings in Chapter 5, this chapter now outlines the outcomes of the case study.

6.3 Research Outcomes

This project has shown that teachers in the study school are motivated to integrate ICT and are aware that they must move in this direction. There is high use of technology and the internet to provide motivating, authentic, relevant, up to date materials and activities. ICT has facilitated changes in pedagogy. Teachers use presentation and internet technologies, model use and provide some opportunities for student use. 91% of teachers use a personal laptop, suggesting that a majority of teachers have invested their own time and money in acquiring new skills. Most of the literature reviewed posited that only a small proportion of teachers have successfully integrated ICT but this case study, which seems to indicate that this is changing, has advanced research on the topic.

ICT integration is an on-going process which is embraced by some teachers; others are apprehensive and lack confidence and many are in between. For most teachers, technology poses a challenge, either technically or pedagogically. Because of its ever-changing nature, even very high users feel a need for training. Teachers are aware of the affordances of new technologies but often have no opportunity to familiarise themselves with them. Many teachers use technology for presentation of material keeping their traditional teaching methodology. The rate of change of technologies and the advent of new technologies is overwhelming for some teachers but most have taken the first steps in the change process.

The integration of ICT is being led by principals through the provision of resources, training, technical support and example. School-based resources, particularly computers for student use, are limited in schools where the provision of infrastructure relies solely on DES funding. Increasing computer provision is not a simple matter of installing more computers; it has practical and cost implications for other areas, e.g., power points, electrical overload, health and safety, security. Principals have introduced administrative systems which teachers must use and this furthers integration.

School-wide planning and collaboration is essential to ensure best use of time, personnel and resources. The subject department is a suitable forum for collaborative planning for the integration of modern pedagogical methods including ICT. Collaboration between teachers has been encouraged and is increasing, particularly in the area of planning and preparation of policies (driven by the DES School Development Planning initiative and the process of Whole School Evaluation). ICT peer support such as troubleshooting, coaching and mentoring occurs informally at present, often between teachers of the same subject.

6.4 Recommendations

This project has shown that implementing change in schools takes time, that teachers welcome change when it contributes to better teaching or learning, but that there are still some barriers to be overcome. One of the barriers is the traditional independence and isolation of the secondary teacher in the classroom. Notwithstanding the

developments in collaborative planning, there is still a culture of isolation within the second-level classroom.

It is recognised that teachers learn best from their peers. A further improvement in integrating ICT could be brought about by introducing a new model of CPD which would include opportunities to observe others using ICT. A system of peer mentoring and technical support available regularly during school hours would encourage the late adopters.

This study has yielded much useful data but has also highlighted the lack of research completed in Ireland. There are many areas which could be further investigated, such as successful uses of ICT. A portfolio of applications and exemplar resources for each subject could be developed and made available on the school network to inspire all teachers. Other areas that could be investigated include learning platforms, how ICT literate students are, how schools are promoting the development of higher-order skills by students.

The NCCA Action website checklist must become part of each teacher's pedagogy so that student ICT skills are developed in a planned manner. After-school access hours should be provided by schools so that disadvantaged students are not left behind.

Teachers must first ensure that they themselves have all necessary skills and the confidence to teach them. An audit of staff ICT skills would be a first step in doing this, followed by ongoing pedagogical and technical support. Pedagogical support could be given by allocating school development planning time to sharing best practice and resources within subject departments.

Finally, the provision of a teaching laptop and data projector for each classroom is welcomed, as is the improved broadband connectivity and laptops for students initiative. Their implementation will further progress ICT integration.

6.5 Conclusion

This case study provides a snapshot of the current situation with regard to ICT integration in teaching and learning in one second-level school. It found that the

important first steps, and often more, have been taken by teachers. The findings will be disseminated to all staff and thus should help improve classroom practice.

This was a small-scale project but it has led to a deeper understanding of the opportunities afforded by ICT for teachers of all subjects in the case-study school, particularly MFL and the Irish language. It is hoped that this research has fostered the continued development of a more collaborative culture at second level.

“Ultimately, the goal is to facilitate uses of technology that lead to increased student learning” (Ertmer 2005).

