Evaluating the effectiveness of ICT Rollout in an Irish Primary School

A Case Study of a Primary School in the West of Ireland.

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MA (Digital Media Development for Education)
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Declaration

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

Signed: ______________________________

Date: 11/10/2011

Student ID: 8301476
Abstract

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Information and communications technology is an integral part of our personal and working lives. The children of today were born as digital natives and technology pervades every aspect of their everyday lives. The ubiquity of ICT demands that all our citizens are prepared for full participation in this digital age. There has been huge investment in ICT by successive governments in terms of research and resources. There are countless bodies of research that extol the pivotal benefits of ICT in education. When properly harnessed it has the potential to enrich learning and enhance teaching invigorating classroom practice and enabling learners to progress in more personalised and self-directed ways.

Yet for all this the education sector seems stubbornly resistant to fully embracing the opportunities that ICT has to offer. The focus needs to shift from technology provision to full integration into pedagogical practice in a transformational way. The evidence shows that teachers are not luddites or technophobes so why is this revolution not happening on the ground?

The main aim of this study was to investigate the impact of sudden rollout of a state-of-the-art ICT infrastructure in a primary school in Ireland. Of primary interest is measurement of adoption rates among teachers and the quality of use in the classroom, benefits to student learning and engagement and any shift in teacher’s attitudes. If barriers exist, what are they and what can be done to alleviate them?

The findings indicate that rapid rollout of technology leads to greater teacher immersion in ICT promoting a steeper learning curve and improved chances of success. The main barriers identified for teachers are lack of training, time constraints, teacher confidence and access to resources.
Acknowledgements

I wish to acknowledge the following for their assistance in completing this thesis:

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My colleagues who gave so willingly of their time in participating in the research.

My wife and children who put up with me being shut away in a room surrounded by a sea of papers. I’ll make it up to you!
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<td>NCTE</td>
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<td>OECD</td>
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Chapter One  Introduction

1.1  Statement of Topic

Children today live in an information age, more recently dubbed a knowledge society, where the all pervasive and ubiquitous nature of information and communication technologies (ICT) is fast becoming an irresistible force. Almost every aspect of how we live, work and play has been touched by this revolution. Devices are increasingly becoming smaller, faster and more powerful and with the advent of Web 2.0 and social networking this information is available at the touch of a fingertip anytime, anywhere.

Today’s students are ‘digital natives’ who live in a world where digital technology is part of the texture of their daily lives. Technology is their native language and they expect to use technology in school.

(SEG research 2008).

The advent of ICT presents an array of opportunities for educators and students and it is an opportunity that cannot be ignored if the students of today are to be prepared for the knowledge society in which they live.

A 2008 report commissioned by the Minister for Education in Ireland stated that

Learning is changing. A Pivotal force in bringing about this change is the use of information and communications technology (ICT) which provides richer, more innovative, world-relevant educational resources and opportunities. When used well, ICT enriches learning and enhances teaching. It invigorates classroom activities and is a powerful motivational tool that encourages learners to progress in more personalised and self-directed ways.

(Department of Education and Science 2008)

The challenge for schools is to integrate ICT into teaching and learning in a manner that delivers this change, improving outcomes for students and transforming schools into e-learning environments.

While the potential benefits are huge, the inherent challenges for schools are significant in terms of investment, cultural and organisational change, teacher skill deficits and training requirements, equipment maintenance issues, time constraints, availability of teaching resources etc.
Despite considerable investment in technology for schools, especially since 2000, the reality on the ground has not always matched the expectation and the technical revolution has not always delivered on its promise. There is evidence of low adoption rates by teachers, lack of confidence in ICT, training deficits, difficulties in integrating ICT into subject areas, poor and inconsistent use of technology in the classroom and the fear that ICT is being used for the sake of using it with the risk that learning objectives are being undermined and core skills are being diluted.

