University of Limerick

ICT investment and e-Maturity progression
A Case Study of a Midlands Community School

Liam Guinan
MA (Digital Media Development for Education)
(Cohort 8)

Supervisor: Mrs. Noeleen Leahy
Submitted to the University of Limerick
October 2011
Declaration

Name: Liam Guinan
Student number: 0047538
Email Address: liamguinan@hotmail.com
Title: ICT investment and e-Maturity progression
       A Case Study of a Midlands Community School

Date of submission: 07 / 10 / 2011

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

___________________________________.
ICT investment and e-Maturity progression

A Case Study of a Midlands Community School

Liam Guinan

Abstract

In a world that is becoming increasingly dependent on technology, people are becoming more at ease with its importance. Despite this, Information and Communication Technology (ICT) investments in the Irish education system are still met with some uncertainty as how best to invest the money. ICT has not yet seemed to penetrate into Irelands classroom to a meaningful degree and pedagogical practices are varied and often off target from recommended usage.

Since the launch of IT 2000, schools at different levels have received £40 million, €50 million and €22 million in 1997, 2007 and 2009 respectively. With the announcement of another investment of €20 million in September 2010, this study has been set out to look at the factors that influence the success, or lack of thereof, of this type of investment in helping a second level schools reach e-Maturity.

This case study was carried out in a communal school in the Midlands which has a high level of ICT facilities. Through using a mixed approach of questionnaires, to collect quantitative data, and interviews and observations, to collect qualitative data, this study was set up to investigate how best the school could spend the latest funds, and to investigate the idea question: “Does provision of ICT equipment mean it is being correctly adopted and integrated as an integral part of pedagogical practices?”

The findings of this study indicate that time, training and access are the factors holding teachers back when it comes to incorporating ICT into their classes as a real pedagogical tool. Accordingly this study concluded that further investment, which does not address these issues as part of the initiative, will see the same low levels of adaptation of pedagogical ICT use as has been seen since the launch of IT2000 in 1999.
Acknowledgements

I wish to sincerely thank my tutor for this thesis, Mrs. Noeleen Leahy, who extended me endless support and advice which has proved priceless in the writing of this report.

I also wish to thank the teachers and management of the case school who kindly participated in this study. Your honesty and thoughts were obviously vital to writing this report but your ideals are testament to your hard working spirit in efforts to improve the teaching and learning experience in your school.

I wish to thank Michael O’Brien for his help during the year with different technical problems and supply of information.

Finally I wish to thank my wife, family and friends who helped me type up interviews, proof read different drafts and gave general support throughout.

Go raibh m‘fle a maith agaibh go léir.
# Table Of Contents

List of Appendix........................................................................................................ iv  
List of Abbreviations.................................................................................................. v  
List of Figures............................................................................................................... vi  

## Chapter 1 Introduction

1.1 Statement of topic ................................................................................................. 1  
1.2 Background to study ........................................................................................... 1  
1.3 Research aims ...................................................................................................... 2  
1.4 Purpose of study .................................................................................................. 3  
1.5 Relevance ............................................................................................................ 3  
1.6 Significance ......................................................................................................... 4  
1.7 Structure of thesis ............................................................................................... 4  

## Chapter 2 Literature Review

2.1 Introduction ......................................................................................................... 6  
2.2 ICT Investment .................................................................................................... 6  
2.3 What is available to schools ............................................................................... 8  
2.4 Policy Development ......................................................................................... 9  
2.5 What is available to schools ............................................................................... 8  
2.6 What’s stopping teachers? ................................................................................. 11  
2.6.1 Time ............................................................................................................... 12  
2.6.2 Support .......................................................................................................... 13  
2.6.3 Technophobia of teachers ............................................................................. 14  
2.7 The Second Digital Divide ............................................................................... 15  
2.8 Need for Professional Development ................................................................. 16  
2.8.1.1 Step-by step ............................................................................................... 18  
2.8.1.2 Make teachers at ease ............................................................................... 19  
2.8.1.3 Make teachers believe .............................................................................. 18  
2.9 Proper use of technology ................................................................................. 20  
2.10 Ideas and lessons from other countries ............................................................ 22  
2.10.1 Finland .......................................................................................................... 22  
2.10.2 Greece ........................................................................................................... 23
2.10.3 Africa ................................................................. 24
2.10.4 England ................................................................. 25
2.10.5 Flanders ................................................................. 26
2.10.6 Asian Pacific ...................................................... 26
2.10.7 International ....................................................... 27
2.11 Summary ................................................................. 27

Chapter 3  Methodology

3.1 Introduction ........................................................... 30
3.2 Research Setting ....................................................... 30
3.3 Research Questions .................................................. 31
3.4 Methodological Approaches ....................................... 31
  3.4.1 Action Research ................................................. 31
  3.4.2 Experiments ..................................................... 32
  3.4.3 Case Study ...................................................... 33
3.5 Approach Adopted .................................................. 34
3.6 Research Instruments .............................................. 35
  3.6.1 Questionnaire .................................................. 35
  3.6.2 Interviews and Observation .................................. 36
3.7 Ethical Considerations ................................................ 36
3.8 Reliability and Validity .............................................. 37

Chapter 4  Findings

4.1 Introduction ........................................................... 39
4.2 Demographic profile of staff ....................................... 39
4.3 Presentation of findings by research question .................. 40
  4.3.1 Is the school ready for a further range of new equipment? 40
  4.3.2 What is helping and hindering teachers from fully utilising ICT? 50
  4.3.3 How might the school best invest in new equipment? .......... 57
4.4 Summary ................................................................. 61
# Chapter 5 Discussion

5.1 Introduction ........................................................................................................62
5.2 Is the school ready for a further range of new equipment? .........................62
5.3 What is helping and hindering teachers from fully utilising ICT? ...............63
  5.3.1 Current ICT levels of teachers ........................................................................63
  5.3.2 Training ...........................................................................................................64
  5.3.3 Time ................................................................................................................66
  5.3.4 Access .............................................................................................................68
  5.3.5 Technical Problems .........................................................................................69
  5.3.6 Lack of experience ........................................................................................70
5.4 How might the school best invest grant money? ........................................70
  5.4.1 What do teachers want? ..................................................................................70
  5.4.2 The Principals ICT Vision ..............................................................................72

# Chapter 6 Conclusion and Recommendations

6.1 Introduction ........................................................................................................73
6.2 Is the school ready for a further range of new equipment? .........................73
6.3 What is helping and hindering teachers from fully utilising ICT? ...............74
6.4 How might the school best invest grant money? ........................................76
6.5 Further Research ...............................................................................................76
6.6 Summary ............................................................................................................77

Bibliography ............................................................................................................78

Appendices .............................................................................................................100
List of Appendices

Appendix A  OECD Graph: Country profiles according to eleven benchmark indicators

Appendix B  Letter from the Department of Education and Science, September 2010 (With Equipment List)

Appendix C  Questionnaire used in this study and results

Appendix D  Letter to Principal and Board of Management

Appendix E  Letter of explanation to teachers

Appendix F  Interview transcript

Appendix G  Observation Checklist

Appendix H  NCTE e-Learning Roadmap
# List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAPT</td>
<td>American Association of Physics Teachers</td>
</tr>
<tr>
<td>BBC</td>
<td>British Broadcasting Company</td>
</tr>
<tr>
<td>CPD</td>
<td>Continuing Professional Development</td>
</tr>
<tr>
<td>DCG</td>
<td>Design and Communication Graphics</td>
</tr>
<tr>
<td>DEIS</td>
<td>Delivering Equality of Opportunity in Schools</td>
</tr>
<tr>
<td>DES</td>
<td>Department of Education and Skills</td>
</tr>
<tr>
<td>F1</td>
<td>Formula One</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communication Technology</td>
</tr>
<tr>
<td>IWB</td>
<td>Interactive White Board</td>
</tr>
<tr>
<td>ITT</td>
<td>Initial teacher training</td>
</tr>
<tr>
<td>ITE</td>
<td>Initial Teacher Education</td>
</tr>
<tr>
<td>NCTE</td>
<td>National Centre for Technology in Education</td>
</tr>
<tr>
<td>NQT</td>
<td>Newly Qualifies Teachers</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
</tr>
<tr>
<td>PCT</td>
<td>Perceptual Control Theory</td>
</tr>
<tr>
<td>PISA</td>
<td>Programme for International Student Assessment</td>
</tr>
<tr>
<td>PDF</td>
<td>Portable Document Format</td>
</tr>
<tr>
<td>SRI</td>
<td>Stanford Research Institute</td>
</tr>
<tr>
<td>SEN</td>
<td>Special Educational Needs</td>
</tr>
<tr>
<td>SLA</td>
<td>Service Level Agreement</td>
</tr>
<tr>
<td>UK</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>US</td>
<td>United States</td>
</tr>
<tr>
<td>UNESCO</td>
<td>United Nations Educational, Scientific and Cultural Organization</td>
</tr>
<tr>
<td>USB</td>
<td>Universal Serial Bus</td>
</tr>
</tbody>
</table>
List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Numbers of years teaching experience of staff.</td>
</tr>
<tr>
<td>4.2</td>
<td>Word processing usage</td>
</tr>
<tr>
<td>4.3</td>
<td>Skill set of teachers.</td>
</tr>
<tr>
<td>4.4</td>
<td>Perceived Competence</td>
</tr>
<tr>
<td>4.5</td>
<td>Perceived Confidence</td>
</tr>
<tr>
<td>4.6</td>
<td>IWBs would be a good purchase for the school</td>
</tr>
<tr>
<td>4.7</td>
<td>Internet based homework</td>
</tr>
<tr>
<td>4.8</td>
<td>E-mailing Homework</td>
</tr>
<tr>
<td>4.9</td>
<td>Levels of internet usage</td>
</tr>
<tr>
<td>4.10</td>
<td>Competence in internet applications</td>
</tr>
<tr>
<td>4.11</td>
<td>Pedagogical In-service</td>
</tr>
<tr>
<td>4.12</td>
<td>Training on Existing Material</td>
</tr>
<tr>
<td>4.13</td>
<td>Training on Developing ICT Material</td>
</tr>
<tr>
<td>4.14</td>
<td>Vision of ICT in Education.</td>
</tr>
<tr>
<td>4.15</td>
<td>Use of classroom computer</td>
</tr>
<tr>
<td>4.16</td>
<td>Use of classroom projector</td>
</tr>
<tr>
<td>4.17</td>
<td>ICT talk with colleagues</td>
</tr>
<tr>
<td>4.18</td>
<td>ICT usage during class</td>
</tr>
<tr>
<td>4.19</td>
<td>Problems hindering use of ICT</td>
</tr>
<tr>
<td>4.20</td>
<td>Is there sufficient time to up skill?</td>
</tr>
<tr>
<td>4.21</td>
<td>Preference for type of training.</td>
</tr>
<tr>
<td>4.22</td>
<td>School time in-service</td>
</tr>
<tr>
<td>4.23</td>
<td>Outside school time in-service</td>
</tr>
<tr>
<td>4.24</td>
<td>Request for ICT training in subject specific programmes</td>
</tr>
<tr>
<td>4.25</td>
<td>Frequency of request for ICT in-service.</td>
</tr>
<tr>
<td>4.26</td>
<td>School ICT facilities</td>
</tr>
<tr>
<td>4.27</td>
<td>Time to develop resources</td>
</tr>
<tr>
<td>4.28</td>
<td>Time allocation for preparing classes using ICT</td>
</tr>
<tr>
<td>4.29</td>
<td>Would teachers welcome new equipment?</td>
</tr>
</tbody>
</table>
Chapter 1  Introduction

1.1 Statement of topic

Technology is all around us. It has become such a normal part of our lives that it has become like the white elephant in the room. Everyone sees it but no one realises it’s there. Modern students are growing up as the first real technical generation or, as Prensky (2001) calls them, “Digital Natives”. As a result they are naturally more aware of, and at ease with, the powers of technology. They wake up listening to radios, text friends before they get out of bed, play computer games on the way to school and after school they Blog, Tweet, E-mail, design websites, etc., all in a self-motivated and socially driven environment. However, even though we are so at ease with technology in our day to day lives, it seems strange that we are having so much difficulty in introducing strong pedagogical ICT initiatives into our education system.

In September 2010 the Department of Education and Skills (DES) announced phase two of its initiative to strengthen ICT usage in schools. The first phase, in 2004, was aimed at primary schools and saw the introduction of Interactive Whiteboards (IWBs) and classroom computers for both students and teachers. This new phase will see a similar drive to modernise second level schools by installing mounted projectors and classroom computers.

With the much welcomed announcement of new investment by the DES into upgrading technology in every classroom a very obvious question arises. What is needed to leverage the investment in technology in schools today?

1.2 Background to study

In relation to any type of new initiative, schools must be considered unique and each school must be examined to see how that initiative can best serve the individual school. This study will take one school in Ireland and use it as a case study to examine current levels of usage of ICT and try to evaluate the best route forward in respect to the announcement of new investment in ICT.

Thanks to a highly motivated and forward thinking staff, the school in question has already established a strong ICT infrastructure. With a well networked system of
computers every classroom in the school has an internet enabled computer and data projector. However providing the equipment by itself enough to effectively change the pedagogical practices of teachers?

If we were to give a prize winning musicals actor, a musical instrument and say to them, “OK, you can sing, you can dance and you can act but if you play an instrument too it would increase the quality of your performance” they would probably agree. The next thing we would do however is train the actor to play the instrument and give them time to practice before putting them on stage to perform.

This is the same idea for teachers. If we were to give a highly skilled teacher, with a very knowledgeable understanding of their subject and pedagogical practices, a computer and IWB and tell them to use it to increase their performance, we must also be prepared to help them with appropriate training and time to develop new skills before asking them “to go on stage and perform”.

With this in mind this author wishes to explore the following.

1.3 Research aims
The main aim of this study is to conduct a case study of a school that has been equipped with high levels of technology in every room in the school for more than five years in order to examine the level of competence of teachers in the use and understanding of the technology available. Using this along with existing literature available the author wishes to draw conclusions to the following questions

- Is the school ready for a further range of new equipment?
- What is helping and hindering teachers from fully utilising ICT?
- How might the school best invest grant money?
1.4 Purpose of study

As future budgets are going to cut more and more funds from all areas of the public service including education, it is important that schools use funds and resources as efficiently as possible. Schools are in the mists of a fast changing and evolving technical revolution that sees the use of multimedia as a principle teaching aid becoming more validated as a general consensus.

With these points in mind it is not just important for teachers as professionals to be more proficient in the use of multimedia but, it is also in the interest of the pupils, that teacher’s fears and lack of understanding of ICT does not hold them back from discovering the world of “real” learning through multimedia.

This study wishes to find the aspects of the case schools current day to day life which both help and hinder teachers in utilising ICT as a pedagogical tool and by doing so suggest some measures that may be taken in order to improve their individual situation. In doing so it is hoped to find what, other than finance, needs to be invested in in Irish education in order for technology to be used in an effective manner.

1.5 Relevance

Year on year new expectations are being put on teachers to perform different tasks and all in a time of economic turmoil where wages are being cut and motivation levels in the country are low. With this in mind the announcement of investment in ICT, while welcomed, means that more is now being asked of our teachers.

In order to ensure that the money available to schools is not squandered on upgrading existing facilities that are still within required specifications or general across the board purchases of unnecessary equipment, each school must examine its current position on the way to e-Maturity and plan what is the best route for them. It must also look at the skill set of its staff and consider if spending in spending in non-material goods such as training and time for teachers could better benefit their school.

The relevance of this study is to examine if existing literature and experiences from other countries and schools can help the case school identify the good and bad parts of its current practices.
1.6 Significance

It is hoped that this case study can be used to help the case school, and other similar schools, to draw on the errors and triumphs of others, as outlined in the literature review, and use it, along with the findings of their own situation, to plan the best way forward while doing the best for both staff and students. It may heighten awareness of the barriers to teachers and allow the staff to work together to overcome these barriers with more focus.

This study could also be used raise awareness of the potential of ICT as a pedagogical tool to those who have not a lot of experience in the area. This could spark and interest into exploring the area more and move from a basic level of usage to a more holistic integration into their teaching.

1.7 Structure of thesis

This report consists of six chapters. Chapter One, Introduction, serves as an overview to the case study and outlines the background, relevance and significance of the study while also introducing the reader to its aims and purpose of the study.

Chapter Two is a Literature Review in which the author offers relevant views of other studies which may be of significance to this study. It looks at the DES ICT grant in more detail and shows what is available to schools. It continues by looking as the importance of proper planning and current ICT usage in schools. It then examines the existing literature on the barriers to ICT usage in schools before discussing the second digital divide and the need for professional development. The literature review finish with a review of some good and bad lessons we can learn from the efforts of other countries to introduce ICT in education.

Chapter Three, Methodology, give more detail into the background of the study and the case school. It continues by outlining the research questions before examining the different methodologies available to the author. It then gives rational as to why a case study was chosen and outline research techniques used. The chapter finishes discussing some ethical consideration to be heeded during the study and finally outlines measures to insure reliability and validity of the study.
Chapter Four outlines the Findings of this study and using data collected from interviews, observations and questionnaires presents these findings using tables and graphs as visual aids. Chapter Five, Discussions, analyses the findings of this study in relation to relevant existing literature as outlined in the literature review.

Chapter Six, Conclusions and Recommendations, answers the research questions in a light of the findings and discussions chapter and give the authors recommendations in reflection on the facts found during the study. It finishes with recommendations for any further research and recaps on the study in a final summary.

All references and appendix in relation to the case study can be found at the end of this report which are listed the contents table.
Chapter 2 Literature Review

2.1 Introduction

This chapter will look in detail at the areas requiring review in order to answer the research question set out by the author.

The first section will give details of the investment made in developing ICT in post primary schools in 2010. It will outline levels of investment, criteria for purchasing equipment and restrictions on spending.

The second section will look at the use of ICT as it stands and into the future. The third section will examine the problems that restrict the use of ICT as an efficient pedagogical tool. It will then look at the Second Digital Divide and its effects on teachers.

The fourth and fifth sections will look at continuing professional development needs of teachers and proper use of ICT, and finally the literature review will conclude by looking at studies from other countries.

Investment in ICT is critical if advances are to be made in relation to its usage in the classroom. The first part of the literature will look at the most recent investment by the Department of Education and Skills (DES) in second level schools.

2.2 ICT Investment

On the 14th of October, 2010, Minister for Education and Skills, Mary Coughlan, announced a €20 million investment for developing better standards of ICT in schools.

She said that:

“These new grants will enable post-primary schools throughout the country to equip their classrooms with appropriate technology, to enhance teaching and learning and to help meet the needs of the Smart Economy.” (IrishTimes.com, October 15, 2010)
In further publications from the Department it was stated that:

“The Department of Education and Skills (DES) has committed to developing Information and Communications Technology (ICT) infrastructure in schools in Ireland. The purpose of this commitment is to help teachers incorporate ICT into their skill sets and teaching practice and develop curriculum and learning resources that make use of ICT.”
(Citizens Information Website, 2010)

In a study (OECD 2004) of 14 OECD countries (graphed in Appendix A) Ireland is in the top three countries in “admission policies” and “guidance and counselling”. However the good news stops here. It is classed as only average in relation to attainment, below average in relation to staff and student access to resources and is in the bottom three in relation to “hiring fully qualified ICT teachers”, “professional development” and “educational use of computers”. This suggests that Ireland has been investing a lot of money in reports and preparation for the introduction of wide scale ICT equipment but to date has been failing to properly implement their recommendations.

In the executive summary of a more recent OECD report (2010) it was stated that “Despite increasing investment in ICT infrastructure in schools, student-computer ratios are still a handicap for ICT use in schools” (p. 12) and that the student computer ratio has been “roughly the same” (p. 12) since 2003.

In September 2010, a letter was sent to all post primary schools informing them of a new grant for the upgrade of ICT in schools (Appendix B). With this new investment of money, schools have a real opportunity to implement some of the administrative documentation in an effective and sustainable manner. It is therefore important that schools take time to reflect on previous studies and reports in order to make the most of this new investment.

However in Appendix 3 of the September 2010 letter from the DES, received by all schools concerned, it was stated that:

“Schools should use the grant to purchase equipment as soon as possible, and are asked to make every effort to purchase equipment before the end of the 2010 calendar year”.