Bibliography

- Abbott, L., Austin, R., Mulkeen, A. & Metcalfe, N. (2004) "The global classroom: advancing cultural awareness in special schools through collaborative work using ICT". *European Journal of Special Needs Education* 19 (2), 225-240.
- Afshari, M., Bakar, K. A., Luan, W. S., Samah, B. A. and Fooi, F. S. (2009) "Factors Affecting Teachers' Use of Information and Communication Technology". *International Journal of Instruction* 2 (1), 77-104.
- Al-Senaïdi, S., Lin, L. and Poirot, J. (2009) "Barriers to adopting technology for teaching and learning in Oman". *Computers & Education* 53, 575-590.
- Anderssen, H. (2006) "ICT and Australia's Productivity Growth: Understanding the Relationship 1". *Prometheus* 24 (2), 189-212.
- Arnseth, H. C., Hatlevik, O., Klovstad, V., Kristiansen, T. and Ottestad, G. (2008) "ITU Monitor 2007 Skolens digitale tilstand 2007 [ITU Monitor: The digital conditions in school 2007]." Oslo, Forsknings- og kompetansenettverk for IT i utdanning. (in Krumsvik, R. (2009), *Situated learning in the network society and the digitised school*, *European Journal of Teacher Education* 32 (2), 167-185.
- Austin, R., Abbott, L., Mulkeen, A., & Metcalfe, N. (2003) "Dissolving boundaries: cross-national co-operation through technology in education". *Curriculum Journal* 14 (1), 55-84.
- Barr, D., Leakey, J. and Ranchoux, A. (2005) "Told Like It Is! An Evaluation of an Integrated Oral Development Pilot Project", *Language Learning & Technology* 9 (3), 55-78.
- Bassey, M. (1999) "Case Study Research in Educational Settings", Maidenhead, Berkshire: Open University Press.
- Baylor, A. L. and Ritchie, D. (2002) "What factors facilitate teacher skill, teacher morale and perceived student learning in technology-using classrooms?" *Computers & Education* 39, 395-414.
- Becta (2003) "Secondary Schools, ICT and Standards – an analysis of national data from Ofsted and QCA by Becta: Key Findings", leaflet, Coventry: Becta.
- Becta (2005) "The Becta Review 2005: Evidence on the progress of ICT in education", Coventry: Becta.
- Becta (2007) "Harnessing Technology Review 2007: Progress and Impact of Technology in Education", Coventry: Becta.
- Becta (2008a) "Harnessing Technology: Preliminary Identification of trends affecting the use of technology in education", Research Report, Coventry: Becta.

- Becta (2008b) "Harnessing Technology: Next Generation Learning 2008-14", Coventry: Becta.
- Becta (2008c) "Analysis of emerging trends affecting the use of technology in education", Research to support the delivery and development of Harnessing Technology: Next Generation Learning 2008-14, Coventry: Becta.
- Becta (2008d) "Next generation learning right now – Recognising ICT excellence in schools – ICT Excellence Awards 2008", Coventry: Becta.
- Becta (2008e) "Harnessing Technology Review 2008: The role of technology and its impact on education", Coventry: Becta.
- Becta (March 2009) "Harnessing Technology for Next Generation Learning: Children, Schools and Families – Implementation Plan 2009-2012", Coventry: Becta.
- Becta (2010a) "Inspiring Learners", Coventry: Becta.
- Becta TechNews newsletter, January 2010 (2010b), [online] available at: <http://emergingtechnologies.becta.org.uk/index.php?section=etn&rid=15128> Accessed 7 February 2010.
- Bell, J. (2005) "Doing your Research Project", Maidenhead, Berkshire: Open University Press.
- Benson, P. (2006) "Autonomy in language teaching and learning", *Language Teaching* 40, 21-40.
- Bogdan, R. and Biklen, S. (2007) "Qualitative Research for Education – An Introduction to Theory and Methods", Boston: Pearson Education, Inc.
- CALL – "The History of CALL", [online] available at: http://www.eurocall-languages.org/resources/history_of_call.pdf Accessed 2 January 2010.
- Callan, J. (2001) "School and Curriculum Development Initiative – Papers Presented at Two Dissemination Seminars in Education Department, NUIM 21st September 2001 and Education Centre, Portlaoise, 19th October 2001, [online] available at: <http://www.nuim.ie/publications/education/scd.pdf> Accessed 10 October 2009.
- Cogill, J. (2003) "The use of interactive whiteboards in the primary school: effects on pedagogy", in Department for Education and Skills/Becta (2003), "ICT Research Bursaries A Compendium of Research Reports: A Report of the ICT Research Bursaries 2002-03", London: DfES.
- Cohen, L., Manion, L. and Morrison, K. (2000) "Research Methods in Education", 5th Edition. London and New York: RoutledgeFalmer.
- Comas-Quinn, A., Mardomingo, R. and Valentine, C. (2009), "Mobile blogs in language learning: making the most of informal and situated learning opportunities",

ReCALL 21 (1), 96-112, United Kingdom: European Association for Computer Assisted Language Learning.

Condie, R. and Munro, B. with Seagraves, L. and Kenesson, S. (2007) "The impact of ICT in schools – a landscape review", Coventry: Becta, [online] available at: <http://becta.org.uk/research> Accessed 13 July 2009.