1.2 **Background to the study:**

The author has been working as a primary school teacher for the last 5 years all of which have been based in the school at the centre of this study. Prior to qualifying as a teacher the author spent 18 years as an Electronic Engineer with US companies involved in the manufacture and design of products ranging from PCs, to microprocessors, security systems and networking equipment.

The differentiating or compelling factor in this particular study is the context of the school in which it took place. This school is a primary school in the West of Ireland with an enrolment of approx 350 students. The student population is primarily from a middle class background and the school has a very inclusive enrolment policy including students with SENs (Special Education Needs) and students from the travelling community. Up until academic year 2010/11 half of the classes were housed in temporary pre-fabricated buildings which were located remotely from the main school building. Availability and use of ICT infrastructure was very hit and miss in the school.

It is important to state that this was purely down to lack of funding from the Department of Education, resulting in a server and PCs that were antiquated and unreliable and a broadband connection speed that was more akin to dial up modem. The Principal of the school has always been knowledgeable, passionate
and progressive in ICT initiatives as have many of the staff but their efforts have been limited by the constraints of the equipment available.

However September 2010 saw the opening of a state of the art school building with ICT facilities to match. While ICT funding for existing schools is difficult to secure, a new school attracts a significant budget allocation for ICT kit out which in this case allowed for the purchase of teaching laptops for the teachers, along with 60 new student PCs. School and parent council fundraising initiatives also allowed for the purchase and installation of Interactive Whiteboards and a visualiser in all of the new and old classrooms. Every classroom in the school also has 4 networked PCs and there is a central computer room with 32 PCs and an interactive whiteboard for teacher demonstration. The school is fully networked and this year has proper usable broadband connectivity for the first time.

From the point of view of the teaching staff this change in ICT resources essentially happened overnight in so far as when they arrived back for the new school term in September 2010, they walked into the new school building with the new ICT infrastructure set up and ready to go. It was a big bang approach with no lead in to allow people to acclimatise. The teachers therefore found themselves in a dramatically changed environment physically and technologically, providing an ideal test case to measure the rate of adoption of ICT among the teaching staff, the effectiveness of their implementation and any changes in attitude among the staff towards adoption of digital technologies.
1.3 Research Objectives

- To measure and evaluate the effects of widespread sudden availability of ICT resources, in terms of adoption levels and quality of use.
- To examine teacher’s attitudes towards using ICT and any shift in those attitudes.
- To identify any barriers that limit fully exploiting the resources.
- To discover perceived benefits to student learning and engagement.

1.4 Purpose of Study

The purpose of this study is to investigate using a case study approach, the adoption of ICT in an Irish primary school specifically with regard to the fact that all the equipment was essentially made available on the same day. The factors to be looked at are attitudes of teachers towards ICT and their openness to change, how teachers are using ICT in the classroom, the benefits to student learning and the barriers that limit ICT use in education.

1.5 Structure of Thesis

The study contains six chapters. Chapter one outlines the area under investigation and the research aims while providing some background information to the study.

Chapter two reviews the existing literature and research in the use of ICT in education. It looks at the benefits of ICT in education from a student and from a teacher’s perspective making reference to learning theory and learning styles. It also discusses the existing research on the quality of implementation of ICT in education in an Irish and in a wider context. Finally the barriers to ICT integration are considered, identifying and reflecting on these barriers and also on the complex area of teachers and their openness to change.
Chapter Three, Methodology, provides background information to the study and examines the research methodology adopted for the study. This is done through critical examination of the available research paradigms and the rationale for selecting the chosen research methodology. The research design, data gathering instruments, data analysis, ethical considerations, reliability and validity are discussed.

Chapter Four, Findings, presents the findings that emerged from the research supported by comments and observations from the participants.

Chapter Five, Discussions, expands on the findings putting them in context and evaluating them in light of the literature review.