7
One might have to question the reasoning behind this push to make impulse purchases as it leaves little time for reflection. Such deadlines, as well as pressure from vendors to buy quickly, can deter from calm and logical consideration of any new technology to be adopted. However as the directive only states “make every effort” schools can still opt to think before they buy.

2.3 What is available to schools

Under the new grant schools will get a “minimum amount of € 1,700” as well as “€ 63.45 per pupil” in the school (DES, September 2010). DEIS (Delivering Equality of Opportunity in Schools) schools, will receive a higher basic grant of € 2,550. If this is applied to a school with 750 students it means the school will get a total grant of € 49,287.50, or € 50,137.50 if it is classed as DEIS.

Attached to the letter from the DES, was a list of strict instructions on how to spend the money along with an “Authorised Equipment” list. The baseline requirement that must be met before purchasing any other equipment is that, “each classroom in the school must be equipped with a teaching computer, with a long range wireless mouse and keyboard, and a fixed digital projector”. It also state that priority must be given to purchasing “ICT Equipment to support Project Maths” as well as “classrooms or laboratories for subjects with practical dimensions e.g. science and T4 subjects (Technology, Design and Communication Graphics (DCG), Engineering Technology and Architectural Technology)”.

It states that “Only when this baseline is in place, can any remaining funding be used” to purchase other equipment. It then clearly lists eleven items (see Appendix B) which can be purchased.

It also clearly states that the funding is not to be used to purchase any software “with the exception of software which will assist in meeting the learning objectives of the Project Maths syllabus”.

Computers by themselves are not a quick fix solution to all the problems in the education system at the moment and the “right conditions need to be in place before the educational benefits of investment in hardware can be fully harnessed” (Ng, 2009).
With an eagerness to jump on the technology bandwagon, it is often overlooked that ICT integration is a systematic process. According to Granger et al (2002, p. 480) successful implementation of ICT is a complex process determined by pedagogical values, attitudes, curricular needs and physical infrastructure.

Lack of proper planning and policymaking “exacerbates the existing lack of resources” (Farrell and Wachholz, 2003, p. 267) and schools could end up with technologies that are not suitable for their needs or cannot be fully utilised due to the lack of teacher training. Monahan (2004) states that most investment results in an “incredible influx of financial support for equipment but only a meagre trickle for network support or staff training” (p. 373).

So, with this new investment, what should schools consider before purchasing equipment?

2.4 Policy Development

One of the limitations of many educational ICT policies is that most countries have not developed holistic policies for the educational use of ICT (OECD, 2010). In order to effectively plan for ICT integration, policymakers should begin by “determining the educational purposes that technologies are to serve before they are brought on board” (Ng, 2009). By establishing a plan and using available resource material, such as the NCTEs Roadmap for Integration, policymakers can effectively utilise any available money.

The key considerations in selecting infrastructure and hardware, as set out by Haddad (2007) are appropriateness, cost-effectiveness, and sustainability. Appropriateness refers to fitness for purpose and context, and as such schools must resist the pressure to adopt the newest technologies simply because they are ‘high-tech’ and other countries are adopting them.

Technological sustainability refers to the fact that technologies become obsolete very quickly. As maintenance and support account for about a third of the initial investment in computer hardware and software, it is important that schools choose technologies that will be effective in the long term, whilst also considering the availability of technical
support. As Haddad (2007) puts it, this requires planning and cannot be “inserted into a project as an afterthought, but must be built into conception and designed with the participation of those concerned” (p. 60).

When planning for the integration of any ICT investment it is vital that it is fully known what the equipment is going to be used for.

2.5 Use of ICT

It is not just in recent years that computers have been hailed as “the next big thing”. Since the eighties teachers have been using computers, in one form or another, to try to enhance their teaching performance. Cox, Preston & Cox (1999a) outline that the factors contributing to on-going use of ICT by teachers include: Making lessons more interesting and enjoyable for teachers and their students, including diversity and being more motivating and supportive of productive learning.

Although the majority of research (Passy, D. et al, 2004; Laubsch 2006; Kozma et al 2008) indicates that using ICT is highly effective and motivational, it also tells us that as of yet very few teachers have been able to master the art of holistic integration of ICT into their classes. Balanskat et al (2006) point out that although teachers appear to acknowledge the value of ICT, difficulties continue to be encountered in adopting and integrating such technologies. It seems ICT has been assimilated into the established way of teaching and not used to create innovative learning experiences (Demetriadis et al., 2003).

An OECD report (2001, p. 67) states that the use of ICT “reflects traditional classroom methodologies”, while Juels Van Belle & Soetaert (2001, p. 38) also say that “information technology in the classroom is used in an ineffective way”. McCannon & Crews (2000, p. 111) go as far as saying that computers in school are being used “in administrative tasks and not as part of the learning process”. Even though this idea is now eleven years old, it is unfortunately still very much valid today.

As evidence a DES report (2009) which states eight years later that “more teachers use ICT in their planning than plan for the actual use of ICT in their teaching” (p.99). As
Condie and Munro (2007) put it, the benefits of ICT use in the classroom depends on the success of which they have been integrated.

It seems that ICT has been used to simply take information and present it in the same way but through a different medium. The technique of transforming traditional classrooms, where the flow of information from teacher to student is typically the norm, into a dynamic, learner-centred environments which uses more participatory pedagogies is proving difficult for many educators (Wong & Trinida, 2004).

With a greater shift to a “knowledge-based economy” our educational system is required to develop students ability to transform information into knowledge and to apply that knowledge in dynamic, cross-cultural contexts. The main goal of using ICT is to aid students to think more for themselves. Ringstaff & Kelley (2002) say that students can learn where computers are used essentially as tutors to increase basic skills and knowledge. They can also learn with computers where technology is applied to a variety of goals in the learning process, and is construed as a resource to help develop higher order thinking, creativity and research skills. (Hennesy et al, 2010)

The main challenge for educators is to determine how to harness this potential of ICT which allows learners interact with peers in teams and sees the teacher take a more facilitating role in the teaching and learning process.

2.6 What’s stopping teachers?

“It is a common misconception that access to technology on its own motivates teachers to apply it in their teaching” (Hennessy et al, 2010, p.42). The reality is that there are many different factors hindering teachers integration of ICT. An OECD (2009) report in to these problems found that the barriers include an inconsistent number of computers to students, a deficit in maintenance and technical support and a lack of computer skills and or knowledge among teachers. In fact there are many factors which must be considered such as time, support, fear, ICT skills and pedagogical know-how and are not just at “micro level” (teachers attitude) but also on “meso level” (institutional) (Balanskat et al 2006).
2.6.1 Time

A survey carried out by Kozma (et al., 2004), assessing the Stanford World Links schools programme, showed that one of the biggest barriers to the use of computers was the lack of time available in classes, and in the teachers own schedules for planning (p. 376). Time, as stated by Haydn and Barton (2008), is “a very precious resource in education”. (p. 446)

Squire et al (2003) highlight that even when teachers take time to attend professional development, the effective delivery of the teaching/learning scenarios in classrooms is often diminished due to lack of time to fully prepare new initiatives. One Swedish teacher described learning how to handle and use the computer as a pedagogical tool by saying; “It takes more time than expected. It is like turning a transatlantic liner around, a very slow process” (Jedeskog, 2007, p.3). Bingimlas (2009) tells that even though teachers are competent and confident in the use of ICT they simply do not have the time to use it. However he goes on to say that real competence is the ability to integrate it into pedagogical practice.

With increasing pressure for results and “productivity” (Public Service agreement 2010-2014, online), from the DES and parents, teachers are finding themselves with less and less time. It is also often the case that the curriculum “is rigid and overloaded, leaving little time for innovative classroom practices” (Hennessy, Harrison & Wamakote 2010). In 2004 Mulkeens’ study of the NCTE Census data 1998 - 2002 Schools for the Digital Age, found that, as a result of curriculum pressure, ICT was primarily used in non-examination areas in post-primary schools (2004). As more modern research shows (Schoepp 2005; Baskin and Williams 2006; Binimilas 2009) there has been very little change since then. Pressure to “get the course finished” has blocked the potential use of ICT as teachers feel they simply “don’t have time”.

By changing pedagogical approaches to teaching, it will be also necessary to change assessment tasks. With new learning environments moving away from summative and formative methods, to more AFL (assessment for learning) approaches and open-ended projects (such as reports and research papers created by groups of students), a lot more time must be dedicated to developing and using appropriate evaluation methods. Changing to these ideas and also learning to adapt to different methods are time consuming and result in an increased teacher workload.
Some researchers however, such as Dawes (2001), have advocated that while preparation time will increase initially, there are a number of ways to alleviate those initial time constraints such as the provision of laptops and other portable equipment which will allow teachers easily reuse prepared information.

According to research, another key element that is essential in developing teacher enthusiasm towards any new technology is that of peer support (Dawes, 2001, p. 70). However in order to do this sufficient time must be made available for teachers. They also need administrative support, exemplars of new practice, leadership from their school managers and of course the necessary time for their own professional development and trialling of new approaches.

2.6.2 Support

Tella et al (2007) highlight that there is a lack of technical support in schools, and teachers lack of expertise in using and solving problems with hard and software, were the prominent factors hindering teachers readiness and confidence in using ICT. Wood et al (2005) find that having an expert ICT technician available is a vital element in ensuring successful ICT integration.

In recent years there have been large private investments in supplying schools with laptops, Interactive Whiteboards, etc. and there was always a lot of publicity around the event. However there has been little follow up on these investments with the relevant training of teachers. Callan (2001) notes that as teachers take on fundamental changes in their classroom pedagogy, they need support through the provision of continuing professional development.

The SRI (Stanford Research Institute) - World Links evaluation (Kozma et al., 2004) shows that teachers enthusiastically engage in collaborative projects and often portray a constructivist pedagogy. However, school administrators offer very little structural support and few incentives to use the technology effectively in the classroom. A European Union Empirica study (2006) reported that “better technical ICT maintenance and support” was “a key issue” for two thirds of European schools and 85% of Irish schools (Condie et al, 2007, DES 2008).
Mulkeen (2004) also reports that lack of technical support and maintenance as “the single item most frequently identified as an issue in all types of Irish schools” (p. 23). Usually it is left to a hand full of “IT Savvy” teachers to try their hand at managing the never ending list of problems that arise with the use of ICT. Many school leaders in 2002 perceived the lack of ICT-related knowledge of teachers as a major obstacle to the realisation of their ICT-related goals (Pelgrum, 2003). This is still an obstacle today.

To counter this, a DES report (2008) recommends that, based on pupil enrolment, schools should provide a call-out and preventative maintenance provision, including a central support service that can be contacted by phone or e-mail, with a technical support server installed in the school which would allow technical issues to be resolved remotely. It also recommends that “Technical support should only be provided for computers that are six years old or less” (p. 23).

The unreliability of hardware, expensive repairs and maintenance, coupled with a lack of technical support have all made teachers wary of using ICT in everyday teaching (Dawes 2001).

2.6.3 Technophobia of teachers

It is clear that the psychological factors of a teacher’s own beliefs and attitudes to ICT and pedagogical innovation are both primary facilitators and/or barriers to teacher use of technology in the classroom (Harrison and Wamakote, 2010). Mumtaz (2000) also believes that a teachers subject pedagogical beliefs, classroom skills and their technical skills are critical to successful ICT integration. On the other hand, lack of support and time can kill off teachers enthusiasm for using ICT and as a result teachers are seen to be “Technophobic” (Lloyd (2009) & Olakulehin, (2007))

It is true to say that a lot of teachers are very comfortable with their established teaching styles and “there is an understandable apprehension, even fear, as to the role of a teacher in an ICT-equipped classroom” (Futurelab, 2003). Hennessy et el (2010) find that teachers may “initially feel threatened by the perceived loss of control in the classroom” as students, who on the most part have a better understanding of the technology, “can quickly access information and challenge the teachers role as the primary source of
knowledge” (p. 47). Tuviera-Lecaroz (2000, online) also states that “the discomfort teachers feel in using technology in the classroom is exacerbated by the awareness that their students are more technology-savvy than they are”. Even when teachers do take steps to improve their ICT awareness and skills they can sometimes lack the confidence necessary to put this training into use.

In an effort to overcome these “fears” the general solution seems to have been to immerse teachers in new technical equipment and in doing so they will magically be able to use it. However, as stated by Edwyn (2000), “the technology is practically worthless unless people are equipped with the know-how, and the willingness, to use it”. He states that those who cannot use it confidently “will become increasingly marginalised within the modern world”. This is now commonly referred to as the “second digital divide”.

2.7 The Second Digital Divide
An OECD (2010) report states that “in nearly every OECD country, all students attend schools equipped with computers, 88% of which are connected to the Internet” (online). This shows a large reduction in the initial digital divide. It also concludes that “the importance of the digital divide in education goes beyond the issue of access to technology”. It identifies the second form of digital divide as being “those who have the necessary competences and skills to benefit from computer use and those who do not”.

This is true also in the teaching profession. As newly trained teachers come from university they bring a large degree of technical skills which they acquired as part of their training. However, as being the first groups of teachers to be also classed as “digital natives”, they are not on par with the more experienced teachers in a school.

This divide can lead to certain teachers being marginalised and “teachers who lack the chance to develop professionally in the use of modern ICT feel under threat” (Hennesy et. el, 2010, p. 42). Ely (1993) and Pelgrum (2001) identify “teachers lack of knowledge/skills” as being a serious obstacle in the way of introducing ICT in schools. Teachers pedagogical and technical expertise is critical for ICT integration and Mooij & Smeets (2001) state that “if teachers are not confident in their ability or competence to
handle computers this may hamper their willingness to introduce technology in their classroom”.

However, if teachers are given an opportunity to engage in appropriate in-service training they will “learn how to manage their classrooms more effectively and to use the technology to create a more stimulating learning environment” (Olakulehin, 2007). As Owston states:

“One of the best investments a government can make to improve student learning is to invest in teacher professional development. Any policy put into place to infuse ICT into schools that does not have a strong teacher professional development and support strategy will only lead to disappointing results”.

(Owston 2006, online)

2.8 Need for Professional Development.

“Teachers are the key to whether technology is used appropriately and effectively” (Carlson and Gadio 2002, p.119). Even with high levels of investment in ICT, schools need fully trained teachers to make use of them. The problem, as identified by Edwyn (2000), is that “the neglect of teacher ICT training, which tends to lag behind physical investment, is a major obstacle” (p. 58). The introduction of new technologies without allocation of sufficient teacher training and support “is like building roads but not making cars available” (Haddad 2007, p.58).

In a report on “E-Learning for Educators” (2001) it is reported that investment in professional development “produces greater increases in student achievement than comparable investments in class size, increasing salaries or even hiring more experienced teachers” (online).

The teachers ability to successfully integrate ICT into the classroom “depends on the ability of teachers to structure their learning environments in non-traditional ways, merging technology with new pedagogies”. (UNESCO 2008, p.9) If ICT is to be properly integrated it will require defining new teacher roles and pedagogies (Makrakis, 2005).

A 2008 UNESCO report states that “teacher professional development will be a crucial component” of successful ICT integration only “if it is focused on specific changes in teacher classroom behaviours” and “if the professional development is on-going and
aligned with other changes in the educational system” (p. 9). However, while the aim of most training is the learning of new skills, it is also important to remember that it also offers a chance to develop “new insights into pedagogy and stimulates an on-going reflection into one’s own practice” (Tuviera-Lecaroz, p. 76).

Tella, et. al. (2007), recommend that professional development policies should support ICT-related teaching models, in particular those that encourage both students and teachers to play an active role in teaching activities. Studies, such as Ertmer, (2005); Tondeur et al, (2008), confirm that “teachers who use computers do so because their conceptions of using ICT fit into their existing teaching beliefs or belief system” (p. 4). However it is important that teachers develop classroom management skills with innovative ways of “using technology to enhance learning and encourage technology literacy, knowledge deepening and knowledge creation” (UNESCO, 2008, p. 9).

Knowledge creation forces educators to go beyond a focus on subject knowledge, to explicitly include 21st century skills that are needed to construct new knowledge and engage in lifelong learning. These skills include the ability to collaborate, communicate, create, innovate and think critically.

In a report by the DES (2008, p. 6-7) titled “Investing Efficiently in ICT in Schools 2008 - 2013” it is stated that “thousands of teachers have attended professional development courses in a voluntary capacity” and “at their own expense” it is recognised that “this approach is not sustainable in the longer term and will not ensure that all teachers receive the training and support necessary to more effectively and consistently embed technologies in their practice”. It is acknowledged that “there is need for an overall framework to bring together national schemes and programmes of teacher ICT education”. It states that this should be for “initial and in-career” training. It also acknowledges that “teacher education and development are central to the more successful national ICT interventions”.

Professional development activities need to be varied as the teachers are “at different points in their career development” (Tuviera-Lecaroz, online). In order to make sure that teachers “acquire and maintain the competencies required to face the diverse challenges involved in teaching and learning” (Howell, 1996) it is important that a wide variety of subjects and activities are included in any professional development courses.
2.8.1 What is best the format for in-service?

Owston (2006, p.1) states that “teacher expertise is one of the most influential factors in determining student achievement and that professional development is the best option to develop needed expertise.” However Cox et al. (1999b) found that most professional development programmes do not demonstrate “how to revise their pedagogical practices, how to replace other traditional lessons without depleting the curriculum coverage and so on” (online). As a result when teachers leave course “they still do not know how to use ICT for teaching pupils. They only knew how to run certain software packages and to fix the printer” (Cox et al 1999b). The question remains what form of in-service should be employed?

2.8.1.1 Step-by-step

Many researchers of this question conclude that ICT implementation is a step by step process. Fullan (2001) cited three stages to ICT implementation. Firstly they must learn about the existence of the innovations and decide whether or not to adopt it. Secondly they implement the strategy, and finally, through evaluation, decide whether to continue using it or not. The time taken to complete this process depended on the individual teacher.

Similarly Venezky (2004), states it is important to have a mix of effective Initial Teacher Education (ITE) and Continuing Professional Development (CPD) for an ICT initiative to succeed. Additionally he believes emphasis should be placed on the pedagogy underlying the use of ICTs for teaching and learning.

Other research (e.g. Glazer & Hannafin, 2006, and Muijs & Lindsay, 2008) supports this finding that traditional, one-off external in-service workshops tend to be of limited value in developing sustained transformation of practice.

Quality in the learning experience also requires an abundant supply of appropriate multimedia learning materials, (Edwyn, 2001) linking it to specific needs of learners, desisting from the “one size fits all” approach (Leach, 2005, p.112).

Similar to Hooper and Reiber (1995), who identify five key stages in the process of embedding any new technology into a classroom – familiarisation, utilisation, integration, reorientation and evolution, the UNESCO ICT competency standards for
teachers (2008) describes three approaches, which are technological literacy, knowledge deepening, and knowledge creation.

These approaches are seen as part of a development continuum, and each approach has different implications for education reform and improvement. They also have different implications for changes in the components of the education system: Pedagogy, teacher practice and professional development, curriculum and assessment, and school organisation and administration. ICT plays a unique, but complementary role in each of these approaches.

2.8.1.2 Make teachers at ease
When introducing technology it is important not to inundate teachers with too much technology as it has been shown that teachers proceed to adopt ICT in stages. Wells and Anderson (1995) report that teachers first try to become comfortable with their own interaction with the new medium and only then will they really start thinking about the potential learning benefits of the new technology. Myhre (1998) concludes that with increased familiarity with computers teachers turn to their interest in the pedagogical use of technology (rather than its operational issues) but also emphasizes that such change processes do not occur rapidly and are not easily achieved. Square et al (2003) found teachers spent more of their time in class “addressing navigational issues” than making sure students were on task.

2.8.2.3 Make teachers believe
Using the Perceptual Control Theory (PCT), i.e. that our perceptions are the only reality we can know, and that the purpose of all our actions is to control the state of this perceived world (Powers, 1973), as a basis for their research, Zhao and Cziko (2001, p.27) write that:

1. Teachers must believe that technology can more effectively achieve or maintain a higher level goal than what has been used (“effectiveness”).
2. Teachers must believe that using technology will not cause disturbances to other higher level goals that they evaluate as more important than the one being maintained (“disturbances”).
3. Teachers must believe that they have the ability and resources to use technology (“control”).
Teachers need to be reassured during professional development in respect of these points. Teachers must be shown the top-end potential of the technology (effectiveness) achieving a specific learning outcome (disturbances) in a simple and effective way (control).