Cox, M., Webb, M., Abbott, C., Blakeley, B., Beauchamp T. and Rhodes, V. (2003) "ICT and pedagogy: A review of the research literature", London: Queen's Printer, DfES/Becta, [online] available at: <http://becta.org.uk/research> Accessed 25 May 2009.

Cuban, L. (2001) "Oversold and Underused: Computers in the Classroom", New York: Harvard University Press.

Cummins, J. (1993) "Bilingualism and Second Language Learning", *Annual Review of Applied Linguistics* 13, 51-70.

Dam, L. (2003) "Developing learner autonomy: the teacher's responsibility", in Little, D., Ridley, J. and Ushioda, E. (Editors) *Learner autonomy in the Foreign Language Classroom* 135-146, Dublin: Authentik.

Department of Communications, Energy and Natural Resources (2009), Press Release *Making the smart economy real: Information on the Government strategy Technology Actions to Support the Smart Economy*, [online] available at: <http://www.dcenr.gov.ie/Press+Releases/2009/Making+the+smart+economy+real.htm> Accessed 2 January 2010.

Department of Education and Science website for statistics at second level, [online] available at: <http://www.education.ie/home/home.jsp?maincat=17216&pcategory=17216&ecategory=17241&language=EN> Accessed 13 May 2009.

Department of Education and Science (1997) "IT 2000 – A Policy Framework for the New Millennium", Dublin: Department of Education and Science.

Department of Education and Science: School Development Planning Initiative (1999), [online] information available at: http://www.education.ie/home/home.jsp?pcategory=10917&ecategory=27180&language=EN&letter=S&pagetitle=S_28819 Accessed 12 December 2009.

Department of Education and Science (2001) "A Blueprint for the Future of ICT in Irish Education Three Year Strategic Action Plan 2001-2003", Dublin: Department of Education and Science.

Department of Education and Science (2007a) "Irish in the Primary School", Dublin: Department of Education and Science.

Department of Education and Science (2007b) "Looking at Irish at Junior Cycle", Dublin: Department of Education and Science.

Department of Education and Science (2007c) "A Value for Money Assessment of Programmes managed by the Teacher Education Section", Dublin: Department of Education and Science.

Department of Education and Science (2007d) "Circular Letter 0042/2007: Changes to the Proportion of Marks for Oral Irish in the Certificate Examinations", [online] available at: http://www.education.ie/servlet/blobServlet/des_circular_listing.htm Accessed 18 May 2009.

Department of Education and Science / Council of Europe (2008) "Language Education Profile for Ireland 2005-2007", [online] available at: http://www.coe.int/t/dg4/linguistic/Profils1_EN.asp Accessed 8 September 2009.

Department of Education and Science (2008a) "Investing Effectively in Information and Communications Technology in Schools, 2008-2013: The Report of the Minister's Strategy Group", Dublin: Department of Education and Science.

Department of Education and Science (2008b) "ICT in Schools", Dublin: Department of Education and Science.

Department of Education and Science (2009) "Taoiseach launches €150m plan for 'smart schools'", [online] available at: <http://www.education.ie/home/home.jsp?maincat=10861&pcategory=10861&category=10876§ionpage=12251&language=EN&link=link001&page=3&doc=46554> Accessed 17 November 2009.

Dörnyei, Z (1997) "Psychological Processes in Cooperative Language Learning: Group Dynamics and Motivation", *The Modern Language Journal* 81 (iv), 482-493.

Dörnyei, Z. (1998) "Motivation in second and foreign language learning", *Language Teaching* 31, 117-135.

Empirica (2006) "Benchmarking Access and Use of ICT in Schools 2006", Bonn: Empirica.

Ertmer, P. A. (2005) "Teacher Pedagogical Beliefs: The Final Frontier in Our Quest for Technology Integration?" *Educational Technology Research and Development* 53 (4), 25-39.

Eteokleous, N. (2008) "Evaluating computer technology integration in a centralized school system", *Computers & Education* 51, 669-686.

Eurydice (European Commission information network on education in Europe) (2001) "ICT@Europe.edu: Information and Communication Technology in European Education Systems", Brussels: Eurydice.

Felix, U. (2008) "The unreasonable effectiveness of CALL: What have we learned in two decades of research?" *ReCALL* 20 (2), 41-161.