Chapter Six is the conclusions chapter which reflects on the issues arising from the study. In addition to considering these issues it recommends the next steps for further research.
Chapter Two  

Literature review

2.1 Introduction

The world in which we live has been radically changed by the technological revolution that touches every aspect of our personal and working lives. The rapid advances in information technology offer the promise of huge benefits in the classroom for educators and students alike (Sutherland et al 2004). Aside from these learning benefits, students must be equipped for the information age in which they find themselves so it is inconceivable that ICT would not have a part in their education. However obvious this sounds, educators have long struggled with identifying how best to integrate ICT into education in a meaningful way.

This literature review chapter shall look at what the existing research says about the benefits or otherwise of ICT in education, the level to which ICT is being used in education and the quality of that usage, barriers that teacher’s experience in making the transition and teacher’s openness or resistance to this change.

2.2 Research on the Benefits of ICT in Education

There is a substantial store of existing literature and research based studies available on the learning opportunities or affordances of ICT in student learning (Harrison et al 2002, Sutherland et al 2004, Becta 2009). Among the affordances of ICT in education that will be explored in this section are constructivism, personalised learning, collaboration among peers and whether or not integrating ICT into pedagogy leads to an overall enhanced learning experience for the student. This section shall also discuss the existing research on the application of ICT for the education of students with SENs (Special Education Needs) as there is much evidence to suggest that the benefits here are particularly pronounced (Becta 2003 and 2009, Pittard et al 2003).
There is a growing body of evidence to support the positive relationship between the use of technology in teaching and the learning outcomes of school aged learners. (Becta 2009, p.2). The same report speaks of better outcomes for ‘e-mature’ schools that take “a systematic and planned approach to using technology to support learning” (ibid).

The ‘Impact 2’ study (Harrison et al 2002) was a large scale, detailed assessment of the impact of the use of ICT on learning conducted in sixty English schools between 1999 and 2002, which found statistically significant relationships between students’ use of technology and student grades. Significant positive impact, equivalent to a term’s additional progress, was found in attainment in English and Science. An interesting and significant finding of this report is that the use of ICT across the curriculum, as opposed to just in individual subjects, was a key factor as it both developed student skills in ICT and promoted an orientation towards independent learning through technology.

Another UK based study on the use of Interactive Whiteboards (IWBs) in primary schools found positive impacts on standards of literacy and mathematics once teachers had experienced sustained use and the technology had become embedded in pedagogical practice (Becta 2009). Additional findings on IWB use were enhanced student perceptions of the quality of learning and teaching and reduced student absence rates compared to other schools.

Becta’s findings concurred with much earlier research by Bialo and Sivin-Kachala who also found ICT had a positive impact on Student attitudes.

The studies reveal that students feel more successful in school and are more motivated to learn and have increased self-confidence and self esteem when using Computer Assisted Technology (CAI). This is particularly true when the technology allows the students to control their own learning. It is also true across a variety of subject areas and is especially noteworthy when students are in at-risk groups – special education, students from inner city or rural schools.

(Bialo and Sivin-Kachala cited in Kosakowski 1998)
In an article entitled “The Computer Delusion” Oppenheimer (1997) offers some words of caution. He warns that in much the same way that TV and radio were once predicted to usurp the role of textbooks, ICT may prove to be the same damp squib. He claims that some of the “studies are more anecdotal that conclusive” and often “lack the necessary scientific controls to make conclusions possible”. He claims that “the studies did not control for variables such as differences between teaching methods” and that “some studies were industry funded and thus tended to publicise mostly positive findings”. On foot of these concerns, he queries the wisdom of cutting school budgets in arts and vocational areas while diverting the investment to ICT. “if business gains too much influence over the curriculum, the schools can become a kind of corporate training centre – largely at the taxpayer’s expense” (Oppenheimer 1997).

While acknowledging the potential benefits for student’s writing and literacy levels, he says that “the easy cut and paste function in today’s word processing programs is encouraging many students to cobble together research materials without thinking them through” (ibid). While this article is over ten years old and technology has advanced significantly since it was written, the arguments put forward are still valid.

The following section shall examine the interactive element of ICT and explore the advantages it presents for the learner in the context of different learning theories.