In a report in The Journal, an online magazine which aims to “transform education through technology”, Rushton Hurley, who heads up Next Vista for Learning, a project that provides free online media for educators and offers training on the use of video content in the classroom, says it is important that “teachers need to learn to fish”. They need to learn to explore technology's possibilities independently. He says that “too often we simply give them fish”, i.e. a set procedure to follow, and “that doesn't help them extend and explore” (2011, online).

“When teachers perceive ICT as a tool to meet curricular goals, they are more likely to integrate ICT in their lessons” (UNESCO Bangkok, 2004, p.104). Hughes (2004) suggests that if a school-based and classroom-focused approach to teacher training is used to reinforce initial teacher training it will allow teachers to learn about ICT “in the context of their subject matter and pedagogy” (p. 347). Ng et al. (2009) back up this idea by stating that “teachers learn how to use ICTs more effectively when they see the technologies not as generic and decontextualized tools but as tools for teaching” (online). This allows them “to see a direct link between technology and the curriculum for which they are responsible” (Carlson and Gadio 2002, p. 122).

When teachers see the potential of ICT and begin to understand how to harness available material, they will be more at ease with the technology and will thus be more willing to use it “properly”.

2.9 Proper use of technology

A UNESCO study (2004, online), which focused on the average or above average attainment levels of pupils whose teachers focused on the pedagogical use of ICT, concludes that there is a large difference between teachers who use ICT “to enhance understanding of a particular topic” as opposed to “those who choose resources merely to present students work in a new way without any direct application to the topic”. Wegerif and Dawes (2004) suggest, “children need to be given the opportunity to make
their ideas public” (p. 86) and Cox et al. (2003) say that “attainment is greatest when pupils are challenged to think and to question their own understanding” (p. 3).

Cox (et al., 2003) also state that when teachers combine their pedagogical know-how of the subject and their understanding of how students understand and learn the subject, “they can then maximise the effects of using ICT in terms of increasing students’ attainment” (p. 3).

This is not an instantaneous event however. A UNESCO report (2002) on curriculum and teacher development for schools outlines that quality use of technology will happen over four stages. At the first stage (Emerging), focus is on discovering general functions and uses of new ICT with emphasis on ICT literacy and basic skills. This usually relates to using simple presentation software.

The second stage (Applying) incorporates more detailed learning of how to use ICT tools, and usually involves using computer based training and learning as well as computer assisted instruction. The third stage (Infusing) begins to see a more purposeful understanding and use of ICT. Teachers develop the ability to recognize how and when to use ICT tools to achieve a particular result, by choosing the most appropriate tools for a particular task, and using these tools in combination to solve real problems, such as the use of multi-media and simulation.

The final stage (Development) is reached when there has been a radical change in pedagogical practices and the learning situation has been totally transformed through the use of ICT. This is a new way of approaching teaching and learning situations with specialized learning management systems.

In order to progress through these stages, the report suggests that teachers should get initial training on ICT-related skills within the context of classroom objectives and activities to ensure the development of skills in the integrated use of ICT in teaching. This should be followed up by school-based training of teachers by their more experienced peers from other schools to ensure that teachers are trained in the context of their workplace. Finally needs-based “just-in-time” learning and peer coaching is required to ensure further development of teachers ICT and pedagogical skills leading to teachers using the technology to its full potential. This model of peer to peer training
has been reported to result in positive outcomes in other studies also (OECD, 2001; Trushell et al., 1998).

One major aspect of ICT is that it allows teachers to make things a lot more real, interesting and above all fun. If teachers learn how to have fun with technology, they'll bring that enthusiasm and sense of possibility to their students (Hurley; 2011, online) All of these different ideas can sometimes be overwhelming so how can schools be sure they are making the right decisions?

2.10 Ideas and lessons from other countries

It is important to remember that “no single solution exists to address the immense challenges of ICT integration because different perspectives of integrating ICT can be chosen” (Niederhauser & Stoddart, 2001). However, as with everything in life, it is important that we learn from past experiences, both our own and of others. It is only by examining the achievements and errors from the past that we can improve the future.

The following are just a few examples of good and bad aspects of the attempts of other countries to implement ICT educational strategies. If Ireland is to gain from any investment in ICT it must take ideas like these on board.

2.10.1 Finland

By adopting some education policies from elsewhere but also avoiding the mistakes made by other countries, Finland has become one of the leading models of an education system. In the not too distant past Finland was at the lower end of the table when it came to equality of student attainment and general efficiency of their educational system. However, according to a report in the Boston Globe (27th December, 2010) by Sahlberg, “the most recent PISA (Programme for International Student Assessment) study proves, Finland is one of the few nations that have accomplished both a high quality of learning and equity in learning at the same time” (online).

Its system does not rely on standardised testing or comparisons of student, teacher or school results. Instead it gives a lot of autonomy to the teachers to create and deliver pedagogical and content rich classes. By creating such an atmosphere Finish teachers
have more time and freedom to explore new pedagogical methodologies such as constructivist ICT approaches.

2.10.2 Greece

In a 2003 report by Demetriadis et al, a very interesting and innovative idea is outlined. They describe how one or two teachers from selected schools participated in a year long postgraduate course which comprised of three training phases.

The first three hundred hours (four months) was based on technology and pedagogical studies in which teachers attended lectures, laboratory sessions, group discussions and team project work. These sessions worked on using ICT to support didactic approaches such as interactive learning environments, project based learning and collaborative learning.

The second part of the course was a four week apprenticeship phase in which teacher-mentors visited selected schools and, supervised by their course tutors, delivered initial training sessions to the school teachers in small groups.

The final part of the training saw teacher-mentors assigned three of four selected schools in which they administered “vertical” training sessions (the training of teachers of the same specialization or subject to use specific educational software including off-line and on-line resources) and “horizontal” training sessions (the training of every interested teacher in the general use of ICT tools such as word processors, electronic presentations and internet communication).

After receiving this training teachers went back to their own schools and were in charge of delivering the same support structure to teachers in their school. However teachers were not totally taken out of classroom teaching. By continuing to teach on a much smaller timetable they were able to increase their pedagogical experience and develop new methodologies and concepts with evolving technology.

This initiative was found to be very successful and is something that could be looked at for Ireland. It would help to solve the problem of, amongst others, full days out for
teachers for in-service training and give more confidence to wary teachers as support would always be on hand.

2.10.3 Africa

Reports show that ICT is becoming more and more prominent in African schools and that their schools are making use of every day technology such as mobile phones to promote learning.

According to Hennessey et. al (2010) there is “growing and widespread awareness that the pedagogical and technical expertise of the teacher” (p. 40) in Africa, with governments identifying teacher professional development “as the key to effectively implementing policy and curricula, to using ICT to enhance teaching and learning, and to raising educational standards” (p. 40).

With the introduction of free primary education in 2005, funding is a big problem in African schools and it is becoming increasingly difficult to find qualified teachers. For this reason they need to be careful that every ‘penny’ spent is fully utilised. Another obstacle is that, like a coherent electricity supply, access and usage of ICT remain sporadic.

Despite the large scale private investment in undersea fibre-optic broadband network, as reported by the BBC on the 8th of April 2009 (online), due to the vastness of the continent access is a large problem. As a way to overcome the problems of access and funding, African countries are now relying on “ingenious technologies with a high penetration potential” (Hennessay et.al, 2010, online). Affordable portable technologies, such as mobile phones, are being utilised due to their low-cost, low-energy and low-maintenance. They offer far more flexibility in terms of mode, timing and location of use. In an Ethiopian study, Hansen et al (2009) say that this form of mobile technology places technology firmly in the learners hands resulting in increased student motivation and time spent on learning.

As mobile phones are a widely available technology they are recognised as having “a great deal of promise, especially for use in rural areas without mains electricity or internet connectivity” (Hennessay et.al, 2010). Although technically limited, several
mobile learning pilot projects are currently taking place and reports, such as Kukulsk-Hulme (2006), Traxler (2009) and Shohel, & Shrestha, (2010) are claiming links between mobile phone usage, as a learning tool, and student achievement.

2.10.4 England

“Professional development in the use of ICT in teaching and learning is essential if schools are to realise their investment in ICT. There are a wide range of national support programmes designed to help teachers, support staff and school leaders improve their use of ICT. They range from free diagnostic and exemplar materials to guidance on how funding can be used to facilitate peer-to-peer coaching and sharing best practice through local networks”.

(teachernet.gov.uk, 2007)

This quote illustrates the view of where the UK education system was in the not to distant past according to government websites. However, due to a lack of proper execution of these ideals, there is now large scale criticism of the system. According to a BBC report (5 August, 2010) “Information technology lessons in UK schools are so dull they are putting pupils off the subject and careers in computing”. This has led to 33% reduction of the number of pupils in England doing ICT GCSE over the last three years (2008-2010), which adds to the 33% fall between 2003 and 2009, in the number of ICT A-level candidates.

Now the Royal Society, the UK's national academy of science, is embarking on a new study: “Computing in schools and its importance and implications for the economic and scientific well-being of the UK”. According to the chair of the study, Professor Steve Furber of the Royal Society, the UK is “now watching the enthusiasm of the next generation waste away through poorly conceived courses and syllabuses” (BBC, 2010). With the support of 24 organisations, including the Royal Academy of Engineering, BCS Academy of Computing, the Council of Professors and Heads of Computing, Google, Microsoft Research and several of the UK’s leading universities, the study, which is due to report back in the autumn (2011), will look at the curriculum, current exams and assessment processes, training for teachers, as well as the facilities and resources available in schools and colleges.

In an interview conducted by the BBC in 2010 (online), Professor Steve Furber stated that "If we cannot address the problem of how to educate our young people in
inspirational and appropriate ways, we risk a future workforce that is totally unskilled and unsuited to tomorrow's job market”. In the same article Professor Matthew Harrison, Director of Education at the Royal Academy of Engineering said that students "have huge appetites for the computing devices they use outside of school”. However he goes on to say that “ICT and computer science in school seem to turn these young people off”. He suggests that the school curriculum needs “to engage” the students better “if the next generation are to engineer technology and not just consume it.”

However a very good part of the Initial Teacher Training (ITT) National Curriculum in England is that ICT is an integral part of teacher training. NQTs (newly qualifies teachers) must demonstrate that they use ICT effectively in their teaching before they can be awarded qualified teacher status. This type of teacher training can help avoid the problems reported in Flanders.

2.10.5 Flanders
A study carried out by Valcke et al (2007) in Flemish schools found that “policies are not well developed and focus on too small an extent on teacher training” (p. 795). He follows on to say that “more innovative applications of ICT are not promoted in the current approaches towards teacher training” (p. 806).

They also reported that there was only a “partial match between policies, need/demands and the actual in-service training of teachers” (p. 806). In conclusion to this study it was recommended that “school-based and team-based approaches are now considered as important indicators of good ICT teacher training” (p. 806).

2.10.6 Asian Pacific
In the recent past in Asia there has been “large-scale adoption of digital technologies that is impacting on curricular and pedagogical structures” (Ng et al 2009, p. 68). There has been large scale investment in most countries in the region but most have seemed to have neglected the initial planning stages of the incentives.

For example, in Malaysia, it has been pointed out that ‘over-dependence on vendors and lack of monitoring are causing the Government millions of ringgit for the rollout of various ICT initiatives’ (The Star 2008), while in the Philippines, the fixation with
technology is demonstrated by the fact that the bulk of funding for ICT in schools projects goes to hardware and very little goes to teacher training (Arinto 2006).

This type of investment sees the schools being supplied with a lot of excellent material but without the appropriate training it is going to waste. This is one situation that Ireland does not want to follow.

2.10.7 International
Tested and developed on international comparative data from several countries, such as France, Germany, Japan, the Netherlands, Switzerland and the US, the “Four in Balance” (Kennisnet, 2001), is a model for the implementation of ICT in schools. The concept behind the model is that the use of ICT for educational purposes is a matter of a well balanced deployment of four elements: 1. Vision; 2. ICT infrastructure; 3. Knowledge, attitudes and skills; 4. Educational software and content.

Ireland would do well to heed all these experiences of adoption / integration and learn from others mistakes.

2.11 Summary
Any investment for increasing levels of ICT usage in schools is obviously welcomed by all involved. However, it is now firmly established that its introduction into schools does not by itself improve the quality of education or raise attainment. Ertmer (2005) states that “computers are only an instrument and no technology can fix an undeveloped educational philosophy or compensate for inadequate practices”.

All this new equipment will go to waste unless teachers receive the appropriate training to use it. This training must not only include the basic operations of ICT proficiency but must also look at developing teachers understanding of using ICT as a pedagogical tool. This should include use of existing resources and also creation of their own.

In-service is necessary and beneficial but time must also be allocated in school to try new procedures and techniques otherwise it is wasted and forgotten about. An OECD (2004, online) reports the scheduling of teachers time, class-room organisation and
teachers’ professional development as being crucial to the success of any investment initiative.

There is no doubt that teachers who use ICT in classrooms have to demonstrate high levels of energy, hard work and perseverance, often in the “face of considerable odds” (Lankshear & Snyder, 2000, p. 110). If they are early adopters then they are required to be resourceful and overcome many barriers to make things work. Planning lessons involving computers can take considerable time and demands complex scheduling and resourcing. Many studies indicate that it is teacher expertise, lack of autonomy and lack of knowledge to evaluate the use and role of ICT in teaching that are the prominent factors hindering teachers readiness and confidence in using ICT support.

In the end, computers by themselves bring very little to the learning process – they are only tools for teaching and learning. It is essential that potential users have a sound understanding of how to use new ICTs beneficially, and a cultural view of the relationship between learning and technology (Leach et al., 2005). The ability of the teacher to collaborate, communicate, create, innovate and think critically is crucial to success. This way of thinking and evaluation can only be brought about through sustained teacher professional development which ideally coordinates teachers sophisticated professional skills with the pervasive use of technology. Killion (1999) said that the “high quality, results-driven, content specific staff development increases student achievement” (p. 3).

Bringing ICT into the classroom can have a considerable impact on the practice of teachers, in particular when ICT is conceptualised as a tool that supports a real change in the pedagogical approach. Not only do teachers need to change their roles and class organisation, they also need to invest energy in themselves and their students in preparing, introducing and managing new learning arrangements.

According to Leach (2005) ICT use enhances teachers professional knowledge and capabilities in very specific ways namely by: extending subject knowledge; enabling planning and preparation for teaching to be more efficient; and developing the range of teachers existing pedagogic practices.
Yet a primary barrier to teachers readiness and confidence in using ICT, despite general enthusiasm and belief in benefits for learners, is their lack of relevant preparation, either initially or in-service. In respect to initial training, Kirschner and Selinger (2003) found that teachers are “graduating in an information age without proper guidance on how to use technology in the classroom” (Kirschner and Selinger 2003, p.7). It is therefore important to infuse technology use into an entire teacher education programme, not providing a “bolted-on” course or separate ICT topics within a course (Society for Information Technology and Teacher Education, 2002).

Despite all the criticism of use of ICT, there is substantial evidence that, in the right hands and used appropriately for specific purposes in specific contexts, ICT can be an effective tool in supporting teaching and learning.

This research will look at how teachers are already using the ICT facilities available to them and what are the factors helping and hindering them of their use. The following chapter, Methodology, sets out how this study was carried out and why those methods were selected.
Chapter 3  Methodology

3.1 Introduction

Hall and Hall (1996) state that research is broken down into; preparation (the research questions, literature review, and development of research design), fieldwork, analysis and the reporting phase (p. 18). This chapter will detail the steps taken in carrying out the research for this report. It will first describe the school used for this research, before then stating exactly the aims of the research. After discussing a number of possible research methodologies, the chosen methods will be outlined in order and a rationale given for their selection. Finally it will outline ethical considerations taken into account and discuss the validity of the research.

3.2 Research Setting

This study will be carried out in a community school in the mid-lands with a population of 800 students and 60 teachers. The school’s students have diverse socio-economic backgrounds but the majority are from working middle class families.

The school has been very forward thinking in its approach to ICT in education and, as a result of much fundraising and hard work, every classroom has been fully equipped with a teachers computer and projector for the last seven years. It also has two fully networked computer rooms which are used extensively and most students take advantage of ECDL training during fourth and fifth year. There are four computers available to use in the staffroom and the latest addition to the hardware are two new Interactive Whiteboards, one of which is in a standard classroom in the school and the other is in a science demonstration room. The whole school is networked with three additional wireless networks in the library, staffroom and Technology room.

Every teacher uses the computers in their classroom to register students in the morning and after lunch. They also fill in exam results on the computer network (which for the first time in the 2010/2011 school year can be done on line from home) as well as use the system to prepare and print material for class.

There is a school website which offers information on general school arrangements, events and facilities as well as individual subject sections. It also has five separate
school blogs for History, Geography, Leaving Certificate Vocational Programme, Transition Year and Technology, maintained by individual teachers.

3.3 Research Questions
The above description might lead one to believe that this is one of the most advanced schools in the country. However do facilities and a handful of very enthusiastic teachers mean that the school is using ICT to its full potential in the classroom?

Bearing in mind that there has been a state investment of €20million for increasing ICT use in schools in 2010, the aim of this project is to conduct a case study of the school to examine the level of competence of the teaching staff as a whole in the understanding and use of the wide range of technology available to them. It will then use this information to examine what are the factors that have helped or hindered teachers in relation to their current levels of ICT understanding and usage. It will also look at what equipment and training is available and finally try to draw conclusions to answer the following research questions:

- Is the school ready for a further range of new equipment?
- What is helping and hindering teachers from fully utilising ICT?
- How might the school best invest grant money?

Before starting the study however, research must be undertaken into the best way to carry it out.

3.4 Methodological Approaches
Once a general background of the topic is researched and the main aims of the project will be identified. It will then necessary to research the different research paradigms available in order to find the one most appropriate to accurately answer the research questions set out. The following are a few examples of what the options were.

3.4.1 Action Research
Referred to as a combination of practical problem-solving and scientific research, action research “is seen as research specifically geared to changing matters” (Denscombe, 2010).
It was first introduced as a methodology in education research by Corey in the mid-1950s (1953). Mills (2003) defined action research as any systematic inquiry for the purpose of gathering data about how a persons particular school operates, how they teach, and how students learn. It involves the thoughtful inquiry, examination and on-going reflection of an existing practice in an attempt to change or improve that practice. The main principle of this research is to establish if the practice in question could be performed in a better way and is carried out with the assumption that improvements can be made (Cohen et al, 2007).

Cohen et al (2007) highlights the four main stages of action research as “identifying a problem, planning an intervention, implementing the intervention and evaluating the outcome” (p. 241), whereas Rossouw (2009), states the main goal of action research is “to bring about changes in the classroom and improve educators effectiveness, while enhancing professional growth” (p. 2).

Within the paradigm of critical theory, action research is used as a form of investigation that enables classroom educators to critically examine issues of interest in the context of their classrooms in an attempt to improve their own practice. It is seen to bridge the gap between academic research and day-to-day applications (de Zeeuw, 2003).

Leitch and Day (2000) say that teachers practice basic forms of reflective thinking every day. When problems arise “they reflect-in-action by thinking, acting simultaneously, reframing the problem and modifying on-going practice in such a way that teaching and learning still take place” (Leitch & Day, 2000, p. 180).

Suter (2006) sees teachers who use this form of research as “reflective practitioners” who can make exemplary contributions to instructional improvement. However this form of research also has its disadvantages too, as it has been stated that the researcher may find it difficult to detach themselves from the research.

3.4.2 Experiments

By investigating underlying relationships among issues or testing propositions, experimental research is used to establish the reason for any changes to the entity being studied, be it in physical sciences or indeed the social sciences. It examines cause and
effect by manipulating or influencing an independent variable, i.e. treatment or experimental variable, to see its effect on a dependent variable, i.e. criterion or outcome variable. It can be used to help explain problems, corroborate or challenge theoretical assumptions and goes beyond description and prediction. At its most basic level, the experiment seeks to make an observation, present a question, establish a hypothesis, examine it, evaluate the results, make a conclusion and communicate results.

Denscombe (2007, refers to the experiment as “an empirical investigation under controlled conditions designed to examine the properties of and relationship between specific factors” (p. 48).

The major strengths of experiments are that they are repeatable, precise and credible. On the other hand, they are sometimes conducted in artificial settings and could be considered unrepresentative. Quasi Experimental research, though more time consuming is a more effective form of experimental research. It matches subjects in treatment and control groups on known extraneous variables. Using as many groups as possible, each group is exposed to all the same treatments but in different order. This is repeated and observed over a period of time.