- Fiszer, E. P. (2004) "How Teachers Learn Best", Maryland, USA: Rowman & Littlefield Education.
- Fón Project (2008), [online] information available at:
<http://foghlaim.edublogs.org/background/> Accessed 9 November, 2009.
- Fullan, M. (1991) *The New Meaning of Educational Change*, London: Cassell.
- Fullan, M. (2008) "6 Secrets of Change", [online] available at:
http://www.michaelfullan.ca/resource_assets/handouts/08_LongHandout_A4.pdf
 Accessed 8 January 2010.
- Fullan, M. (2010) "Motion Leadership: The Skinny on Becoming Change Savvy", [online] available at:
http://www.michaelfullan.ca/resource_assets/handouts/10_Motion_Leadership_Handout_US.pdf Accessed 8 January 2010.
- Futurelab Report 14 (2006) "Teachers Learning with Digital Technologies: A review of research and projects", [online] available at:
<http://www.futurelab.org.uk/resources/publications-reports-articles/literature-reviews/Literature-Review129> Accessed 25 August 2009.
- Gardner, H. (2006) *Multiple Intelligences – New Horizons*, New York: Basic Books, A Member of the Perseus Books Group.
- Gillespie, J. H. and Barr, J. D. (2002) "Resistance, reluctance and radicalism: A study of staff reaction to the adoption of CALL/C&IT in modern languages departments." *ReCALL* 14 (1), 120-132.
- Government of Ireland (1999) *Primary School Curriculum – Introduction*, Dublin: The Stationery Office.
- Government of Ireland: Department of Education and Science (2008) *Tuarascáil Staitistiúil 2005/2006 Statistical Report*. Dublin: The Stationery Office.
- Gross Davis, B. (1993), "Collaborative Learning: Group Work and Study Teams" in Gross Davis, B., *Tools for Teaching*, San Francisco: Jossey-Bass, [online] available at:
<http://teaching.berkeley.edu/bgd/collaborative.html> Accessed 27 January 2010.
- Harrison, C. et al., (2003) *ImpaCT2 – The Impact of Information and Communication Technologies on Pupil Learning and Attainment – Full Report*, Coventry: Becta.
- Jones, A. (2004) "A review of the research literature on barriers to the uptake of ICT by teachers", Coventry, Becta, [online] available at:
http://partners.becta.org.uk/upload-dir/downloads/page_documents/research/barriers.pdf Accessed 13 July 2009.
- Kern, R., Ware, P. and Warschauer, M. (2004) "Crossing Frontiers: New Directions in Online Pedagogy and Research", *Annual Review of Applied Linguistics* 24, 243-260.

- John, P. and Sutherland, R. (2005) "Affordance, opportunity and the pedagogical implications of ICT". *Educational Review* 57 (4), 406-413.
- Kitchen, S., Finch, S. and Sinclair, R. (2007), "Harnessing Technology schools survey 2007", Coventry: Becta.
- Koehler, M. J. and Mishra, P. (2008) "What is technological pedagogical content knowledge (TPCK)?" in *Handbook of Technological Pedagogical Content Knowledge*, New York: Routledge (for the American Association of Colleges for Teacher Education).
- Little, D. (2003) *Languages in the Post-Primary Curriculum – A Discussion Document*, Dublin: National Council for Curriculum and Assessment.
- Little, D. (2005) "The Common European Framework and the European Language Portfolio: involving learners and their judgement in the assessment process". *Language Testing* 22 (3), 321-336.
- Luckin, R. (2003) "Between the lines: documenting the multiple dimensions of computer-supported collaborations". *Computers & Education* 41, 379-396.
- Martin, M. (1999) "Towards the Learning Society: Responsiveness and Accountability" in Ward, N. and Dooney, T. (Editors), *Irish Education for the 21st Century*, Dublin: Oak Tree Press.
- McGarr, O. and 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.
- Mueller, J., Wood, E., Willoughby, T., Ross, C. and Specht, J. (2008) "Identifying discriminating variables between teachers who fully integrate computers and teachers with limited integration", *Computers & Education* 51, 1523-1537.
- Mulkeen, A. (2001) "The place of ICT in Irish schools: Early indicators of the changes since IT2000", *Irish Educational Studies* 20 (1), 45-58.
- Mulkeen, A. (2003a) "What Can Policy Makers Do to Encourage Integration of Information and Communications Technology? Evidence from the Irish School System", *Technology, Pedagogy and Education* 12 (2), 277-294.
- Mulkeen, A. (2003b) "Schoolsat: Satellite Internet access for Schools: Pedagogical Evaluation Report", Dublin: NCTE, [online] available at: <http://www.ncte.ie/Broadband/Publications/> Accessed 17 May 2009.
- Mulkeen, A. (2004) "Schools for the Digital Age – Information and Communication Technology in Irish Schools: Progress Report 1998-2002", Dublin: NCTE.
- Mumtaz, S. (2000) "Factors Affecting Teachers' Use of Information and Communications Technology: a review of the literature", *Journal of Information Technology for Teacher Education* 9 (3), 319-342.