2.2.1 **Constructivism and self directed learning:**

One of the key advantages of ICT in education is the control that students can have over their own learning, setting both the pace and the direction based on their own interest, knowledge and learning needs. The constructivist view of learning posits that teachers should be facilitators helping students construct their own understandings and capabilities in carrying out challenging tasks, putting the emphasis on the activity of the student rather than on that of the teacher. In this context children are active participants in their own learning,
constructing their own ideas and concepts as they develop. Seymour Papert believed that people learn through doing, moving the construction of knowledge from an internal process to an external one, creating knowledge through interpretation.

Children don’t get ideas, they make ideas. Better learning will not come from finding better ways for the teacher to instruct, but from giving the learner better opportunities to construct

(Trinity College Dublin, 2003 [online])

He placed a huge emphasis on what he termed ‘Objects to think with’ where these objects enable the learner to bring their cognition and knowledge construction to a level that would not otherwise be possible, enhancing thinking and problem solving skills creating an intellectual partnership between the learner and technology to promote critical thinking, creative thinking and complex thinking.

There is a constructivist element to ICT based learning in so far as it is self-directed, facilitating critical thinking and when properly harnessed, the classroom can become a collaborative working environment where the teacher is more of a facilitator than a lecturer in the traditional sense.

ICT facilitates a shift in pedagogy away from a teacher-led transmission model towards one that is more learner centred and in which pupils experience greater autonomy in learning

(Pittard et al 2003, p.13)

Hennessy et al speak of ICT supporting the processes of checking, trialling and refinement facilitating immediate feedback and encouraging self-correction. In the context of mathematics and science they identify benefits to problem solving strategies based on repeated trial and improvement, promoting experimentation and offering opportunities for investigation and exploration leading to refinement of ideas and self-correction of conjectures (Hennessy et al 2005 p.173).

However the same authors offer a caveat in the form of a warning that overuse of ICT may detract from the teaching and learning of basic subject skills that
need to be learned, possibly at the expense of their not being able to achieve the same results manually or from first principles. (ibid, p.176)

The following section shall address how ICT can be used to automate mundane processes allowing students to focus on the core learning objectives. This is especially relevant to Science based subjects but also has relevance for literacy especially in the drafting, editing and publishing process in writing.

2.2.2 Elimination of Routine labour

In the context of Science Education, ICT has huge advantages in terms of elimination of routine labour. Webb lists some of the opportunities for elimination of routine labour as the use of the World Wide Web as an information source, email for communications, simulations and micro worlds, modelling software, data-logging, and text and multimedia editing software (Webb 2005, p.706)

With regard to computer based modelling and simulation, modelling is an important process in real science so it should have a significant place in a new curriculum that addresses the nature of science. Computer based modelling in which students build their own models by identifying relevant factors and variables and hypothesising relationships enables them to develop understanding of modelling as a process in science investigation as well as developing understanding of the scientific ideas they are modelling (ibid 2005).

In laboratory or experimental work, facilities provided by ICT to speed up and simplify data collection, may enable students to be less focussed on mechanical issues and hence more engaged with conceptual issues. Barton (cited in Webb 2005) in a review on data-logging, identified three studies that demonstrate that real-time graphing removes drudgery and saves time. While this can be interpreted as a labour saving aid, crucially Linn and His (2000) found that students are much better at interpreting the findings of their experiments when using electronic data-collection and automatic graphing than when they
construct their own graphs. By being freed from the drudgery of number crunching their minds are free to focus on the meaning of the data (ibid 2005).

Hennessy et al (2005) support this view when they speak of ICT allowing students to focus on overarching issues and accentuate important features by automating routine and laborious procedures where pupils often get bogged down.