### 3.4.3 Case Study

Bell (2005) describes a case study as a thorough study of a single individual, group, incident, or community, where the researcher seeks to increase his or her understanding of the phenomena studied (Johansson, 2002, p. 2). This type of research involves a detailed, examination of a single instance or event referred to as the case. Cohen et al. (2007, p.182) see the case study as “a rich, vivid and holistic description and portrayal of events, contexts and situations”.

Case studies are often criticized because of the assumed difficulty with generalisations, but Flyvbjerg (2001), defends the case study method by saying that formal generalisation can be overvalued as a source of scientific development, whereas “the force of example” (p. 425) is underestimated. Holland & Herstad (2000) use Flyvbjerg’s concept of a “critical case” to indicate ways of limiting formal generalisation from case studies.
Case studies allow the researcher “to look at events, gather data, analyse information and present findings” (Ruddin, 2006, online) within a real life contexts. Yin (1994) refers to case studies as first-hand inquiries within a real-life context where the case, as a natural phenomenon, exists prior to, during and after research.

Denscombe (2007, p.45) argues that case studies enable the researcher “to grapple with relationships and social processes”. Critics of the case studies believe it relies too much on rich descriptive qualitative data, which may be ill-suited to statistical analysis or evaluation (Denscombe 2007, p.46). However if it uses a variety of research methods and sources of data it enhances validity through triangulation.

3.5 Approach Adopted
Following careful consideration of a number of alternatives, a case study methodology with an open approach will be employed. The case study methodology is the most appropriate paradigm in examining this particular issue, as it involves the study of a particular group and their interaction with ICT.

Bell (2005) and Yin (1994) conclude that a case study approach may sometimes be appropriate, as it provides an opportunity to study a problem; while Flyvbjerg (2006) asserts that the case study holds up well when compared to other methods. Denscombe (2007) concurs, arguing that “the use of more than one research method sits comfortably with the case study approach” (p. 38).

Action research was deemed inappropriate as, in this particular instance, the author is not seeking to improve practice, but to examine the factors influencing the use of ICT. Similarly, experiment was dismissed, as the author is not attempting to explain a change among colleagues in this research.

In order to improve the validity and accuracy of this study a mixed method technique will be followed by collecting quantitative and qualitative data sequentially across two phases. The study will first look at the level of understanding and needs of teachers (Quantitive phase) and guided by these results, interviews and observations will be carried out (Qualitive phase). According to Cohen et al (2000) quantitative methods, such as surveys, allow the collection of comparable data, while qualitative methods
gather “unique, non-standardised, personalised information about how individuals view the world”. This combination of mixed methods, sampling strategies, and multiple variables was chosen to deepen the quality of the final results but also to minimize errors that may arise from a single technique, and maximize the meaning from results of data interpretation (Patton, (2002); Tashakkori & Teddlie, (2003)).

3.6 Research Instruments

This section will outline the different research instruments used in carrying out the case study.

3.6.1 Questionnaire

The first part of the case study will focus on the collection of quantitative data using a questionnaire (Appendix C), which will be distributed to all members of staff. Cohen et al (2007) point out that questionnaires “gather data at a particular point in time with the intention of describing the nature of existing conditions” (p. 169). Trochim (2006) states that this type of “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”.

In order to ensure the questionnaire was the best possible a first draft will be designed and piloted and changes made. After careful revisions of the second draft the questionnaire will be timed and arrangements made to distribute it during a staff meeting in the school.

In designing the survey “sensitive questions” (Bell, 2005) will not be included. Therefore, respondents will not be asked for their age. However, length of teaching experience will be included.

When asking for opinion on certain matters a “bipolar” scaling will be used, with a neutral central point and the two ends of the scale at opposite positions (Trochim 2006).

It was considered to use an on-line survey provider, such as SurveyMonkey, however this was rejected because it was felt that those teachers who were not comfortable with using computers would not take the survey. To increase response rate the questionnaire will be given out during a staff meeting and 15 minutes will be allocated to allow
teachers fill it out. As a result approximately 95% of teachers will be surveyed, as some teachers may be absent on the day.

3.6.2 Interviews and Observation

The second part of this case study will be carried out using interview and observation techniques in order to collect qualitative information. The sample base will use the maximum variation sampling strategy (Patton, 2002; Teddlie & Yu, 2007) to purposely select teachers with extreme or maximal differences in teachers’ beliefs.

By hand picking teachers, based on questionnaire feedback and indication of willingness, it will be possible to probe for more in-depth points of view, from teachers of different levels and competence of use of ICT. This approach, i.e. deciding exactly how to narrow the focus of the study, is referred to by Bogdan and Biklen (2007) as internal sampling. The interviews will be recorded, with the consent of the participants, and the responses analysed against each other and the literature reviewed by the author.

Some observations will be also carried out in different classes to see if and how ICT is being used. Some of the teachers may take time after the class in which the observation occurred to explain other practices and pedagogical reasoning for how they use ICT.

3.7 Ethical Considerations

In order to protect the research participants, the researcher and the research study itself, all parts of the study were carried out in accordance with best practice.

The first consideration was to obtain “access and acceptance” (Cohen et al 2007) from the Principal and the Board of Management of the school. In order to keep within research guidelines the author first outlined the project to the Principal and “informed consent” will be requested to be sanctioned by the Board of Management and the Principal (Appendix D). The practical benefits to the school will also be discussed and the researcher will be available at all times to keep the Principal informed as the project develops upon request.

The second consideration will be to allow teachers the right not to participate in the study. An explanatory letter (Appendix E), which will accompany the questionnaire,
will gave a clearer outline the purpose of the study and it will be stated that participation will be at the “informed consent” of each teacher. This will allow participants to “choose whether to participate in the investigation after being informed of that would be likely to influence their decision” (Diener & Crandall, 1978, p. 57). There will also be a section on the survey that allowed teachers to indicate their interest in participating further in the study if deemed necessary.

The third consideration will be the issues of confidentiality and anonymity. In the same letter, as mentioned above, it will be stated that the research will be being undertaken for the purpose of a University of Limerick Masters in Digital Media Development for Education and that all information would be dealt with adhering to proper ethical guidelines and anonymity was assured.

3.8 Reliability and Validity
In order to ensure accurate reporting of the case at hand this study will follow all recommend procedures available to the author. Triangulation will be used in order to ensure authenticity of results (Spencer et al 2003) and by combining a quantitative questionnaire and qualitative interviews and observations a rounded and holistic view will be achievable.

Questions used in all parts of the study will be non-leading and unbiased, and designed in accordance with established procedures. The questionnaire will use mainly close ended questions with an opportunity to expand on answers given near the end. Hypothetical questions will be avoided and careful consideration will be given to phrasing of questions and types of responses which will be asked for. Prestige bias, the tendency for respondents to answer in a way that make them feel better, is an unavoidable disadvantage of questionnaires and may distort some results.

However the author of this report will try to diminish this by assuring anonymity and asking participants, before they complete the questionnaire, to be as truthful as possible.

The interviews will use open ended questioning with the base questions (Appendix F) designed before the interviews and asked to all participants. Probing questions will then be used during the interview to allow participants to elaborate on certain points of
interest to the interviewer. All interviews will be recorded with consent and later analysed.

Observation of one off sections of class time can sometimes not be totally representative of the normal everyday class. Teachers will be asked to do things as normal as possible and care will be taken by the observer not to interfere in the class in any way during the observation time. A brief observation checklist (Appendix G) will filled out and time will most likely be given by most of the teacher to explain reasoning for their use or lack of use of ICT.

The next section of this report will outline the finding of the study outlined above.
Chapter 4   Findings

4.1 Introduction
This chapter will outline the findings of all parts of the case study which was carried out using questionnaires, interviews and observation by the author. All results have been calculated and analysed as accurately as possible and within standard research guidelines in order to ensure valid and precise reporting of the case in hand.

In total 50 questionnaires were handed out. As time was allocated during a staff meeting all 50 were completed and returned during the meeting. This is well above the required response rate of 50% for accurate reporting, as outlined by Cohen et al (2000).

Based on their indication of willingness to participate further in the study during the questionnaire, three teachers were selected to be interviewed and three others observed. Those selected were from a variety of subjects backgrounds, age, sex, perceived competence and usage levels. This was to give a broader view of all sections of the school staff. In order to maintain anonymity these teachers will be referred to as Teacher A, Teacher B, etc. Interviews were also carried out with the head of the ICT department and the Principal.

Before looking in more detail at the findings it is important to first look at the profile of the teaching staff in the case school.

4.2 Demographic profile of staff
Of the 50 respondents 43 were female and 7 were male, which represents 86% and 14% of the staff respectively. This is well below the national female to male average of 3:2 as reported by Coady (2010, p. 17).
As teachers enter the profession at different ages, it was thought that number of years teaching experience was more important to ask than age. As seen from Figure 4.1 below, there is a fairly even distribution of teachers in the different levels of experience with 60% of the staff having less than 15 years experience.

![Teaching experience chart]

Figure 4.1 Numbers of years teaching experience of staff.

4.3 Presentation of findings by research question

In order to best present the information from the three different research tools used during this case study, this section will present findings under the headings of the research questions of this study. This will help to illustrate the figures in a triangular format. Where the school was at as of December 2010 will be considered first.

4.3.1 Is the school ready for a further range of new equipment?

In order to answer this question it must analysed under a number of sub headings.
4.3.1.1 Current ICT levels of teachers
First of all the current ICT level of teachers in the case school needs to be considered. When it came to understanding and knowledge of basic computer applications, as a group, the staff is well skilled. In relation to word processing operations 78% of respondents said that they use these types of programmes on a frequent basis (Fig. 4.2). Similar results were seen in relation to PowerPoint and Internet usage with 68% and 82% respectively of respondents reporting frequent use.

This was also evident from interviews and observations with PowerPoint being the most popular choice of presentation material when ICT is used, with teachers using a mix of downloaded presentations (Teacher A) and original material (Teacher C).
When the capability of carrying out different operations on the computer is looked at in more detail (Fig. 4.3), it is seen that more than 50% of respondents say they know how to create, copy and paste files and text; crop and rotate images; download images and videos from the internet and digital media devices; and used projectors in the classroom to display this information on direct feed from the internet or in animated PowerPoint presentations.

Figure 4.3 Skill set of teachers.
When asked about perceived level of ICT competence on a scale of 1 to 5, with 5 being very competent, 34% reported average ability with 42% feeling they had above average ability (Fig. 4.4), and 60% reported that they felt confident in the use of ICT as a pedagogical tool (Fig. 4.5).

These results are however dependent on the level of teaching experience. 70% of those with more than 20 years experience stated they have weak or very weak overall ICT skills and 80% do not feel confident in using it in class. This is in direct contrast to those who are new to teaching. 96% of teachers with less than 10 years experience have a competent or very competent level of skills and 87% saying they feel confident in the use of ICT.

However when looking at competent use of ICT as a pedagogical tool it is necessary to look past basic ICT operations. As impressive as these results are, lack of knowledge was discovered when it came to varying from these standard procedures. More than 50% of respondents (Fig. 4.3) reported lack of knowledge of procedures such as creating or uploading to a blog for students to access information, making Skype calls, taking a print screen or text wrapping images to make creation of documents easier.

Figure 4.4 Perceived Competence

Figure 4.5 Perceived Confidence
Other areas where teachers reported difficulty was the ability to modify or edit the information which they accessed on line or from other sources. 66% and 72% of respondents reported “never” using video or sound editing programs respectively.

It is evident too, from the questionnaire responses and observations, that there is a lack of interactivity in the material being produced. When asked if they use blogs, interactive programmes or IWB’s the responses for “never” or “not very often” were 68%, 46% and 82% respectively. When talking about the IWB Teacher B, a teacher with between 10-15 years experience, said, “It’s there alright! We were taken down to be shown how to use it for fifteen minutes after school but I haven’t used it since”. This is contrast with Teacher E, who has an IWB in her room, and stated that she “uses it in almost every class”.

Contrary to the current levels of use it was found that 76% of teachers agreed that IWBs would be a good purchase for the school (Fig. 4.6). It must also be noted that this questionnaire was filled out one month before a demonstration was given on the use of IWBs as referred to by Teacher B above. Therefore the 14% who did not know what they were would now be aware of them.

![Interactive White Board](image)

Figure 4.6  IWBs would be a good purchase for the school
Also, when asked about assigning internet based homework, 84% said “never” or “not very often” (Fig. 4.7), while 76% said they “never” or “not very often” asked their students to e-mail their homework (Fig. 4.8). Teacher C, a person new to the profession and a strong user of ICT in class, said that they “get students to go home and look up material on the net and then uses this information during class for discussions”.

When it comes to internet usage it was found that only 2% of teachers say they never use the internet with 82% saying they use it frequently (Fig. 4.9)
When asked about proficiency of different tasks on a scale of 1 to 5 (with 5 being very strong and 1 being very weak), E-mailing, finding teaching resources on the net and use of internet search engines were all firmly in the “strong” or “very strong” competency levels at 88%, 74% and 90% respectively. 32% said they were competent or very competent in downloading educational videos, while tweeting and blogging were the least used by staff members with only 16% and 6% respectively of teachers reporting competent or very competent levels of use (Fig. 4.10)

![Internet Proficiency](image)

**Figure 4.10** Competence in internet applications

**4.3.1.2 NCCA roadmap**

Next it is important to establish at what level the school is in relation to NCTE e-Learning Roadmap. This is a national plan which is designed to aid schools follow their development through four stages of ICT integration.
The four stages are;

- Initial, the planning stage and initial introduction.
- e-Enabled, when schools have sufficient facilities and begin to implement planning.
- e-Confident, when most teachers are familiar and confident with the use of ICT.
- e-Mature, where ICT knowledge and access is common place and teachers begin to diversify their own resources to suit individual needs.

The roadmap classifies the school under these titles in relation to

- “Leadership and Planning”,
- “ICT in the curriculum”,
- “Professional Development”,
- “e-Learning culture”
- “ICT infrastructure”.

Through observation, and also through an interview with the ICT co-ordinator, the case school was examined under this road map (Appendix H).

It was found that in relation to “Leadership and Planning” the school is very much in the e-Enabled stage showing signs of strong foundations in relation to vision, planning, integration and special educational needs (SEN). When it comes to an acceptable usage policy the school is more in the e-Confident stage as this has been well developed and accepted by all stakeholders through planning and mediation.

In relation to “ICT in the curriculum” the school is again mainly in the e-Enabled stage but in certain situations some teachers are starting to break into the e-Confident stage. This is especially evident when looking at student entries to competitions, such as the Irish Blog Awards and F1 in Schools, the production and editing of films using mobile phones carried out in the English department, and recording and editing of songs in the Music department.
In relation to “Professional Development” the school is just exiting the e-Enabled stages and establishing itself as e-Confident. Confidence in use of ICT is growing but uptake of ICT specific professional development is still at a low level. As can be seen from Figure 4.11, only 42% of teachers claim to have received ICT training specifically for using ICT as a pedagogical tool.

![Figure 4.11 Pedagogical In-service](image)

However as can be seen from Figures 4.12 and 4.13, this type of “pedagogical training” usually concentrates on using existing publications and not as much on creating new material.

![Figure 4.12 Training on Existing Material](image)  ![Figure 4.13 Training on Developing ICT Material](image)
In relation to “e-Learning culture”, the school is well established in the e-Enabled stage. A web site is in place and communication through text message is regularly used and 98% of teachers feel the use of ICT in teaching is a good idea (Fig. 4.14). However, as reported during the survey and interviews, which will be discussed in more detail in this report, access to equipment can still be a problem. The presence of ICT in the school is very important for teachers and pupils and there is a high level of ICT awareness throughout the school.

![Figure 4.14 Vision of ICT in Education.](image)

The school is at its strongest when examined in relation to “ICT Infrastructure”. Here it is already breaking into the e-Confident stage with all learning areas having access to a range of ICT equipment including digital projectors. A high speed and reliable network extends to all areas of the school to which all computers are connected, facilitating access to online and locally based server resources.

Technical support and appropriate warranties are always factored into purchasing agreements of new equipment. Formal technical support contract with Service Level Agreement (SLA) is in place with an external provider. The school even manages to enter the highest echelon of “e-Mature” by insuring that all new installations of hardware and software meet the required licensing standards.
However updating of existing equipment, the introduction of new initiatives such as wirelessly-enabled tablets, or investment in more IWB's, laptops and laptop trolleys to improve access to resources, are holding the school back in this area. One laptop trolley is available to improve access to resources and, although it is not used to its full potential (observation), more are needed. But, by far, the Achilles heel of this section for the school is the limited use of appropriate e-learning resources which are available.

4.3.2 What is helping and hindering teachers from fully utilising ICT?
This report will first look at what is helping teachers and then what is holding them back.

4.3.2.1 What is helping teachers?
While carrying out the study it was found that there were a number of Principal factors aiding teachers in their efforts to become more e-Mature. 88% of respondents said that levels of technology available in the school and support from other teachers within the school (84%) were important in their adaptation to ICT pedagogy. As every classroom in the school is already equipped with a computer and digital projector the question was asked how often do teachers use them. 84% say they use the computer in the classroom frequently (Fig. 4.15), while 80% say they frequently use the projector (Fig. 4.16).

![Computer in Classroom](image)
**Figure 4.15 Use of classroom computer**

![Projector in Classroom](image)
**Figure 4.16 Use of classroom projector**
There was a high personal interest in using ICT reported with 78% of respondents classing it as being very important and only 8% of teachers saying that they “never” talk to their colleagues about ICT (Fig. 4.17).

![Figure 4.17 ICT talk with colleagues](image)

With this strong penetration of ICT equipment 86% of teachers say they use ICT during class (Fig. 4.18)

![Figure 4.18 ICT usage during class](image)

Possible peer pressure was evident when Teacher A, responding to a question on how often they use ICT, stated “not as often as I am supposed to be doing or as often as I should”. He went on to say “there is more pressure being put on us as it is seen as being the way forward and we should be using it”.

51
However it was also reported by 84% of the staff that time spent learning independently outside of school was essential as there were a number of factors holding them back during school hours. Teacher C classes herself as “self-taught” when it comes to their ICT knowledge.

4.3.2.2 What’s holding teachers back?
With a highly motivated staff, only 28% of respondents said that fear of using ICT in the classroom was holding them back. The major problems reported were time, access and training (Figure 4.19)

![Problems hindering use of ICT](image)

**Figure 4.19  Problems hindering use of ICT**
4.3.2.2.1 Training

62% of respondents said they had received subject specific training, with 42% saying they had received training for ICT as a pedagogical tool. Despite this, 70% of respondents said there is not enough training in ICT (Fig. 4.20), with 76% reporting a lack of in-service given in school time. 94% said they want more training, with 58% of people wanting a series of short sessions as opposed to a one off full day training session (Fig. 4.21).

Figure 4.20 Is there sufficient time to up skill?

98% of respondents said they would partake in in-service during school time (Fig. 4.22) with 78% saying they would attend training outside of school time (Fig. 4.23).

Figure 4.22 School time in-service

Figure 4.23 Outside school time in-service
However, with 96% of teachers stating they would like to receive training in programmes specific for their subject (Fig. 4.24) and 94% they wanted training to develop their own material, only 4% say they have frequently requested ICT specific training with only a further 18% saying they sometimes request training (Fig. 4.25).

Figure 4.24 Request for ICT training in subject specific programmes

Figure 4.25 Frequency of request for ICT in-service.

All teachers interviewed/observed said they have had some form of ICT training but all of them also said it was more demonstration of how things work. Teacher C described the experience as “there was nothing pedagogical in it at all. It was more of a demo than actual interactive. . . . . this is how you use this and if you want to you can”. Teacher C went on to say “I know myself I could probably do a lot more with it (ICT)” and that a lack of proper pedagogical training and time is limiting their use. This was backed up by the majority of teachers who took part in the study, who said that they needed more training and more time to apply the training in class.
4.3.2.2 Time

With 78% of respondents saying there is sufficient ICT in the school (Fig. 4.26), 74% say there is not enough time to use it properly. 84% said lack of time available to develop resources during school time is a serious problem (Fig. 4.27), while 64% reported finding time to learn independently outside of school posed problems.

![Figure 4.26 School ICT facilities](image)

![Figure 4.27 Time to develop resources](image)

Teacher A said that, while he had made efforts to attend training outside of school time, they sometimes “learn something on a course but by the time you get to try implement it you have forgotten how to use it”. This was a sentiment shared by all teachers, to varying degrees, who were interviewed, observed or those who casually expressed their ideas to the author.