National Council for Curriculum and Assessment (NCCA), “Fón Project”, [online] available at: http://www.ncca.ie/en/Curriculum_and_Assessment/Post-Primary_Education/Junior_Cycle/F%C3%93N_project/F%C3%93N_project1.html Accessed 5 October 2009.

National Centre for Technology in Education (2001-2007) *Annual Report* (Seven reports). Dublin: NCTE.

NPADC (2001) *Impact of Schools IT 2000*, Dublin: NPADC, c/o NCTE.

Ó Croidheáin, C. (2006) *Language from below: The Irish Language, Ideology and Power in 20th Century Ireland*, Bern, Switzerland: Peter Lang A G, International Academic Publishers.

O’Dowd, R. (2009) “Blended Learning”, [online] available at: http://www.ecml.at/projects/voll/evolution/graz_2009/blended/index_intro.htm Accessed 2 January 2010.

O’Dowd, R. (n.d.) “Intercultural e-mail exchanges in the foreign language classroom”, [online] available at: www3.unileon.es/personal/wwdfmrod/Talent.doc Accessed 2 January 2010.

Ó hÉallaithe, D. (2004) “From Language Revival to Language Survival” in Mac Murchaidh, C. (Ed.) (2004), *Who Needs Irish? Reflections on the Importance of the Irish Language Today*, Dublin: Veritas Publications.

OECD (1999) *Education Policy Analysis*, Paris: OECD.

OECD (2000) *What Works in Innovation in Education: Motivating Students for Lifelong Learning*, Paris: OECD.

OECD/CERI (2001a) *ICT and School Improvement: Executive Summary for Ireland*, OECD, [online] available at: <http://www.oecd.org/dataoecd/45/29/2741671.pdf> Accessed 29 October 2009.

OECD/CERI (2001b) *Educational Policy Analysis 2001*, Paris: OECD

OECD (2003) *Education at a Glance OECD Indicators 2003*, Paris: OECD.

OECD Broadband Portal, [online] available at: <http://oecd.org/sti/ict/broadband> Accessed 30 October 2009.

OECD (2009) *Statistical Profile of Ireland 2009*, [online] available at: <http://stats.oecd.org/viewhtml.aspx?queryname=18157&querytype=view&lang=en> Accessed: 16 July 2009.

OECD Statistics re Broadband Penetration, [online] available at: http://www.oecd.org/document/23/0,3343,en_2649_34449_33987543_1_1_1_1,00.html Accessed 26 February 2010.

OECD (2009) *Creating Effective Teaching and Learning Environments: First Results from TALIS*, Paris: OECD.

Ó Laoire, M. (2005) “Three languages in the schools in Ireland”, *International Journal of the Sociology of Language*, 171, 95-113.

Ó Laoire, M. (2007) “An Approach to Developing Language Awareness in the Irish Language Classroom: A Case Study”, *International Journal of Bilingual Education and Bilingualism*, 10 (4), 454-470.

Passey, D. and Rogers, C. with Machell, J. and McHugh, G. (2004) *The Motivational Effect of ICT on Pupils*, Nottingham: Department of Education and Science.

Payne, J. S. and Ross, B. M. (2005) “Synchronous CMC, Working Memory, and L2 Oral Proficiency Development”, *Language Learning & Technology* 9 (3), 35-54.

Ryan, E., Minister for Communications, Press Release, 25 June, 2009, [online] available at: <http://www.dcenr.gov.ie/Press+Releases/Post-Primary+Schools+nationwide+to+receive+High-Speed+Broadband.htm> Accessed 10 October 2009.

Scrimshaw, P. (2004) *Enabling teachers to make successful use of ICT*, Coventry: Becta, [online] available at: http://partners.becta.org.uk/upload-dir/downloads/page_documents/research/enablers.pdf Accessed 13 July 2009.

Selwood, I. and Pilkington, R. (2005) “Teacher workload: using ICT to release time to teach”, *Educational Review* 57 (2), 163-174.

Sheil, G. and O’Flaherty, A. (2006) *NCTE 2005 Census on ICT Infrastructure in Schools Statistical Report*, Dublin: Educational Research Centre, St. Patrick’s College for NCTE.

Simmie, G. M. (2007), “Teacher Design Teams (TDTs) – building capacity for innovation, learning and curriculum implementation in the continuing professional development of in-career teachers”, *Irish Educational Studies*, 26 (2), 163-176.

Smith, P., Rudd, P. and Coghlan, M. (2008a) *Harnessing Technology: Schools Survey 2008. Report 1: Analysis*, Coventry: Becta.

Smith, P., Rudd, P. and Coghlan, M. (2008b) *Harnessing Technology: Schools Survey 2008. Report 2: Data*, Coventry: Becta.

Smith, P., Rudd, P. and Coghlan, M. (2008c) *Harnessing Technology: Schools Survey 2008. Report 3: Executive Summary*, Coventry: Becta.

Stuart, L.H., Mills, A. M. and Remus, U. (2009) “School leaders, ICT competence and championing innovations”, *Computers & Education* 53, 733-741.

Taylor, A., Lazarus, E. and Cole, R. (2005) "Putting Languages on the (drop down) menu: innovative writing frames in modern foreign language teaching". *Educational Review* 57 (4), 435-455.

Trochim, W. M. K. (2006) *Research Methods Knowledge Base*, [online] available at: <http://www.socialresearchmethods.net/kb/index.php> Accessed 5 September 2009.

Underwood, J., Baryard, P., Betts, L., Farrington-Flint, L., Kerlin, L., Stiller, J. and Yeomans, S. (2009) *Narrowing the gap: an exploration of the ways technology can support approaches to narrowing the gap for underachieving and low-achieving learners in secondary schools*, [online] available at: http://research.becta.org.uk/index.php?section=rh&&catcode= re_rp_02&rid=17439 Accessed 22 February 2010.

van Braak, J. (2001) "Factors influencing the use of computer mediated communication by teachers in secondary schools", *Computers & Education* 36, 47-51.

Warschauer, M. (1996) "Computer Assisted Language Learning: An Introduction". In Fotos, S. (ed.) *Multimedia Language Teaching*, Tokyo: Logos International: 3-20, [online] available at: <http://www.ict4lt.org/en/warschauer.htm> Accessed 2 January 2010.

Warschauer, M. (1997) "Computer-Mediated Collaborative Learning: Theory and Practice", *The Modern Language Journal* 81 (4), 470-481, [online] available at: http://www.gse.uci.edu/person/warschauer_m/docs/cmcl.pdf Accessed 2 January 2010.

Warschauer, M. and Healey, D. (1998) "Computers and Language Learning: An Overview", *Language Teaching* 31, 57-71

Wilhelm, K. Hughes (1997) "Sometimes Kicking and Screaming: Language Teachers-in-Training React to a Collaborative Learning Model", *The Modern Language Journal* 81 (4), 527-542

Zapata, G. and Sagarra, N. (2007) "CALL on Hold: The delayed benefits of an online workbook on L2 vocabulary learning", *Computer Assisted Language Learning* 20 (2), 153-171.

Appendix A

Some Internet Resources for Teachers

CPD resources

Web 2.0 can be exploited by teachers in order to make learning a language more interesting, immediate and relevant to students. The Scoilnet website, <http://www.scoilnet.ie/>, has links which give information to teachers on how to get started using Twitter, Blogs, Podcasts, Wikis, etc. Many of the links lead to further hyperlinks relating to particular subjects, including MFL. The benefit of these links is that they give concrete pedagogical examples of how Web 2.0 can be integrated into the MFL classroom. Following the Podcasting link, for example, leads to a hyperlink to *Using audio creatively in the classroom* on the blog, <http://www.joedale.typepad.com/>, *Integrating ICT into the MFL classroom*, where the renowned MFL expert gives practical tips and advice, along with a host of hyperlinks, on how to integrate ICT in MFL teaching.

Teaching resources

Websites such as www.tes.co.uk allow teachers of all subjects share digital resources freely online.

Free Resources for Language Teachers (from Graham Davies):

<http://www.camsoftpartners.co.uk/websites.htm>

Google Images, Microsoft Office Clipart, Photostory 3, Puzzlemaker, Wordle, BYKI, etc.

NCCA Framework

The Framework provides a guide to teachers for embedding ICT in curriculum and assessment across curriculum subjects.

<http://www.action.ncca.ie/en/ict-framework/intro>

Appendix B

Letter to the Board of Management Seeking Permission to Conduct the Research

XXXXXXXXXX,
XXXXXXXX,
XXXXXXXX,
XXXXXXXX.
26.09.2009

Xx xxxxx,
Chairperson,
Board of Management,
Xxxxx School.

Dear XXXXXXXXXXXX,

I wish to seek the Board's permission to conduct some research within xxxxxx school. I am completing a Masters in Digital Media Development for Education run by the University of Limerick. As part of my study I must complete a small research project on the pedagogical use of ICT in schools. I propose to conduct a survey among the staff and ask for volunteer teachers to keep an IT diary for a week or be interviewed about their IT use. Information gathered should be of benefit to the school and will be shared with staff in due course. The survey will be completed anonymously and neither the school nor any teacher will be identified by name.

I would be grateful if the Board would grant me permission to conduct this survey.

Yours sincerely,

Mary Ahern

Appendix C

Explanatory Email to Colleagues

Dear Colleague,

I am contacting you all to ask for your assistance with a survey which I would like to carry out.