Teacher A also stated that he used ICT just “to present the information not as a problem solving tool”. They believe “at the end of the day the exam the students will be doing is a written exam” and that “you can cover the material quicker without using ICT”.

55
4.3.2.2.3 **Access**

Teacher A reported that the only time he had access to his classroom was when they had “students in front of me”. He said that before school and during lunch and break, the class was used by students and that after school it was used for evening study. He also stated that the computer in the room was either not there or not working for three three week periods during the year due to damage and viruses. This obviously equated to nine weeks of the 2010/2011 school year with no ICT facilities in the room.

After observing a part of a class Teacher D, a teacher of 10 years experience, commented on some common problems. One thing they said was “when opening files from the net you need to be in the room before the class to get prepared. This usually isn’t possible...” This also links in with time for preparing classes with 74% of respondents to the questionnaire saying they had not enough time to prepare using ICT (Fig. 4.28).

![Figure 4.28 Time allocation for preparing classes using ICT](image)

4.3.2.2.4 **Technical Problems**

One issue that was not included in the questionnaire but came up during the interviews and observations was the problem of technical difficulties. Teacher A said “When you’re trying to use it (ICT) there are often problems”. They go on to say “I was without a computer for three weeks three times during the year so far”.

56
Through talking to the ICT Coordinator it was found that there is a very good and efficient system of problem reporting, in place in the school but due to most of the problems having to be fixed by an outside contractor it was often slow to get problems resolved.

Teacher B said during the interview “I still use the overhead projector as I have the material in my hand…. It’s safer”. They continue to say that “computers can be slow and files won’t open”.

Technical problems were evident in two of the three classes observed during the study and in one case the teacher was aided by students to solve the problem.

4.3.3 How might the school best invest grant money?
This section will outline only the quantifiable data collected in relation to equipment available under the current grant. A more comprehensive answer to this question is given in the Discussions chapter of this report.

4.3.3.1 What do teachers want?
An emphasis was placed on equipment in the survey because, in the instructions from the DES in relation grant money, an emphasis was placed on installation of equipment. When given the list of equipment available under the current grant (page 3 of the questionnaire Appendix C), which 92% of the staff were aware of, teacher were asked to tick the things they would use and feel would be good purchases for the school or if they didn’t know what the item was. Laptops were the number one item with 90% of respondents saying they would be a good purchase. Speakers were next with 82%, 76% of teachers though Interactive White Boards would be a good idea even though only 10% of respondents say they used them frequently or sometimes.
Laser printers (72%), Interactive Projectors (70%), Scanners (68%), School-server (68%), Cameras (66%), Video cameras (66%) and mobile laptop trollies (64%) were all in the top ten wants from the list.

There were however, high levels of respondents claiming that they did not know about more modern advances in ICT such as Visualisers (66%), Presenter Pen (56%), Wireless Slate (52%), Digital Pen (Livescribe) (48%) and Mobile multi-media station (also known as a video editing station) (38%).

When given a list of ICT applications and asked to indicate “How often would you use the following for class preparation or during a class?”, the most used were Internet (96%), Word (90%), projectors in classrooms (88%) and PowerPoint (86%). The least used facilities used were IWB (10%), Video editing (14%) and sound editing (16%).

Of the staff, which again must be stated is very highly motivated, 90% said they would definitely use any new equipment purchased (Fig. 4.29).

![Figure 4.29](image.png)  
**Figure 4.29**  Would teachers welcome new equipment?
4.3.3.2 Principal interview

In order to find out the direction the management of the school sees ICT moving in in the future an interview was carried out with the Principal of the case school. During the interview the findings of the case study were briefly presented and the opinions of the Principal were obtained.

4.3.3.2.1 The Principals ICT Vision

When asked what direction the Principal saw ICT going she honestly replied that she “would be relying on the feedback and opinions of the experts in the school”, namely the ICT department. She said she has a very strong interest in ICT and feels it has an important place in the school but says that even though she has attended in-service on it she feels they are in a better position to lead the initiative.

She went on to say that she feels ICT “should not be forced on staff. They have to want it”. She said we must ask ourselves “What makes a good teacher?” She says in her opinion “some of the best teachers in the school don’t use it (ICT)”. She said that “teachers don’t have enough training and some fear the idea of using ICT” but their students have no problem in achieving good results using traditional methods.

In her opinion it should be used “as a facilitator of learning. It is a tool not a teacher.” She said one of the main advantages a teacher has over a computer is that “teachers can differentiate between students of different abilities”. She believes that “the human interaction between the teacher and student is vital and should never be replaced by computers”.

4.3.3.2.2 The Principals views on findings

When confronted with the problem of time the Principal was quick to point out that this is a problem for every part of school life. She said that teachers dedicate a lot of time in the school to helping student outside of class and in extra curricular activities. With the new structure of meetings, because of the Croke Park agreement, she described how the school calendar was completely full. She said that “every teacher has their own priorities” and that it was her responsibility to consider the needs of the whole staff.
Leading from this the problem of teacher access was discussed. When presented with the findings she said that she “did not accept this as a problem”. She said that “the two computer rooms are free during lunch and after school and there are four computers in the staffroom”. She said that “that excuse is a non-runner”.

When asked about the possibility of teacher laptops she said she was “not against the idea”. However she went on to say that the main problems with this would be cost of maintenance, insurance and possible abuse by staff of the facility by downloading inappropriate material. She said she knows of schools who have taken on this initiative but doesn’t see it in the immediate future of the case school.

Next the problems of professional development was discussed. In the Principals opinion every teacher as a professional has the obligation to keep up with advances in their profession. She gave the example of a doctor not keeping up with the latest medical advances. The Principal said that if teachers saw the need for changing their pedagogical practice that the onus was on them to attend the appropriate in-service. She said that the school would support teachers in their efforts and that a part of an upcoming staff development day could be dedicated to ICT, “if that’s what teachers want”, but that if teachers feel it is important to use a certain ICT support “they must know themselves how to use and maintain it”. The Principal said that “there is no point in having computers gathering dust”.

In a rhetorical question posed by the Principal she asked “If ICT is so important maybe we should make it an obligation in the application process for jobs?” She said that, in an effort to change at grass roots, “it should be part of teacher training that every graduate must reach a certain level of ICT”.
4.4 Summary

The following is a summary of the main findings of this case study:

- The case school is well equipped and its teachers highly motivated.
- There are calls for updating equipment and introduction of new initiatives.
- Support from ICT department and management is very high and ICT has a very high standing in the school ethos.
- There is a lot of collaboration within the staff to help and encourage each other in using ICT and overcoming problems.
- Lack of time, training and access as well as technical problems are the main barriers to an increase in ICT use in the school.
- General levels of understanding of ICT are very high in the school but there is a lack of knowledge when it come to the application of more in-depth pedagogical practices in relation to using ICT.
- ICT usage in the school mainly encompasses using YouTube, Google and PowerPoint and there is a lack of interactivity in the use of ICT and presentation methods.
- Newer members of staff are more at ease with ICT than more experienced members.
- There is a lot of interest amongst teachers to mature into using new technologies but there little understanding of what is available and how to use it.

The next chapter of this report, Discussions, uses these findings along with information gathered for the literature review, to discuss in more detail the research questions of this case study.
Chapter 5  
Discussion

5.1  Introduction

This chapter will compare the findings of this case study to research findings of other reports as outlined in the literature review, chapter two.

The purpose of this is to examine and validate the hypothesis that the provision of ICT equipment alone does not facilitate the pedagogical use of the equipment. Money must be spent on training teachers on proper pedagogical use of ICT and allowing them time to adapt to new techniques, in order to make proper use of the new investment.

The following discussion will be laid out in relation to the research questions and their sub headings.

5.2  Is the school ready for a further range of new equipment?

As can be seen from their positioning on the NCCA roadmap and data collected in the case school, it is clear to see that the school is highly equipped and is very much forward thinking in relation to ICT. Every class has its own computer and projector but it is widely accepted within the staff and management that there is a need to upgrade the current equipment available in the school.

According to the ICT coordinator in the school, “there have been a number of calls from staff to get projectors mounted over the past few years in order to reduce cabling and to reduce damage caused to computers as a result of them being moved around”. These problems were also reported during interviews with teachers A and B both citing problems with speed and reliability of aging classroom computers. With problems occurring with computers, i.e. viruses and other software problems, and despite the high levels of support (from the ICT department in conjunction with outside contractors) as reported in the questionnaire responses, some computers have been out of action for up to nine weeks a year, as reported by Teacher A in his interview.

Faced with these types of problems, teachers find it hard to plan classes with ICT integration in mind. As a result they are more likely to plan classes with traditional support material as they “have the notes to hand” and are “ready to go inside in class”
(Teacher B). As seen earlier in this report Wells & Anderson (1995), Myhre (1998) and Square (2003) all find that teachers will only begin to use ICT to its full potential when they feel at ease with planning and using it in their classes. Only when this happens can teachers start to change their pedagogical thinking in relation to ICT.

In line with findings of Juels Van Bell & Soetaert (2001), Demetriaddis (2003), Balanskat (2006) etc., this school seems to be struggling with the difference between using ICT as a presentation tool and using ICT as a pedagogical tool. Similar to a DES report (2009), this school uses ICT more in administration and planning than in actual use during class. Apart from a few initiatives as outlined in the findings chapter of this report, where used, ICT was found to be mainly used to transfer information in the traditional style of teaching but using different mediums.

This lack of student based learning can be explained by a number of factors. The first is the lack of access to computers for students, which will be discussed later in this chapter. The second factor is the lack of interactive teaching material such as wireless slates, IWBs and accompanying student interactive devices. Despite the availability of two IWBs in the school usage levels are still low, even though those who do use them do so in most lessons. This doesn’t mean however that teachers are not interested in the technology, as can be seen from the 76% of teachers who believe that further IWBs would be a good investment. The main reasons reported were again access but also lack of training and time to learn how to use them and prepare classes.

5.3 What is helping and hindering teachers from fully utilising ICT?
As just alluded to there are a number of factors which must be considered when introducing new ICT initiatives. As outlined by Haddad (2007), if these are not planned for from the beginning the initiative is likely to fail. The following are factors which help and hinder teachers integration of ICT.

5.3.1 Current ICT levels of teachers
The staff in the case school is very highly motivated and try their best to use ICT in their teaching. As reported earlier, studies such as a BECTA report 2004 and Hennessy
et al 2010, amongst others, show that the confidence and motivation of a school staff is crucial to the success or failure of ICT initiatives.

We can see from the results in the findings chapter of this report that 98% of teachers in the case school see ICT as a good idea, with 86% saying they already use ICT in teaching and 90% saying they would definitely use any equipment purchased to try and incorporate ICT more into their teaching.

These figures are very impressive but when looked at in more detail it is possible to see the real levels of teachers. In a general discussion with one teacher in the staffroom she claimed to use the classroom computer every day. When asked what she uses it for she proudly replied “I do the registration on e-portal every day”. This shows that there is a difference between real use and perceived use of ICT as part of teaching.

The school is extensively networked with every classroom being hard wired and three WiFi hotspots in the school. Due to lack of understanding and training of teachers in relation to this resource it was found to be extremely underutilised.

When we look at the findings of the questionnaire it is also possible to see that computer skills are mainly limited to word processing, PowerPoint and YouTube. Even though these are well utilised and teachers are trying very hard to develop ICT resources there is a lack of student based material. Never-the-less, within a staff which is already ICT orientated like this, the introduction of new ideas and equipment should be easily accepted and fully utilised if other aspects of planning are allowed for, such as appropriate training and allocation of time.

5.3.2 Training
One of the main things to consider is the need for training. It is excellent that the government has decided to push ICT by giving each school grant money, but if all of this is spent on equipment, as is outline in the instructions from the DES, the question must be asked; how are teachers going to use it?

As seen in the literature review of this report, researchers such as Owston (2006), Carlson & Gadio (2002), Edwyn (2001) and Haddad (2007) found that if teachers are to
utilise new technologies they must be given the appropriate professional development
and that this was more important to the success of an initiative than class size,
increasing salaries or hiring more teachers, which in the current economic climate are
sure not to happen.

In line with this, teachers in the case school also highlighted a lack of training as a
problem with 78% of respondents to the questionnaire and all three teachers interviewed
stating it causes a major obstacle. The best form of professional development, as
reported by UNESCO (2008) and Tella (2007), is that it must be on-going, reflective
and pedagogically based. It must also incorporate hands on training in use of new
equipment and development of resources. Venezkys (2004) ideas of Initial Teacher
Education (ITE) and Continuing Professional Development (CPD), while emphasising
pedagogy underlying the use of ICTs for teaching and learning, are also
important considerations here. These researchers found that professional
development courses do not illustrate to teachers how to revise their pedagogical
practices to replace traditional lessons without depleting curriculum coverage, and thus
they leave the course not knowing how to use ICT for teaching pupils. As teacher C said
in her interview any ICT content in her training was “more of a demo than interactive...this is how you use this and if you want to you can”.

During the interview with the Principal she made an interesting and valid point in
relation to professional development being the responsibility of teachers as
professionals. Her comparison to doctors, as professionals, keeping up with medical
advances and teachers, as professionals, keeping up with new pedagogies and subject
material, makes a great deal of sense and is reported on in studies conducted by
Timperle (2008), the AAPT (2009) and the OECD (2010b). However, as found in this
report and others (Owston (2006); DES (2008)), a lot of time is already being spent by
teachers outside of school time on school related tasks including professional
development. The same DES report (2008) found this type of approach to be “not
sustainable in the longer term” (p. 7)

As found to be the case in relation to the ITT National Curriculum in England, the
Principal also suggests that ICT should be incorporated more into the initial training of
teachers and that they should have to attain a certain level of pedagogical abilities in
relation to ICT before being allowed to graduate. She also makes the suggestion of have
this level of ability as a prerequisite in the interview process of teachers and thus again putting the onus on qualified teachers to take the time to upgrade their professional skills to new standards.

Using data collected during this study the type of in-service teachers would like to have was found to be a series of short in-service sessions which are specific, clear, hands on and which would take place during school time. As reported during the interview with teacher B, “there is too much in a full days in-service and you don’t get a chance to use half of it”.

Another interesting point made by the Principal during her interview was that she could see posts of responsibility disappear in the future and the work currently undertaken by teachers would become administrative work. Money saved on paying teachers would pay for any additional staff required and teachers time would be freed up for more teaching specific tasks, as in class preparation and professional development.

In relation to ICT her view is that, as well as the “strong peer support structure” which already exists in the school, this staff recruitment would see the possibility of having an IT technician to look after both technical problems and training of staff. She says that “in the current economic climate this is not possible now but is maybe something for the future”. This is a very interesting idea as it would solve problems of time, professional development and technical problems as well as alleviate some of the fears of the more wary members of staff.

As with the relationship between the purchase of equipment and professional development of staff, the training of teachers is money wasted if time is not given for teachers to practice new skills and develop new material before going in front of a class.

5.3.3 Time
In an education system where curriculums are overloaded and results of a terminal exam are key, teachers are now experiencing increasing pressure for results and “productivity”. With these demands they are finding it hard to allocate time to develop relative ICT skills and material.
In line with studies by Kozma (2004), Jedeskog, (2007) and Bingimlas (2009), this case study also found that time was repetitively cited as being a major obstacle in improving ICT integration. Linking with the previous section Teacher A in his interview said “I have learned different things on courses but then by then time I got a chance to try use it I had forgotten how to use it……. I suppose it’s, if you’re not using it you lose it.”

Even Teacher C, who is using ICT at a very high level, said that “I know I can do a lot more with it …... I just don’t have the time”. She classes herself as self-taught and said that she only reached this level of understanding by spending a lot of time doing it herself outside of school.

When Teacher B was asked what was the main obstacle he said “Time is the big thing. It’s all about time.” He said he had attended some full day in-service sessions but found it hard to get time to implement it. However he also said that “older technology turned me off ICT because it was so hard to use but the newer versions are quicker and easier to use”. When giving one example of a new piece of equipment he is trying to use in class, which is used to record and analyse scientific data during student experiments, he said “It’s just so easy. I would definitely use it again”.

This illustrates that teachers are motivated and if they are given time and introduced to new technology slowly they will see the advantage of the technology and have time to introduce it at their pace.

Another important thing to remember when trying to introduce something as time consuming as this, is to make use of the time teachers are dedicating. As explained by the ICT coordinator in the school “there was a great buzz at the beginning of the year when people heard about the investment and we demonstrated the IWBs”. However, she went on to say that “the wind was taken out of the sails” with the introduction of extra working hours for the 2011/2012 school year (dubbed “Croke Park hours”), and efforts to simultaneously introduce initiatives to totally redoing subject plans and assessment methods, also had a negative effect on this.

As important as these are, is it must be remembered that this type of reform will be a slow process to start with. Teachers must first be allowed time to learn the relative skills and pedagogies, they can then start to introduce them to their teaching methods and with
experience they can begin holistic change in teaching and examination. If schools try over burden teachers with too much work too soon they will discourage them from the outset.

5.3.4 Access
As already mentioned at the beginning of this chapter, access is an issue which must be addressed. In interviews, observations and questionnaires of this study teachers highlighted access as a major problem. This however can sometimes be more an issue of timetabling and availability of rooms than a lack of ICT resources.

Teacher A said he did not have access to his computer outside of class time due to students using the room before and after school and during lunchtime. As it is a standard classroom it is used for all subjects and thus when he is not using it during class time there is another class timetabled for the room.

Teachers B, C and D all raised the point of not being able to download material before class and as a result lose time during class waiting for files to download, especially if the connection is running slow. This, they claim, is due to having to change room and not being able to access computers before classes start. They also highlight that while there are four computers available in the staffroom these are difficult to get to use due to high demand.

In response to this during her interview the Principal said that “this excuse is a non-runner”. She said that the computer rooms were nearly always free during lunch and after school and that teachers could use these facilities as they wish.

Access is not only a problem for staff but also for students. As reported by the OECD (2010) “student-computer ratios are still a handicap for ICT use in schools”. Even with the two excellently equipped computer-rooms and a laptop trolley with 16 laptops available in the school, it was reported that access is very difficult due to high demand. Also the laptops, even though on a trolley must be used in a designated room and thus are sometimes not accessible due to timetabling difficulties.
In order to move towards more student based ICT activities there must be greater access to computers for students. Even if there was a computer for two students in a class more inquiry and research learning could take place. However with this increased usage of ICT comes another problem. “Teacher! Mine’s not working!”

### 5.3.5 Technical Problems

One thing that did not appear in the questionnaires but did arise in interviews and class observations was the matter of technical problems. There is a very good support system in the school where issues are solved as quick as possible either by the ICT department or by an outside contractor, and during the questionnaires no one highlighted support as a factor that would hinder their progress.

However during interviews and observations it was found that:

- Some computers were out of service for three weeks at a time and up to nine weeks a year (Teacher A);
- Files not opening and computers being slow (teacher B);
- Having to download videos and sound files during class, which sometimes takes a long time, because USB keys are forbidden (Teacher C);
- Teachers losing time trying to solve IT problems or relying on student to solve problems as seen during class observations.

These may seem to be small problems by themselves but when reoccurring can cause teacher to revert back to old methods of overheads or chalk and talk. When this happens teacher can be referred to as “Technophobic” as seen in reports by Harrison & Wamakote, (2010), Hennessy et el (2010), Wheeler (2005). They report that it can lead to teachers feeling threatened by technology and some feel a loss of control by being outsmarted by technologically savvy students. If this begins, the strong gains which the school has made in advancing into an e-Enabled school will be weakened and ICT will be less utilised.
5.3.6  Lack of experience

This is something which permeates through all of the above factors. Without equipment you can’t practice using it, without training you can’t use equipment which might be in the school and without time and access to use equipment you can’t progress. All of these factors when nurtured can help teachers feel more confident in themselves and in their own ideas.

Without this experience teachers are less likely to try using new techniques. For all teachers maintaining control in a class is vital. Some teachers see a student centred discovery learning environment as a threat to this order, and with good reason. If teachers are not equipped with adequate ICT knowledge, resources and experience they could easily find themselves in a position where students begin to question their understanding of the subject and thus lose control. However with proper support and time teachers can evolve slowly and adapt traditional pedagogies in line with new ideas.