As you may know, I have been doing some study in the area of computers and education. The course I have been following, Master of Arts in Digital Media Development for Education, is run by the University of Limerick. As part of my study I must complete a small research project on the use of ICT in schools. I have chosen to examine current ICT use in St. Paul's and the principal and the Board of Management have kindly allowed me permission to conduct this research. I would be very grateful if you would agree to take a short online survey which I have prepared.

The aim of the survey is to describe current ICT use in school. A further aim of my research is to identify instances of good pedagogical practice and pointers for the future. With this in mind I hope that some of you will help me out by volunteering to keep a simple IT Diary for one week, or maybe by agreeing to be interviewed about your IT use in school. I hope that my research will benefit us all eventually and information gathered will be shared with staff in due course.

The survey consists of 10 mostly 'tick the box' type questions, is easy to fill in and should only take around 5 minutes to complete.

It is an anonymous survey and I will not be able to identify any individual responses. You can access the survey by clicking on the link below:

http://www.surveymonkey.com/s.aspx?sm=hixonfZnMdxtVpYXrWp2zw_3d_3d

If you have any concerns about completing this survey, please contact me.

Many thanks,

Mary Ahern

Appendix D

Online Survey Questionnaire

Question 1: General Information

Question 2: Subjects Taught

The screenshot shows a web browser window displaying the 'mma survey one' questionnaire. The page title is 'mma survey one' and the subtitle is '1. ICT (Information and Communication Technology) Survey Mary Ahern'. A message states: 'Thank you for agreeing to complete this survey. Your help is much appreciated. There are 10 questions in all and the survey will only take a few minutes.' The current question is '1. General Information:'. It includes two dropdown menus: 'M/F' and 'Teaching experience'. Below these is a section for '2. Please tick the main subject(s) you teach:' with a grid of checkboxes for various subjects: Art, Building Construction, Business, C.S.P.E., Engineering, English, French/German/Spanish, Other (please specify), Geography, History, Home Economics, Irish, Maths, Metalwork, Music, P.E., R.E., Science, Technical Graphics, and Woodwork. A 'Next' button is at the bottom.

Question 3: Technology Use Outside of the Classroom

The screenshot shows a web browser window displaying the 'mma survey one' questionnaire. The page title is 'mma survey one' and the subtitle is '2. Technology use outside of school'. The current question is '3. Please indicate how often you use each of the following technologies outside of the classroom:'. The response options are 'most days', 'often', 'sometimes', 'rarely', and 'never'. The technologies listed are: camcorder, digital camera, email, home computer, internet (browsing), internet (purchasing, banking, etc.), internet (social networking), mobile phone, mp3 player/pod, personal hand held device, personal laptop, printer, scanner, and Other (please specify). Each technology has a radio button for each frequency option. A 'Prev' and 'Next' button are at the bottom.

Question 4: Technology Use in the Classroom

mma survey one [Exit this survey](#)

3. Your use of technology in the classroom

*** 4. Please tick how often you use each of the following technologies in your teaching:**

	most days	often	sometimes	rarely	never
scanner	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
camcorder	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
data projector	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
email	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
digital camera	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
internet (subject-based website)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
teacher's own laptop	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
internet (research)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
printer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
computer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
interactive whiteboard	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify)	<input type="text"/>				

[Prev](#) [Next](#)

Survey Powered by: [SurveyMonkey](#)

Question 5: Students' Use of Technology

mma survey one [Exit this survey](#)

4. Students' use of technology in your class

5. Please tick any/all technologies that students use in your class:

	most days	often	sometimes	rarely	never
single computer in classroom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
email	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
internet (subject-based research)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
internet (specific subject-based website)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
printer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
digital camera	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
camcorder	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
scanner	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
data projector	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
interactive whiteboard	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
computer room (students doing research)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
computer room (students on specific website)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
school laptops	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify)	<input type="text"/>				

Question 6: Factors Facilitating the Use of ICT in the Classroom

mma survey one [Exit this survey](#)

5. Reasons for using ICT in the classroom

6. Here is a list of possible reasons for using ICT in the classroom. Please tick each statement according to how true it is for you. If you wish to add another reason, please type it in the box at the end.

	Very true	True	Somewhat true	Not very true	Not at all true
All students need to become computer literate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drill and practice exercises	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
For revision	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ICT is useful for preparation of lessons/texts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It's a requirement for my subject	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Presentation of material	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Students like using it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Students present material better	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Students work better	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using ICT motivates me to improve my teaching	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify)	<input type="text"/>				

Question 7: Barriers to Integrating ICT in the Classroom

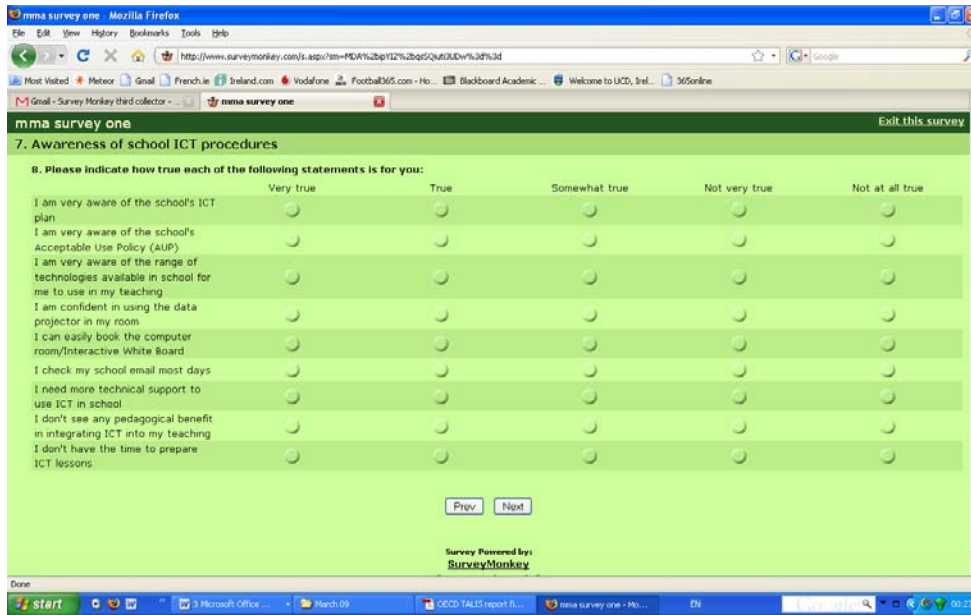
mma survey one [Exit this survey](#)

6. Factors which deter your use of ICT in the classroom

7. Here is a list of possible reasons for not using ICT in the classroom. Please tick each statement according to how true it is for you. If you wish to add another reason, please type it in the box at the end.

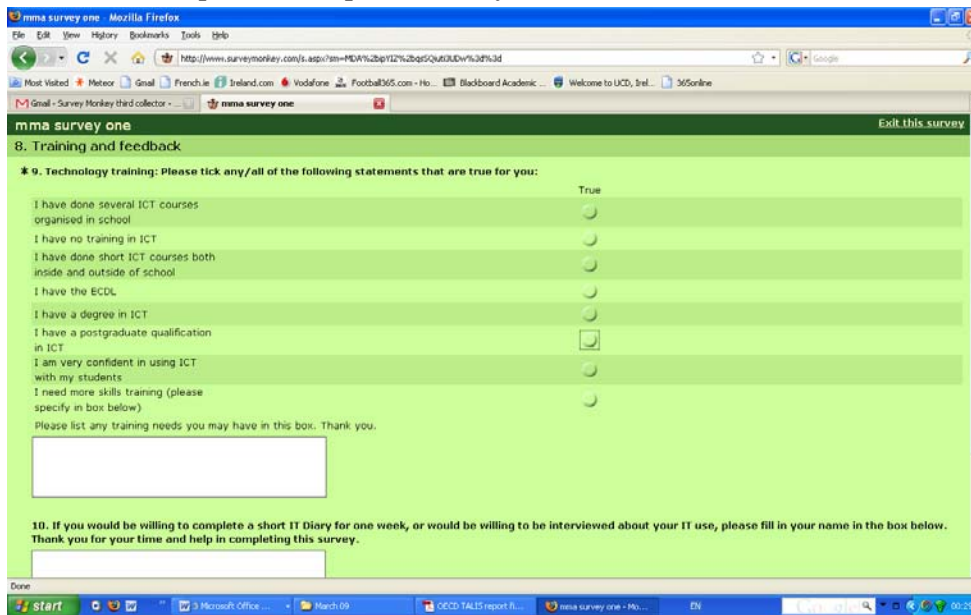
	Very true	True	Somewhat true	Not very true	Not at all true
I have not had enough training in using IT in the classroom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is a lack of suitable software programmes/online resources available in my subject(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It takes too much time to prepare classes using IT	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There are not enough computers available in school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am not able to see what each student is doing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I cannot see any benefit in using IT in my teaching	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I need more technical support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am not interested in using technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is more difficult to manage a class in the computer room	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I lack confidence in using technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other reason (please specify)	<input type="text"/>				

Question 8: Awareness of School ICT Procedures



Question 9: ICT Training

Question 10: Request to Complete IT Diary or be Interviewed



Appendix E

IT Diary

Teacher: _____

Date	ICT used	Subject & Class	Purpose of use	Outcome