5.4  How might the school best invest grant money?

The announcement of the ICT grant in September 2010 coincided with the introduction of a new Leaving and Junior certificate maths curriculum. It was thought that in order to teach maths using the new ICT programmes available it would be necessary to equip every school with networked classroom computers and roof mounted projectors. It is also highlighted in a letter from the DES to all schools that once this had been done that priority should be given to T4 subjects and science labs.

However as the case school is in the advantageous position of already having these facilities the question is asked “How do we use the money to best suit our school?” When answering this question they must look at the following issues.

5.4.1  What do teachers want?

There are a number of thing that were highlighted by teachers during the study which they feel would be most useful to progress into an e-Mature school.
In the questionnaire the most requested items by staff were teacher laptops, speakers and Interactive White Boards. These top three items are, in this authors view, very forward thinking and very useful.

Laptops would allow teachers to overcome the problems of access to classroom computers to prepare classes. With laptops they could do this from any part of the school. Also, as the school has three WiFi zones (the staffroom, technology room area and the library), teachers could easily connect to the internet and network in order to find and share resources and print material. This would also eliminate the need for USB keys and downloading of files for every class.

If each teacher had their own laptop they could download and save any files (videos, sound, PDF etc) directly to the laptop which they could bring with them. By installing a laptop docking station on each desk the teachers can effortlessly connect to any peripheral devices such as projectors, speakers or IWBs. This would solve problems such as access, spread of viruses etc.

Speakers are of upmost importance if teachers want to play video or sound files for the whole class. Without a proper sound system student might not be able to hear the relevant information and thus the class will be ineffective. The speakers installed should be of good quality and wall mounted to avoid wires on desks and damage caused by moving them.

IWB’s are something that most teachers know about but few have experience in. This did not however defer from it being placed as the third most important purchase for the school. The school already has two interactive white boards but as stated in the findings chapter they are not fully utilised at the moment. This is not due to lack of interest but lack of training and experience. IWB’s are proven to increase student participation and attentiveness and also offer a diverse number of possibilities to teachers. They can easily display students work, save their own work directly from the board and run quizzes and interactive games for the full class.
However teachers were not only interested in material investment. As seen from the first section of this chapter, teachers are asking for money to be invested in training and time to practice using equipment and develop resources. As Owston (2006) tell us, if this professional development and support strategies are not provided it will only lead to disappointing results.

### 5.4.2 The Principals ICT Vision

It was extremely interesting, not only to hear the views of the Principals views in relation to the future of ICT in the case school, but also to hear her opinion on the findings of the study. When these views are compared to existing literature, as outline in chapter two, strong similarities are visible.

One thing that was very strong throughout the interview was that any examples of how ICT is benefiting the school were all administrative. She said how the timetable was more efficiently done; e-portal help track attendance, results and student information; and emails, text and an excellent school website help keep parents informed of all school matters. This is in line with finding by McCannon & Crews (2000), Condie & Munro (2007) and the DES (2009) who all state that ICT is more utilised as an administrative tool than as a pedagogical one.

However the Principal did state that she depends a lot on the “*expertise of certain staff*” to help develop a strong ICT structure. She said that this is not only in relation to ICT in-service but also in relation to purchasing equipment. She stated that “*there is no point in having equipment gathering dust*”. This type of collaboration is highly recommended and goes along with Haddads (2007) considerations of appropriateness, cost-effectiveness and sustainability before acting on any particular initiative.
Chapter 6 Conclusion and Recommendations

6.1 Introduction

It is rarely questioned that ICT has a major role to play in future educational establishments. The extent to which it is used and for what purpose is not only up to the each individual school but ultimately up to each teacher. This chapter will outline the key conclusions of this case study and put forward some recommendations to help the case school and similar schools advance into e-Maturity.

6.2 Is the school ready for a further range of new equipment?

Based on findings of this study the simple answer to this question is yes. Considering the efforts that have been made over the past ten years in developing their ICT facilities, as discussed with the ICT co-ordinator, to what they are today, and the interest in ICT that staff relay, the next logical step would be to update facilities.

Even though the school has excellent facilities they need to be modernise in both terms of equipment standards and relativeness in relation to the modern ideal of teaching with ICT. This should be done through reflection and consultation with affected teachers, to decide what is best for their individual situation. If this communication is not realised, general across the board purchases will prove to be a waste of money.

Recommendation

- As set out by the DES, the first part of the grant money should be used to mount projectors in every room. Then, while keeping within the guidelines of the DES, instead of purchasing all new computers, existing computers should be overhauled in relation to both hard and software. This would help to address the technical problems as teachers have expressed in the Findings, such as: damage to computers and projectors due to movement; eliminate traces of viruses that may be hidden on hard drives; speed up computers; and offer most up to date software to produce better material.

- When this has been achieved money should be spent on interactive equipment in order to allow more student interaction in ICT based pedagogies.
### 6.3 What is helping and hindering teachers from fully utilising ICT?

Teachers have profited immensely from the support of management, their ICT department and peers. With the facilities available to them in recent years teachers have achieved a lot and advanced more into an ICT friendly establishment than other schools.

As opposed to some reports, teachers in this school seem not to be effected as much by the fear factor. Teachers use ICT every day to record student attendance and grades, and have access to timetabling information. They also use ICT in teaching, but to varying levels. Personal time and effort, as well as support and availability of equipment, are the main helping factors in the school.

So what’s stopping them continuing on the path to e-Maturity? As has been extensively discussed in this report, the main barriers to their continuing progression are

- time,
- training,
- access
- technical problems.

Time is of the essence. Teachers throughout this study cited time as being the main barrier. With more pressure from public perception of the teaching profession and from the government to work extra hours in order to become “more productive”, teachers are finding themselves having to work more hours and have very little time for professionally developing areas outside their subject domain, such as ICT.

As developing ICT skills, resources and experience is slow and takes a lot of preparation to explore and adapt methods, teachers find that, even with high levels of motivation, there simply isn’t enough time for everything. It is very often used as an excuse that “at the end of the day there is a course to get through”, and, as a profession under increasing scrutiny, results are unfortunately the only way they are assessed as professionals. This is of course a totally inaccurate system as each school and each class has its own unique problems, but it is unfortunately a reality. By looking at the advances made by Finland (as set out in the literature Review of this report), Ireland could learn a lot about reducing the amount of content in subject curriculums and by doing so giving more autonomy to create and deliver pedagogical and content rich classes.
Time can be more efficiently used if the correct training was to accompany new investment in equipment. Pedagogical specific, hands on training would help teachers to use new ICT equipment in a time efficient and pedagogically efficient way. However, as Square et al. (2003) highlight, even with appropriate training teachers do not have the time to implement the new ideas. If the training is given as a one off session teachers will be overloaded and again not have time to adapt. This was also highlighted as a problem by teachers during the interviews in this case study.

Regular and problem free access is also essential for development. Without sufficient practice teachers will be unable to transfer knowledge into a flowing class. Also, if teachers find themselves spending more time fixing problems than practicing, they will quickly become wary of the technology and abandon using it.

**Recommendations**

- In order to increase ICT “productivity” and keep in line with finding of existing literature (Cox et al. 1999; Square et al. 2003) and of this study, this author recommends a series of short training sessions (1-2 hours) which would be held on the school premises. This could be done outside of school time but be taken into consideration as part the supplementary Croke Park hours. Ireland could learn a lot from the Greek initiative of peer mentoring (Demetriadis et al, 2003) as discussed earlier in this report.

- In addition to this, time should be allocated to allow teachers practice and adapt new pedagogical ideas and practice them with first or fourth year groups before being encouraged to introduce them into all classes. If student were aware of this initiative they could also help by giving feedback and support.

- Drawing on the ideas of Africa’s mobile technology initiative, teachers should be given access to laptop computers which they can take home and use. This would allow them more time to practice, develop resources and become more familiar with relevant software. It would also give teachers more autonomy to develop resources and in doing so follow in the direction of the Finish ideals.
6.4 How might the school best invest grant money?

This school has a head start on most other schools in Ireland in relation to facilities and practices. It therefore has a real opportunity to push ahead into a more interactive ICT structure. IWBs, more student computers/laptops and other interactive equipment should be top of the list of purchases after projectors are mounted and existing computers updated.

However, as stated by Haddad (2007), the introduction of new technologies without allocation of sufficient teacher training and support “is like building roads but not making cars available”.

**Recommendations**

- Grant money should be used to bring the school in line with new standards as set out in a letter from the DES with accompanied notification of the grant scheme in September 2010.

- With any remaining money, investment should be made into training teachers as to insure that any new equipment is fully utilised (Greece example) and that teachers have the relevant support to develop resources and pedagogical practices into the future.

6.5 Further Research

This study was carried out by one person and in a limited time frame, and thus was restricted by what it could investigate. Staff in the school were the main source of information during the study (except during observations). This means there is room to deepen the quality of findings by examining the views of students. Their input is also very important as they are the ones teachers are trying to adapt for. Also ideas put forward by the Principal were very interesting and would need more time to investigate as a follow up study.

As this study was carried out in one particular school, which is at one point on the e-learning Roadmap, some of the finding of this report might not be relevant to other schools, which are at other points on the roadmap. In order develop a more precise strategy schools should be examined individually. Levels of investment in each school
will vary due to existing facilities, size of school and status (DEIS or not). Motivation of staff and students may also vary due to individual circumstance.

6.6 Summary

This study has highlighted a number of different points of view in relation to the use of ICT as a teaching tool. It is undisputed that ICT should be used as a tool to aid learning rather than a tool to replacing teachers. With continuing support and investment teachers can become more skilled and confident and eventually change pedagogical practices. However, this study found that without the proportional investment in all aspects, such as equipment, training and time, any initiative will undoubtedly fail.

This study also found that while schools may feel they are high users of ICT, it is often the case that they are merely using ICT to transmit information in the same way but in a different format. In order for ICT to be fully utilised there needs to be fundamental changes in pedagogical thinking. While this author believes in maintaining appropriate behavioural levels and respect in the classroom, in order for ICT to be used efficiently in classes it must be interactive, more student based and less restrictive. This means more work initially but great advantages in the future.

The goal of e-Maturity is achievable but it will be a long process. In order to achieve real change, time and money must be spent and schools must be patient to allow change. Plans must be in place and continual communication between all involved (teachers, students and management) must be maintained.

In order to achieve holistic change, a holistic approach must be implemented.
Bibliography


Citizens information website, [online], available:


Coady, L. (2010) ‘Becoming a Teacher: Students Experience and Perceptions of their Initial Teacher Education’, Submitted University of Limerick, February 2010 for PhD


Futurelab. (2003). ‘Literature Review in Primary Science and ICT’, Belfast: Graduate School of Education, Queens University


Howell, F. (1996). ‘What is Professional Development? The Teacher. acquire and maintain the competencies required to face the diverse challenges involved in teaching and learning’


Leach, J. (2005) ‘Do new information and communication technologies have a role to play in achieving quality professional development for teachers in the global south?’ Curriculum Journal, 16(3), 293-329


Olakulehin, F. K. (2007) ‘Information and communication technologies in teacher training and professional development in Nigeria’, Turkish Journal of Distance Education TODJE, 8(1), 133-142


TeacherNet (2007), [online] available:


Appendix A

OECD Graph

Country profiles according to eleven benchmark indicators
### Country profiles according to eleven benchmark indicators

<table>
<thead>
<tr>
<th></th>
<th>Admission policy *</th>
<th>Attainment (2)</th>
<th>Guidance and counselling (3)</th>
<th>External feedback (4)</th>
<th>Staff resources (5)</th>
<th>Hiring (6)</th>
<th>Computer resources (student) (7)</th>
<th>Computer resources (teacher) (8)</th>
<th>Professional development (9)</th>
<th>Professional development (related to ICT) (10)</th>
<th>Use of computers (11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OECD countries</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belgium (Fl.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td>▼▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
<tr>
<td>Finland</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
<tr>
<td>France</td>
<td>▼▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
<tr>
<td>Hungary</td>
<td>▼▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
<tr>
<td>Ireland</td>
<td>▼▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
<tr>
<td>Italy</td>
<td>▼▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
<tr>
<td>Korea</td>
<td>▼▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
<tr>
<td>Mexico</td>
<td>▼▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
<tr>
<td>Norway</td>
<td>▼▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
<tr>
<td>Portugal</td>
<td>▼▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
<tr>
<td>Spain</td>
<td>▼▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
<tr>
<td>Sweden</td>
<td>▼▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
<tr>
<td>Switzerland</td>
<td>▼▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
</tbody>
</table>

**Key:** ▼▼ in highest 3 ▼ = above average ▼ = average ▼▼ = below average ▼▼ = in lowest three. "Average" = within 0.1 standard deviation on indices, within 5 percentage points on participation/attainment rates, within 10 per cent on resourcing ratios.

* Scoring high or low on the "inclusiveness" of admissions policy does not necessarily indicate strength or weakness.

---

(1) Index of performance-related admission policies
(2) % of 20-24 year olds who have at least an upper secondary qualification or who are still in education
(3) Sum of indices of internal and external guidance-counselling
(4) Index of variety of external feedback received
(5) Ratio of students to professional staff (countries with low ratios, indicating high staff resources, are ranked highest)
(6) Index of difficulty of hiring fully qualified teachers (countries with low ratios, indicating "easy" of hiring qualified teachers, are ranked highest)
(7) Ratio of students to computers (countries with low ratios, indicating "high" computer resources, are ranked highest)
(8) Ratio of full-time equivalent teachers to computers (countries with low ratios, indicating "high" computer resources, are ranked highest)
(9) Index of variety in professional development
(10) % of teachers participating
(11) Index of variety in educational use of computers
Appendix B

Letter from the Department of Education and Science, September 2010
(With Equipment List)
Dear Chairperson,

As part of the implementation of the Smart Schools = Smart Economy Report and the 2008 ICT Strategy Report, the Tánaiste has announced ICT grants for post primary schools. I now write to inform you that the sum of (Amount) has been paid directly into your school’s bank account for the purchase of ICT equipment. The payment of this grant is strictly subject to the conditions set out below. The amount of your grant consists of a minimum amount of €1,700 (which equates to the cost of purchasing one fixed digital projector and teaching computer with a long range wireless mouse and keyboard) and a capitation allocation at (Amount) per capita.

Requests for an increase to the amount available to an individual school cannot be considered and any expenditure incurred in excess of the grant amount must be met by the school.

Appendix 1 lists, in order of priority, the items of equipment authorised for purchase. The grant is provided so that, as a baseline, each classroom in the school should be equipped with a teaching computer, with a long range wireless mouse and keyboard, and a fixed digital projector. Please note that the purchase of equipment (teaching computers and digital projectors) to support Project Maths must be prioritised. Only if this equipment is in place for Project Maths, should the funding be used to purchase other items of equipment as listed.

Terms:
In order to comply with the terms of the scheme your school must now take the following steps:
1) the Form of Acceptance at Appendix 2, should be signed by the Chairperson of the Board of Management and returned to the ICT Policy Unit of the Department of Education & Skills, Marlborough Street, Dublin 1 as soon as possible and before any purchases are made.
2) the ICT equipment selected for purchase must be in compliance with the prioritised list of authorised equipment as set out at Appendix 1 to this letter.
3) All purchases must be in compliance with Public Procurement Procedures. Existing ICT purchasing Frameworks must be engaged with and taken advantage of. Frameworks are
currently available for PCs, printers, laptops and digital projectors. However, if having reviewed the market and considered detailed technical specifications, warranties and associated supports, it is clear that better value for money can be achieved from non-Framework vendors, then schools should seek concurrent quotes from both Framework and non-Framework vendors. Make sure that identical technical specification and warranty options are presented to all vendors at the time of request for written quotations.

4) As soon as the equipment is purchased, please complete the on-line expenditure return which can be accessed at the following link: www.ncte.ie/ppgrantreturn. The password is ppgrant2010. The return will take about 10 minutes to complete, however it must be completed in one online session covering all purchases made with the grant funding. (Please note that ‘paper’ versions of the return must NOT be submitted. Only online versions of the grant return form can be accepted).

**Public Procurement – rules and assistance**

ICT Procurement Frameworks simplify the process of purchasing ICT equipment for schools. Further information on ICT Frameworks is available at www.ncte.ie/ictpurchasingframeworks/. When purchasing equipment for which no ICT framework exists, schools are advised to refer to the NCTE’s advice sheets and general purchasing guidance at: www.ncte.ie/ICTAdviceSupport, then seek best value for money by sourcing written quotes from a minimum of three suppliers.

Information regarding public procurement rules is available at: http://www.etenders.gov.ie/.

**Freedom of Information**

Information provided by schools and colleges to the Department of Education and Skills or to the NCTE may be disclosed in response to a request under the Freedom of Information (FOI) Acts, 1997 and 2003. The Chairperson shall, if requested, provide the Department of Education and Skills or the NCTE with any record relating to any action or service provided under this scheme.

**Audits**

As outlined above, schools must certify to the Department the equipment which they have purchased using these grants. The Department of Education & Skills will undertake audits and inspections of schools who have been awarded ICT grants under this scheme. In accordance with standard practice, payment of any further grants is conditional on the Department being satisfied that the funding has been applied for the purpose intended, and that the school has followed proper procedures and retained appropriate records for at least seven years.
Further Information
An FAQ document is attached at Appendix 3. Further information is also available on the NCTE website (www.ncte.ie). Seminars on e-learning planning for post-primary principals will be held in Autumn 2010. Information and advice on choosing equipment, planning and on procurement procedures will be part of the seminars. Dates and venues for these seminars will be communicated shortly.

Queries in relation to this letter should be addressed as follows:
• Queries and advice on choosing equipment, public procurement procedures and using the ICT Procurement Frameworks should be emailed to NCTE at ictadvice@ncte.ie or by telephone to 01 7008388. Queries on the ICT Infrastructure grant will be answered between the hours of 10.00am and 1.00pm and from 2.30pm - 4.30 pm.
• Queries regarding the amount of grant funding issued to schools, the terms and conditions of the funding, acceptance forms and the online expenditure returns should be addressed by email to the ICT Policy Unit at ictpolicy@education.gov.ie or by telephone to 01 8896413.

Yours sincerely,
Alan Wall
Principal Officer
ICT Policy Unit APPENDIX 1 - AUTHORISED EQUIPMENT
ICT INFRASTRUCTURE GRANTS SCHEME
POST PRIMARY SCHOOLS 2010

Authorised Categories

Funding is being provided to schools for ICT equipment purchase on the following prioritised basis:

(i) ICT Equipment (teaching computers and fixed digital projectors) to support Project Maths for classrooms or teaching areas where maths is taught.

(ii) Each classroom in the school must be equipped with a teaching computer, with a long range wireless mouse and keyboard, and a fixed digital projector.

(iii) In addition to baseline equipment (as defined in point (ii)), priority should be given to classrooms or laboratories for subjects with practical dimensions e.g. science and T4 subjects.

(iv) Only when this baseline is in place, can any remaining funding be used to purchase equipment from the following prioritisation list:

- Visualisers (also known as document cameras)
- Classroom computers (e.g. desktops or laptops)
- Digital cameras
- Digital video cameras
- Mobile laptop trolley
- Laser printer (black and white or colour)
- Mobile multi media station (also known as a video editing station)
- School server
- Scanner
- Speakers
- Networking equipment (e.g. fixed or wireless networking, cabling, switches, wireless access points, and including installation)
- Interactive Whiteboards: factors to be considered before purchasing an IWB are available on the IWB advice sheet at www.ncte.ie/ICTAdviceSupport/AdviceSheets
- Software which will assist in meeting the learning objectives of the Project Maths syllabuses
Appendix 2 - Form of Acceptance

ICT INFRASTRUCTURE GRANT SCHEME – POST PRIMARY 2010

1. I confirm that the Board of Management accepts the Department of Education and Skills’ offer of grant assistance under the above Scheme to enable my school to upgrade its Information & Communications Technology (ICT) infrastructure, and that inclusion of the school in this Scheme has the approval of the Trustees/Patron.

2. I confirm that the Board of Management agrees to use this grant to make purchases (i) as outlined in the letter of offer and (ii) within the Authorised Categories identified in Appendix 1, subject to the conditions outlined. I confirm that the Board accepts that the grant payable by the Department of Education and Skills cannot be increased.

3. I confirm that the Board of Management accepts that no additional funding from the Department of Education and Skills will be available to cover any additional or ancillary costs which may arise under this scheme.

4. I confirm that the Board of Management also agrees to:
   a) abide by public procurement rules;
   b) where ICT purchasing frameworks are not used obtain concurrent tenders on a fixed price basis using a competitive tendering process in compliance with public procurement rules;
   c) ensure compliance with the Safety, Health and Welfare at Work Act, 2005;
   d) safeguard the grant received and ensure that it is only used in accordance with the terms and conditions of this scheme;
   e) retain all receipts, documentation and any other records relating to the purchase of equipment for a period of at least seven years.

School Name: _____________________________
Name of Principal: _____________________________ (Block Capitals)
Roll No: _____________________________
Signed: _____________________________ (Chairperson, Board of Management)
Date: ______
Phone no: _____________________________
Fax no: _____________________________
Email address: _____________________________

This signed ‘Form of Acceptance’ should be returned by post or fax to:
The ICT Policy Unit, Department of Education and Skills
Block 1, Floor 3, Marlborough Street, Dublin 1
Telephone: (01) 889 6413 Fax: (01) 889 2365
Appendix 3 - Frequently Asked Questions:
ICT Infrastructure Grant 2010 – Post Primary

This document will be updated as required and can be accessed at www.ncte.ie

1. Can I submit my Form of Acceptance by email? No. For audit trail purposes, signed forms must be sent in by fax or post to the ICT Policy Unit.

2. Do I need to provide receipts to the Department of Education & Skills? No. However, you must retain receipts for all expenditure for at least seven years. Random audits will be carried out.

3. What if the cost of my purchases is higher than the grant allocated? Where total cost exceeds grant allocated, no additional funding is available. Schools must make up the difference from their own resources.

4. Where can I get more information on how to use ICT Framework arrangements for Procurement? Please see the NCTE’s website: www.ncte.ie/ictpurchasingframeworks/

5. What are the benefits of using the Frameworks? For those items covered by the Frameworks, it is expected that the prices obtained will be very competitive. Furthermore, use of the Frameworks should offer significant administrative advantages, in terms of simplifying the tendering process – for example, a single email to a central email address can be used to obtain competitive tenders from all Framework vendors. More specifically, advantages include the following:
   a. Schools are spared the need to research the market, develop detailed once-off tender processes, and so on
   b. Prices include 3-year next-business-day on-site warranties
   c. Standard products supplied must meet specification requirements set with schools in mind
   d. Option to seek non-standard specifications
   e. Vendors have committed to pricing equal to or lower than the ‘ceiling price’ published in the framework documents for the standard category products in question.
   f. National delivery at a single fixed price (or in some cases, free).
   g. Flexibility for schools to come together and pool their demand for greater discounts
   h. Option to seek quotes for “associated products” (such as wireless mice/ keyboards) and “associated services” (say installation/configuration) under the Frameworks.
   i. Schools can raise issues regarding Framework effectiveness with NCTE or the Department

   We would encourage schools to consider working together on a local or regional basis to aggregate their requirements and therefore maximise value for money.

6. What if I want associated services under the Frameworks (for example installation services) or associated products (for example, consumables)? Tenders under the Frameworks
can be specified to include certain “associated services” or “associated products”. For further information on this, please see the NCTE’s website: www.ncte.ie/ictpurchasingframeworks

7. Having reviewed the market and considered specifications in depth, I believe I can get better value for money from non-Framework vendors – can I seek quotes from non-Framework vendors? In these circumstances, you can seek concurrent quotes from Framework and non-Framework vendors, and for an identical specification of your minimum requirements. Please remember that your request for quotes (RFQ) must not refer to specific brand/manufacturer names, processor names and speeds, etc. When seeking quotes from non framework vendors you must issue a separate RFQ – the Framework RFQ system must not be used for non framework vendors.

8. Can I purchase items outside those listed in the letter of offer or on the Authorised Categories list in Appendix 1? No.

9. How was my school’s grant calculated? Your school’s grant is composed of €1,700 (which is considered sufficient to purchase the recommended baseline of one fixed digital projector and teaching computer) plus a per capita amount. The per capita calculation uses the Department’s official record of enrolment figures as at 30th September 2009.

10. My school is getting new accommodation – can I defer spending the grant until this new accommodation is available? Yes.

11. Is the ICT equipment strictly for regular classrooms only? A “classroom” encompasses any key permanent/semi-permanent area in the school where teaching takes place on a regular basis. It can include lab, libraries and other spaces used for learning and teaching.

12. Can I use the grant to buy Software? No. With the exception of software which will assist in meeting the learning objectives of the Project Maths syllabuses.

13. Can a “teaching computer” be either a laptop or a desktop? Yes

14. What is a “teaching computer”? The expression ”teaching computer” refers to the computer which the teacher uses for presentation of digital content (including interactive content) through the Digital Projector (or interactive whiteboard, if one happens to be in place already), for integration of ICT into teaching and learning. The teaching computer should be connected to the school's network and have broadband internet access (e.g. through Schools Broadband). It should be the host for the wireless mouse and keyboard which schools are also required to purchase under this grant scheme. The teaching computer would typically be at the front of a general classroom (but other configurations may of course be appropriate for specialist teaching spaces).

15. What is a visualiser? A visualiser is a digital camera on the end of an arm (either rigid or flexible) with controls available at the base unit. You can zoom in and out, freeze and capture an image or display it through the digital projector. The camera is mounted 30-50cm directly above a ‘display’ space or teachers table top onto which documents, diagrams, pages from books or
objects can be placed for display purposes. For further information refer to the Visualiser advice sheet at: http://www.ncte.ie/ICTAdviceSupport/AdviceSheets/

16. Can I buy Interactive Whiteboards (IWBs) with grant funding instead of Digital Projectors? Yes, however the core requirement remains that the grant funding must be used to kit out all classrooms with the four baseline items before it can be spent on other Authorised Category items (such as IWBs).

17. Can I purchase a Digital Projector with integrated interactive capability? Yes. The Framework for Digital Projectors can be used to purchase this technology. Schools should specify in their quote that they wish to have integrated interactive capability.

18. When do I have to spend the grant? Schools should use the grant to purchase equipment as soon as possible, and are asked to make every effort to purchase equipment before the end of the 2010 calendar year.

19. Can I use the grant as reimbursement for equipment bought previously, or to pay off loans outstanding in relation to previous purchases? Where schools have already purchased equipment that conforms to the requirements of the grants package, (teaching computer, digital projector, wireless mouse and wireless keyboard for each classroom) and in compliance with public procurement rules, the grant may be used to offset loans outstanding - at the time the grant issued - in respect of these purchases.

20. Does the Department maintain a panel of retailers/suppliers? No. Where frameworks are not available for products, selection of vendors for competitive tender is a matter for each school. When purchasing ICT equipment for which no ICT Framework exists, schools are advised to refer to NCTE’s general purchasing advice and to seek best value for money by seeking quotes from a minimum of three suppliers.

21. The digital projector and teaching computer kit is not appropriate for our school’s Special Classes. Can we use the grant to buy alternative ICT equipment? Yes, you can use the grant to buy classroom ICT equipment which is more appropriate to the special classes in question, provided that your school’s ICT plan has clearly identified how the ICT equipment in question is used to support pupils with special educational needs. Schools with Special Classes can get further information in regard to special education needs and ICT at: www.ncse.ie. It should be noted that the equipment purchased for special classes should not replace or supplement the existing Assistive Technology Grants Scheme whereby grants are available to meet the needs of individual pupils.

22. Can schools buy refurbished computers with Department grant funding? Refurbished computers are not recommended to schools as generally they are inherently more prone to failure, have shorter lifespans, and have shorter and weaker warranties than the 3 year next business day onsite warranty that is standard on new ICT equipment purchased under ICT frameworks. When buying new computers through the ICT frameworks, schools will get a three-year next-business-day on-site warranty included as standard (no extra charge) and will
also have the option to buy extended warranties. However where schools have the technical knowledge required and are in a position to make a fully informed decision regarding the quality of refurbished computers and are aware of the risks, and yet are convinced that they are getting better value for money they may purchase high quality refurbished computers (eg 2GB memory, and up to 3 years warranty) from reliable suppliers.

23. **Do I have to buy computers before buying projectors – e.g. if the grant is just enough to cover equipping 5 more classrooms with computers OR two more classrooms with Digital Projectors, do I have to buy the computers first?** No. Once the fund is being spent on equipping classrooms with the four prioritised items (teaching computers, digital projectors, and long-range wireless mice and keyboards), there is no requirement to buy those items in any particular order. The core requirement remains, i.e. the fund must be used to kit out all classrooms with the four baseline items before it can be spent on other Authorised Category items.

24. **Can the grant be used to cover installation costs associated with purchases of PCs, Notebooks or Digital Projectors?** Yes.

25. **If I am purchasing an Interactive Whiteboard which includes a digital projector – do I have to split the purchase and buy the Projector from the framework?** No. The core requirement remains however that grant funding must be used to kit out all classrooms with the four baseline items before it can be spent on other Authorised Category items (such as IWBs).

26. **Does the grant cover situations where a school wants to acquire teaching computers for learning support teachers and language teachers in a mainstream school setting?** Yes

27. **If a school purchases and installs a fixed digital projector can it be used with an Interactive Whiteboard or other projection surface installed at a later date?** Yes in general, digital projectors purchased under the Frameworks are compatible with IWBs. We would suggest however that to avoid any potential compatibility issues, you should make sure that any IWBs subsequently purchased are compatible with already installed digital projectors. Subject to the above, in general if the surface being projected onto (e.g. ordinary whiteboard, IWB, smooth wall) by a fixed projector changes the projector settings may need to be adjusted to take these changes into account. This is a minor adjustment, to be carried out as per the projector manual, and which should take no more than a few minutes.

28. **How is funding allocated for VEC schools?** The post-primary ICT Infrastructure Grant scheme is administered by the relevant VEC for the schools which it covers. Each VEC is provided with an aggregate fund. This fund must be used in accordance with the same terms which apply to non-VEC schools, and is calculated in the same manner. The precise outlay in respect of each school within its remit is a matter for each VEC.

29. **Is there any additional funding for DEIS schools?** DEIS schools have each been allocated an extra €850 (50% of the block grant of €1700).
30. Can schools buy ICT equipment for use with different operating systems (for example Microsoft Windows, Apple Mac OS, Linux OS, etc.)? Yes. Schools are free to choose ICT equipment which is configured for use with any operating system, or with multiple operating systems. This is a technical choice which should be covered in each school’s ICT plan. Public procurement rules must be followed in all cases.

Contact Details:
For further guidance relating to the ICT Frameworks specifically, schools may also contact:
The National Centre for Technology in Education, Dublin City University, Dublin 9
By Phone: (01) 7008388 ; By Email: info@ncte.ie

Appendix 2 forms must be returned by post or fax to:

ICT Policy Unit, Department of Education and Skills, Marlborough St, Dublin 1
Fax: (01) 889 2365.
Appendix C

Questionnaire used in this study and results
Name ____________________________ Subject taught ____________________________ Number of years teaching experience ______

I would be willing to partake in a quick interview for this study: Yes [ ] No [X]

Please indicate your level of IT skills. Beginner [ ] Intermediate [ ] Advanced [ ]

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have received in-service specifically for using ICT as a <strong>pedagogical tool</strong>.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have received in-service training specifically for my subject(s).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>This training included:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>how to use existing ICT material.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>how to develop my own material.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>There are sufficient levels of ICT facilities in the school.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel confident in the use of ICT as a <strong>pedagogical tool</strong>.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel there is sufficient time allocated to allow me prepare classes with the use of ICT.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel there is sufficient training available to me to up skill in the use of ICT.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I think the use of ICT in teaching is a good idea.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am aware of new levels of investment in ICT in schools.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I will definitely use any new equipment purchased.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I use the ICT facilities in the school during classes.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I use web space as a learning tool (blog, wiki etc.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would partake in any in-service provided outside of school hours.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would partake in any in-service provided during school hours.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would prefer: <strong>one off</strong> training sessions.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a <strong>series</strong> of 1 or 2 hour sessions.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would like to receive training for developing my own class material.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would like to be trained in the use of programmes specific to my subject.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
What do you feel has **aided** you in achieving your current level of ICT ability?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time allocated to develop resources during school time.</td>
<td></td>
</tr>
<tr>
<td>Time spent learning independently outside of school.</td>
<td></td>
</tr>
<tr>
<td>In-service given in school time.</td>
<td></td>
</tr>
<tr>
<td>Training done outside of school time.</td>
<td></td>
</tr>
<tr>
<td>Levels of technology available in the school.</td>
<td></td>
</tr>
<tr>
<td>Support from other teachers within the school.</td>
<td></td>
</tr>
<tr>
<td>Interest in the use of technology.</td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
</tr>
</tbody>
</table>

What do you feel is **hindering** you from improving your level of understanding and use of ICT?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of time available to develop resources during school time.</td>
<td></td>
</tr>
<tr>
<td>Lack of time available to learn independently outside of school.</td>
<td></td>
</tr>
<tr>
<td>Lack of in-service given in school time.</td>
<td></td>
</tr>
<tr>
<td>Unavailability of training available outside of school time.</td>
<td></td>
</tr>
<tr>
<td>Levels of technology available in the school.</td>
<td></td>
</tr>
<tr>
<td>Lack of general understanding of ICT.</td>
<td></td>
</tr>
<tr>
<td>Fears of using ICT in the classroom.</td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
</tr>
</tbody>
</table>
What do you feel has **sided** you in achieving your current level of ICT ability?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time allocated to develop resources during school time.</td>
<td></td>
</tr>
<tr>
<td>Time spent learning independently outside of school.</td>
<td></td>
</tr>
<tr>
<td>In-service given in school time.</td>
<td></td>
</tr>
<tr>
<td>Training done outside of school time.</td>
<td></td>
</tr>
<tr>
<td>Levels of technology available in the school.</td>
<td></td>
</tr>
<tr>
<td>Support from other teachers within the school.</td>
<td></td>
</tr>
<tr>
<td>Interest in the use of technology.</td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
</tr>
</tbody>
</table>

What do you feel is **hinder**ing you from improving your level of understanding and use of ICT?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of time available to develop resources during school time.</td>
<td></td>
</tr>
<tr>
<td>Lack of time available to learn independently outside of school.</td>
<td></td>
</tr>
<tr>
<td>Lack of in-service given in school time.</td>
<td></td>
</tr>
<tr>
<td>Unavailability of training available outside of school time.</td>
<td></td>
</tr>
<tr>
<td>Levels of technology available in the school.</td>
<td></td>
</tr>
<tr>
<td>Lack of general understanding of ICT.</td>
<td></td>
</tr>
<tr>
<td>Fears of using ICT in the classroom.</td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
</tr>
<tr>
<td>How often would you use the following for class preparation or during a class?</td>
<td>Frequently</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Word processing programme (Word, Publisher, NotePad)</td>
<td></td>
</tr>
<tr>
<td>Video editing software</td>
<td></td>
</tr>
<tr>
<td>Videos downloaded from the internet</td>
<td></td>
</tr>
<tr>
<td>Sound editing software</td>
<td></td>
</tr>
<tr>
<td>PowerPoint,</td>
<td></td>
</tr>
<tr>
<td>Excel</td>
<td></td>
</tr>
<tr>
<td>Internet</td>
<td></td>
</tr>
<tr>
<td>Blog</td>
<td></td>
</tr>
<tr>
<td>Interactive programmes</td>
<td></td>
</tr>
<tr>
<td>Computer in classroom</td>
<td></td>
</tr>
<tr>
<td>Projector in classroom</td>
<td></td>
</tr>
<tr>
<td>Interactive white board</td>
<td></td>
</tr>
<tr>
<td>Other (please specify)</td>
<td></td>
</tr>
<tr>
<td>How often would you give homework that is internet based?</td>
<td></td>
</tr>
<tr>
<td>How often would you ask your students to email homework instead using copies?</td>
<td></td>
</tr>
<tr>
<td>How often do you talk with your colleagues about ICT as a teaching tool?</td>
<td></td>
</tr>
<tr>
<td>How often have you requested ICT up-skilling?</td>
<td></td>
</tr>
</tbody>
</table>

If the answer to any of the above is “never” or “not very often” please explain why?

Consider: Time [ ] Lack of Training [ ] Fear [ ] Access [ ] Lack of Support [ ] Inexperience [ ] Other [ ]

________________________________________________________________________________________
________________________________________________________________________________________
Please give your level of proficiency in the following programs with 1 being very weak and 5 being very competent.

<table>
<thead>
<tr>
<th>Word</th>
<th>Publisher</th>
<th>PowerPoint</th>
<th>E-mailing</th>
<th>Blogging</th>
<th>Tweeting</th>
<th>Internet search engines (Google, Yahoo, etc.)</th>
<th>Internet use for finding teaching resources</th>
<th>Use of videos available on the net</th>
<th>Interactive white board use</th>
<th>Overall use of ICT</th>
<th>Other (please specify)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In terms of the above, please indicate the top 3 applications you would like to receive training in.

1.  
2.  
3.  

Please indicate types of training already received and body giving training:

_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________

The following is a list of Computing procedures. Tick **YES** if you know how to carry out the procedure & **NO** if you don’t;

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Yes</th>
<th>No</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make a PowerPoint presentation</td>
<td></td>
<td>Download a video</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Add sound to a PowerPoint presentation</td>
<td></td>
<td>Download an image</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Add animation to a PowerPoint presentation</td>
<td></td>
<td>Download a sound file</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Print a PowerPoint presentation</td>
<td></td>
<td>Make a Skype call</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use a projector in the classroom</td>
<td></td>
<td>Text wrap an image</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Send an e-mail</td>
<td></td>
<td>Crop or rotate an image</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set up a blog</td>
<td></td>
<td>Cut an image / file</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post items on an existing blog</td>
<td></td>
<td>Copy and paste an image / file</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create a PDF version of a document</td>
<td></td>
<td>Transfer images and videos from camera to computer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create a new folder on the desk top</td>
<td></td>
<td>Take a print screen</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Are there any other comments you wish to make on the levels of investment and use of ICT in the classroom?

__________________________________________________________________________________________________________________________________________________

__________________________________________________________________________________________________________________________________________________

__________________________________________________________________________________________________________________________________________________

Thank You for your time and for helping with this study. It is greatly appreciated. 

*Liam*
I have received in-service specifically for using ICT as a pedagogical tool.

- 56% yes
- 42% no
- 2% no answer

I have received in-service training specifically for my subject(s).

- 38% yes
- 62% no
- 0% no answer

This training included how to use existing ICT material.

- 20 yes
- 10 no

This training included how to develop my own material.

- 15 yes
- 15 no
There are sufficient levels of ICT facilities in the school.

- Yes: 78%
- No: 12%
- No Answer: 10%

I feel confident in the use of ICT as a pedagogical tool.

- Yes: 60%
- No: 38%
- No Answer: 2%

I feel there is sufficient time allocated to allow me prepare classes with the use of ICT.

- Yes: 20%
- No: 74%
- No Answer: 6%
I feel there is sufficient training available to me to up skill in the use of ICT.

- Yes: 26%
- No: 70%
- No answer: 4%

I think the use of ICT in teaching is a good idea.

- Yes: 98%
- No: 2%
- No answer: 0%

I am aware of new levels of investment in ICT in schools.

- Yes: 92%
- No: 8%
- No answer: 0%

I will definitely use any new equipment purchased.

- Yes: 90%
- No: 6%
- No answer: 4%
I use the ICT facilities in the school during classes.

- Yes: 86%
- No: 10%
- No answer: 4%

I use web space as a learning tool (blog, wiki etc).

- Yes: 8%
- No: 26%
- No answer: 66%

I would like to be trained in the use of programmes specific to my subject.

- Yes: 96%
- No: 4%
- No answer: 0%

I would like to receive training for developing my own class material.

- Yes: 94%
- No: 2%
- No answer: 4%
I would partake in any in-service provided during school hours.

- Yes: 98%
- No: 2%
- No answer: 0%

I would partake in any in-service provided outside of school hours.

- Yes: 78%
- No: 12%
- No answer: 10%

I would prefer one-off training sessions.

I would prefer a series of 1 or 2 hour sessions.
What do you feel has aided you in achieving your current levels of ICT ability?
What do you feel has hindered you from improving your level of understanding and use of ICT?
Good purchases for the school:
How often would you use the following during class preparation or during class?

- **Word processing programme (Word, Publisher, NotePad)**
  - Frequently: 76%
  - Sometimes: 6%
  - Not very often: 4%
  - Never: 14%

- **Video editing software**
  - Frequently: 20%
  - Sometimes: 12%
  - Not very often: 2%
  - Never: 66%

- **Videos downloaded from the internet**
  - Frequently: 38%
  - Sometimes: 36%
  - Not very often: 18%
  - Never: 8%

- **Sound editing software**
  - Frequently: 12%
  - Sometimes: 10%
  - Not very often: 6%
  - Never: 72%
Do you know how to carry out the following operations?
Level of proficiency from 1-5 with 1 being very weak and 5 very competent

**Proficiency in Programs**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word</td>
<td>0</td>
<td>3</td>
<td>5</td>
<td>17</td>
<td>25</td>
</tr>
<tr>
<td>Publisher</td>
<td>15</td>
<td>8</td>
<td>13</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>PowerPoint</td>
<td>4</td>
<td>2</td>
<td>7</td>
<td>16</td>
<td>21</td>
</tr>
</tbody>
</table>

**Internet Proficiency**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-mailing</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>14</td>
<td>30</td>
</tr>
<tr>
<td>Blogging</td>
<td>29</td>
<td>8</td>
<td>10</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Tweeting</td>
<td>31</td>
<td>10</td>
<td>3</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Internet search engines (Google, Yahoo, etc.)</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>11</td>
<td>34</td>
</tr>
<tr>
<td>Internet use for finding teaching resources</td>
<td>2</td>
<td>4</td>
<td>7</td>
<td>11</td>
<td>26</td>
</tr>
<tr>
<td>Use of videos available on the net</td>
<td>7</td>
<td>7</td>
<td>10</td>
<td>10</td>
<td>16</td>
</tr>
</tbody>
</table>
Appendix D

Letter to Principal and Board of Management
18/11/2010

To the Principal and Board of Management,

I am currently in the second year of a Digital Media in Education masters with the University of Limerick and as part of my studies I must write a thesis relevant to my course. In this respect I am writing to ask if it would be possible to conduct a case study in -----(school name)------.

The study will concentrate on the excellent ICT facilities available in every classroom in the school and, in light of the announcement of new investment in ICT, examine:

- The actual and potential levels of use of these technologies;
- The levels of understanding of the staff in relation to using ICT as a pedagogical tool;
- The problems holding teachers back when it comes to exploring the technology and developing their skills (time, fears, etc.).

The purpose of this study is to show that high levels of investment in ICT must be met with similar investment of time and money in the up-skilling of staff.

During the study I will need to distribute questionnaires to students and staff and also conduct interviews with the principal and selected teachers and students.

All persons involved in the study will remain anonymous and information collected will be used only for this study.

I would be extremely grateful if you could oblige me with this request.

Thank you in advance,

Liam Guinan.
Appendix E

Letter of explanation to teachers
11/12/2010

Dear Participant,

I am currently in the second year of a Digital Media in Education masters with the University of Limerick and as part of my studies I must write a thesis relevant to my course.

I have decided to conduct a study that will concentrate on the excellent ICT facilities available in every classroom of .......(school name)....... and, in light of the announcement of new investment in ICT, examine:

- The actual and potential levels of use of these technologies;
- The levels of understanding of the staff in relation to using ICT as a pedagogical tool;
- The factors helping and the problems hindering you when it comes to exploring these and new technologies and developing your ICT skills.

This part of the study is a staff questionnaires but I am also looking for people who are willing to participate in short interviews and maybe class observation. If you are willing to participate further in the study please indicate this at the beginning of the questionnaire.

All persons involved in the study will remain anonymous and information collected will be used only for this study.

Thank you in advance for your participation,

Liam Guinan.
Appendix F

Interview Transcript
Teacher A

Interviewer: Do you know about the ICT investment?

Interviewee: We would have been told that the school is getting €100,000 and the principal is looking for ideas on how to spend it. And after that I wouldn’t know much more about it.

Interviewer: Do you use ICT?

Interviewee: I would use it from time to time, not as often as I suppose to be doing or as often as I should, but I would use some PowerPoint that are prepared and would download them and use them to teach history, historical photos and images and for Geography I would use it for maps but probably not as much as it could be used at all.

Interviewer: You said “as much as you are supposed to…” what do you mean by that?

Interviewee: I have the perception that there is more pressure being put on us as it is seen as being the way forward and we should be using it. It should be used quite a lot even if at time I think that you could cover a materiel quicker without using ICT. I would also be conscious that at the end of the day the students will be doing a written exam, you can have all the lovely PowerPoint presentations and images, which in a way are good for a stimulus point of view, but at the same time, the students still need to be prepared for a written exam.

Interviewer: Do you not see it as a problem solving materiel more so than a way to present material?

Interviewee: I would use it to present the information not as a problem solving tool. I’ve used it in the past with transition year groups. I would have done projects and they would have done their own individual research using ICT in the computer room; but in the classroom itself I wouldn’t have used it as a problem solving tool.
Interviewer: What do you think are the main factors which are stopping you from using it?

Interviewee: Confidence in what could be done with it, training; seeing other people using it and being trained on how to incorporate it into a class, maybe it doesn’t have to be the entire class. Also we find that the day when you’re trying to use it there are often problems with the Internet, or the server, or the computer has been damaged by a virus and will be missing for 3 weeks before it comes back……. practical problems arise.

In my case computers have been missing 3 times for 3 weeks, because of viruses or because of hard drive damages, or because the computer was moved and damaged. They were sent out to be repaired so I was 9 weeks in total with computers missing.

These issues have been addressed so they are going to put the data projectors attached to the ceilings. Computers won’t be moved but that doesn’t solve the virus problems.

Interviewer: Do you think there is enough training provided?

Interviewee: No, there should be more in-school training rather than going out to a training centre and more subject based training. Training that applies specifically to your subject. I would have done some courses in ……… Teacher Centre, but there should be a follow up on these training because 3 years ago we didn’t have the facilities in the classrooms, so you learn something on a course but by the time you get to try implement it you have forgotten how to use it. It was too long between learning and practicing. I suppose if you’re not using it you lose it.

Interviewer: Do you think there is enough time to practice it?

Interviewee: No, I can’t get into my classroom without a class being there, at break time there having their lunch in the classroom, after school, they study in the classroom and when I have free classes, there is someone else in the
classroom, so I have no access to my computer in my classroom, except when I'm teaching; and when you have 30 kids in front of you, you can’t really practice at that stage. With in-service, when the kids are not there, you would have time, but generally that time is given to staff meetings or broader subjects than just based on your classroom.

Interviewer: Is there enough support in the school?

Interviewee: I think there is support, but they are constrained by making time available. They can’t tell the kids you can go home and we have the teachers’ computer trained. Generally speaking, management in the school here would be very supportive; they have given time and would encourage people to train. I think there is support within the school.

Interviewer: You said you had some ICT training, was it just the use of the ICT or was it on how to use ICT as a pedagogical tool?

Interviewee: Both, I have done a couple of courses here after school, and I have done word processing and PowerPoint, the school paid for it. In the ............... Education Centre, it was more as a pedagogical tool, specifically linked to my subject; it was the use of Google maps and how to incorporate Google maps into teaching geography, so in that case it would be more pedagogical. It’s more the lack time that is holding me back from using ICT than the training.

Interviewer: Would confidence come into that too?

Interviewee: Yes, and again having support when problems arise and time to practice.
Teacher B

Interviewer: Do you use ICT?

Interviewee: I do, I use it with the computer and with the overhead projector to put things up on the screen, but I wouldn’t use it all the time, I try to vary my lessons. I use the overhead a lot because I have the materiel in my hand so if I couldn’t open something on the computer, or if the computer is very slow and files won’t open, I have my notes in my hands and I’m ready to go inside in class It’s safer.

We are doing a course at the moment with Discovering Sensors; it’s very good in sciences, it’s a new thing that came up, the principal asked us to go on it. It’s all about data loggers in sciences to use PH probes, temperature probes, pressure probes when you do little experiments. It’s all new technology and you are getting results instantaneously. It’s fantastic, we are still learning, but we are looking at, which I don’t know how to do yet, the idea of putting the probes on to the computer and then putting it up on the screen so they can see instantaneously and get results immediately.

Interviewer: Do you think you have enough time to do it? Is it taking a lot of time for the results you are getting?

Interviewee: No the results are coming up very quickly; I actually was negative at first before I did the course in ………….. We were taking through a couple of experiments and it’s just so easy, so I definitely would use it again.

It’s very much pedagogical based, this is the new way of teaching. They are looking at methods of teaching combining it with that. There is a whole website on it. It’s all stimulus based.

What they want us to do now is to go onto www.youtube.ie, find a good clip on a heart or something that is relevant to your lesson, save that website address and put it into www.discoversensors.ie forum. So then,
there is all the teachers forums, so you can just click onto the link that would interest you and also see what the other teachers are doing.

Interviewer: Is it easy to use?

Interviewee: Yes it is, but you need to have it ready before the students come in.

Interviewer: Do you think there is enough time given in the school to prepare for new teaching methods?

Interviewee: For www.discoversensors.ie, the principal put us on in-service and that was really good. But we got interactive boards in the school and I think we need more time for training because I wouldn’t be confident enough to use it in a class yet; I have to get it familiar with it myself.

Interviewer: Would confidence in using IT in general be a problem?

Interviewee: Not in general, but for something like the interactive boards which are new yes, I would need a couple of hours to get familiar with it, there is so much we can do, so many icons to use. It just takes time.

Interviewer: Do you have access to the boards to learn how to use them?

Interviewee: It’s there alright! We were taken down to be shown how to use it for fifteen minutes after school but I haven’t used it since. I would need to stay after school and play around with it.

Interviewer: What has helped or hindered you when it comes to ICT? What you feel helped you using the new methods?

Interviewee: Doing the training and seeing other teachers at my level or higher level and sharing ideas, getting away from the school and having a day to promote it and see what you can do with it. Having a good atmosphere got me going as well. There is too much in a full days in-service though
and you don’t get a chance to use half of it. Shorter training would be better.

Interviewer: What hinders you?

Interviewee: Time, it’s a big thing, it’s all about time. You have work to be done in the class, so it’s a mixture with the syllabus, and to get a little bit of confidence. Get them focused on what they are doing.

Interviewer: Besides the in-service that you have done beside the one you just mentioned, did you do any other in-service which incorporated ICT before that?

Interviewee: We did a couple of years ago on data loggers and they were prehistoric compares to these new ones. In a way, that turned me off ICT back then, because you had to press so many buttons to get on the programme working, whereas for the new ones, you just connect the probes, put it in and off it comes on the screen. You don’t have to have a technical mind to work these new programmes. Yeh definitely the older technology turned me off ICT because it was so hard to use but the newer versions are quicker and easier to use.

Interviewer: Is it too easy for students?

Interviewee: It depends on how you use it. The experiment we did recently was finding the PH at different points, the computer will do everything for you, from the graph to the results, but the way I use it was to take the results from the different monitors and give them that information so the students will draw their own graph and analysing the results themselves. It’s up to the teacher to use it the way they want to lead their class.
Teacher C

Interviewer: Do you know about the investment after being made in Ireland?

Interviewee: Yes I do, there has been a lot of money been invested in buying equipment for schools in the hope that every teacher gets ICT literate.

Interviewer: How do you use ICT?

Interviewee: I use PowerPoint presentation, over projector to display projects and presentations, for putting up projects that the students have done and stuff I have on the public drive. In that respect I would be lost without it. For music I use it every day to show instruments, orchestra, video clips, so it’s really important for music.

Interviewer: Did you get a lot of in-service training?

Interviewee: No self taught. Little bit in college, little bit of ICT literacy and little in using IWBs but after that no

Interviewer: Is there enough time available?

Interviewee: For me I’d say more time. You would need a pretty intensive courses for some aspects. I would have the basic but not using it to its full potential.

Interviewer: With time allocated here for meeting, do you think there would be time for training?

Interviewee: There should be time for some aspect of it. For things that can be shown quickly

Interviewer: In the in-service that you have got, was there any ICT?
Interviewee: There was but there was nothing pedagogical in it at all. It was more of a demo than actual interactive…… this is how you use this and if you want to you can.

Interviewer: What do you think is hindering you from using it more, can you use it more?

Interviewee: For what’s available to me, I’m using exactly what I need, but I know myself I could probably do a lot more with it. It’s a lack of knowledge and practice different applications or programmes. So I would hope that I would develop more but I don’t have the time to dedicate to it at the moment.

Interviewer: Do you use it for research or just for recording and play back music?

Interviewee: Mixture of both
Appendix G

Observation Checklist
<table>
<thead>
<tr>
<th>Observation</th>
<th>1 = Yes</th>
<th>0 = No</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICT used in the Class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICT used at high pedagogical level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICT used at low pedagogical level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problems using ICT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher could solve problem quickly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time was lost due to ICT problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students were off task</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students were engaged</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix H

NCTE e-Learning Roadmap
# e-Learning Roadmap

<table>
<thead>
<tr>
<th>Initial</th>
<th>e-Enabled</th>
<th>e-Confident</th>
<th>e-Mature</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vision</strong></td>
<td>- Learning vision is developed by exercising teams.</td>
<td>- Learning vision is fully integrated into the whole school vision.</td>
<td>- Learning vision is strongly aligned and shared by all stakeholders.</td>
</tr>
<tr>
<td><strong>Leadership &amp; Planning</strong></td>
<td>Basic ICT taken for granted.</td>
<td>Comprehensive learning plan is integrated into all school plans.</td>
<td>Teachers implement the learning initiatives through their daily work.</td>
</tr>
<tr>
<td><strong>Integrate</strong></td>
<td>Focus is mainly on ICT equipment and the acquisition of basic ICT skills.</td>
<td>Focus is mainly on supporting the integration of ICT usage throughout the school.</td>
<td>The NCP identifies innovative uses of new technologies and facilitates the development of a comprehensive and responsible approach to the use of ICT.</td>
</tr>
<tr>
<td><strong>Acceptable Use Policy</strong></td>
<td>School has developed an Acceptable Use Policy for the internet.</td>
<td>School has developed an AUP following consultation with staff, students, and parents.</td>
<td>The AUP is in place and the policy is fully implemented.</td>
</tr>
<tr>
<td><strong>Special Educational Needs</strong></td>
<td>Support of ICT as a tool for learning in special educational needs is not well understood.</td>
<td>Use of ICT is focused on the areas of learning support and resource teaching.</td>
<td>School includes the use of ICT to support and enhance the learning of all students.</td>
</tr>
<tr>
<td><strong>ICT in the Curriculum</strong></td>
<td>Teachers have a general understanding of how learning can be improved through learning and technology.</td>
<td>A number of teachers understand the methodologies to integrate ICT into the curriculum.</td>
<td>Most teachers understand how learning can be enhanced and are content to add it to their curriculum.</td>
</tr>
<tr>
<td><strong>Planning</strong></td>
<td>There is a little planning for ICT integration with ICT activities focused on core learning and assessment.</td>
<td>There is some planning to ICT integration, with the focus mainly on core teaching, learning, and assessment.</td>
<td>Teachers plan ICT integration in their lessons and ensure it is well integrated.</td>
</tr>
<tr>
<td><strong>Teacher Training</strong></td>
<td>Teacher is comfortable with the use of ICT.</td>
<td>Teachers use ICT to support learning and assessment in the classroom.</td>
<td>Teachers attend ICT training workshops to improve their ICT skills.</td>
</tr>
<tr>
<td><strong>Student Proficiency</strong></td>
<td>Students occasionally use ICT as part of the learning process.</td>
<td>Students experience learning and assessment with regular and systematic use of ICT.</td>
<td>Students are encouraged to use ICT to support their learning and to enhance their learning and assessment.</td>
</tr>
<tr>
<td><strong>SEN</strong></td>
<td>Teachers are aware that ICT can enhance the learning opportunities of students with special educational needs.</td>
<td>Teachers also focus on how ICT can support the integration of ICT into the curriculum.</td>
<td>Teachers develop individual learning plans for students with special educational needs.</td>
</tr>
<tr>
<td><strong>Professional Development</strong></td>
<td>Some teachers have used ICT in their teaching practices.</td>
<td>Teachers are aware of and have participated in ICT professional development programmes.</td>
<td>Teachers rate the professional development needs of their students.</td>
</tr>
<tr>
<td><strong>Planning</strong></td>
<td>There is little planning concerning ICT.</td>
<td>All ICT is linked to the learning outcomes and is integrated into the curriculum.</td>
<td>Teachers engage in ongoing professional development to enhance their ICT skills.</td>
</tr>
<tr>
<td><strong>Focus</strong></td>
<td>Professional development is focused on improving ICT skills.</td>
<td>Some staff are participating in ICT CPD which focuses on the integration of ICT into the curriculum.</td>
<td>Teachers are involved in planning and delivering ICT training for their colleagues.</td>
</tr>
<tr>
<td><strong>Teacher Commitment</strong></td>
<td>Teacher is more willing to try new ideas and good practices that will improve student learning.</td>
<td>Teachers are open-minded and supportive of ICT in their classrooms.</td>
<td>Teachers are committed to and have experience of using a variety of ICT tools and techniques.</td>
</tr>
<tr>
<td><strong>SEN</strong></td>
<td>Teachers are more willing to try new ideas and good practices that will improve student learning.</td>
<td>Teachers are open-minded and supportive of ICT in their classrooms.</td>
<td>Teachers are committed to and have experience of using a variety of ICT tools and techniques.</td>
</tr>
</tbody>
</table>

---

146
### e-Learning Culture

<table>
<thead>
<tr>
<th>Access</th>
<th>Teachers and students have limited access to e-learning resources.</th>
<th>Teachers and students have regular access to e-learning resources.</th>
<th>Learning resources are readily available to staff and all students.</th>
<th>Learning resources are readily available to staff and all students.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embodiment of Idea</td>
<td>There is little visible evidence of e-learning.</td>
<td>There is visible evidence of use of e-learning.</td>
<td>The school has an active e-learning website.</td>
<td>The school has an active and up-to-date e-learning website.</td>
</tr>
<tr>
<td>Mobile/Online Presence</td>
<td>School has an active blog, a wiki, or an active learning environment.</td>
<td>School has an active e-learning website.</td>
<td>School has an active, up-to-date e-learning website.</td>
<td>School has an active, up-to-date e-learning website.</td>
</tr>
<tr>
<td>Projects</td>
<td>There is evidence of projects that engage students in e-learning.</td>
<td>School has evidence of projects that engage students in e-learning.</td>
<td>School has evidence of projects that engage students in e-learning.</td>
<td>School has evidence of projects that engage students in e-learning.</td>
</tr>
<tr>
<td>Communication</td>
<td>There is good communication between schools, home, and the community.</td>
<td>There is good communication between schools, home, and the community.</td>
<td>There is good communication between schools, home, and the community.</td>
<td>There is good communication between schools, home, and the community.</td>
</tr>
</tbody>
</table>

### ICT Infrastructure

<table>
<thead>
<tr>
<th>Planning for Acquisition of Resources</th>
<th>Basic level of planning for ICT purchasing goals.</th>
<th>Some evidence of ICT purchasing goals.</th>
<th>Procurement planning and implementation of ICT equipment is in place.</th>
<th>Procurement planning and implementation of ICT equipment is in place.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAN &amp; Broadband Access</td>
<td>A network exists in some areas of the school.</td>
<td>Most areas have access to the internet.</td>
<td>Most areas have access to the internet.</td>
<td>Most areas have access to the internet.</td>
</tr>
<tr>
<td>Technical Support</td>
<td>Technical Support is carried out using a variety of methodologies.</td>
<td>Technical Support is provided by an external company.</td>
<td>Technical Support is provided by an external company.</td>
<td>Technical Support is provided by an external company.</td>
</tr>
<tr>
<td>Software and Digital Content</td>
<td>Some software is available.</td>
<td>Some software is available.</td>
<td>Some software is available.</td>
<td>Some software is available.</td>
</tr>
<tr>
<td>ICT Equipment</td>
<td>Some classrooms have desktop computers.</td>
<td>Some classrooms have desktop computers.</td>
<td>Some classrooms have desktop computers.</td>
<td>Some classrooms have desktop computers.</td>
</tr>
<tr>
<td>Licensing</td>
<td>It is unclear whether all software is up to date.</td>
<td>It is unclear whether all software is up to date.</td>
<td>It is unclear whether all software is up to date.</td>
<td>It is unclear whether all software is up to date.</td>
</tr>
</tbody>
</table>