Simulations, spreadsheets and graphing technologies allow pupils to visualise processes and relationships, focussing attention on overarching issues, increasing salience of the underlying concepts, helping students to formulate new ideas and access a higher learning point. (Hennessy et al 2005 p.174)

Counterbalancing this argument the same authors warn that ICT cannot replace some important aspects of subject practice, particularly hands-on experience and experience of using the equipment for themselves. (ibid p.176)

2.2.3 Personalised learning:

The constructivist element of ICT discussed in 2.2.1 feeds into personalised learning, allowing the students to personalise the pace and direction of their learning according to their own learning needs and pre-existing knowledge. Hennessy et al identify the role of ICT in fostering pupil independence and peer support, offering pupils autonomy, ownership and more responsibility for their own learning. (Hennessy et al 2005)

A key feature of ICT enabled learning is that feedback is provided by the ICT system, an attribute identified by Black and William as being a formative assessment tool enabling students to understand and manage their own learning. (Black & William 2004)
Webb identifies 4 key affordances of ICT in education that lead not just to enhanced learning outcomes but also personalised learning for the student. These are:

(1) Promoting cognitive acceleration (2) enabling a wider range of experience so that students can relate learning to their own and other real-world experiences (3) Increasing student’s self-management and enabling them to track their progress (4) Facilitating data collection and presentation of data that helps students to understand the data and additionally free student’s time so that they have more time to focus on developing conceptual understanding. (Webb 2005, p.728)

Another key factor identified by Webb is the notion that children develop ‘native theories’ which they use to explain the natural phenomena that they observe in the world around them. Often these alternative conceptions are immature or inaccurate and can become a barrier rather than a stepping stone to full understanding. Webb argues that there is evidence that computer based simulations can act as a cognitive accelerant, enabling conceptual change in the student leading to fuller understanding. (ibid 2005)

Hennessy et al (2005) argue that teachers must “resist the seductive nature of ICT and the temptation to use it for its own sake”, but rather they must maintain focus on the learning objective – ensuring “the medium doesn’t become the message”. However the authors develop this point by stating that teachers are learning to ‘tame’ ICT by employing mediating strategies to overcome potential drawbacks of using it without due care and attention to the underlying learning aims. They assert that inherent in the risk that students can blindly use ICT without understanding the subject matter, is the likelihood that they are developing critical thinking skills in terms of learning to discern the good from the bad, the relevant from the irrelevant, which are all key skills in this age of digital technology. (Hennessy et al 2005, pp. 177-180)

One of the key attributes of multi-media learning is its ability to target different learning styles and also to target the different information channels that humans
use to learn. Learning style theories emphasise the unique cognitive approaches favoured by individual learners and highlight the importance of providing a range of instructional strategies to facilitate learning for all learners. The potential of multimedia applications has been theoreticallyfavoured in the learning styles model, based on their ability to effectively target various learning styles – visual, auditory, reading/writing, kinaesthetic or tactile. (Mandernach 2009)

Mayer proposed that humans have separate systems for representing verbal and non-verbal information and that each working memory store has limited capacity. Effectively designed multimedia learning environments can exploit this by presenting information through multiple channels (visual and aural) thereby minimising the chances of overload of any one channel and maximising the impact for the learner. In the process it is also maximising the chances of playing to the learner’s individual learning style. (Moreno and Mayer, 2000)

Many children with special education needs or learning difficulties learn differently than others. It is often the multi media and interactive elements of ICT that can make them effective for such learners which shall be explored in the next section.
2.2.4 Aid to students with learning difficulties:

According to the National Council for Curriculum and Assessment (NCCA), students who have Special Education needs (SEN) are described as encountering barriers to learning, which in turn can be attributed to cognitive or neurological function, physical impairment involving movement, sight, hearing or speech (NCCA, 1999).

There is strong evidence that assistive technology in the form of ICT based intervention can be invaluable to these students. In this context, Assistive Technology (AT) is defined as any piece of equipment or system that is used to maintain, increase or improve the functional capabilities of individuals with disabilities.

Technology can help SEN students overcome many of their communication difficulties. Software designed to meet a particular student’s needs can help to motivate him or her. For some students technology is the only way to ensure they can make their thoughts and needs known. For them, access to appropriate ICT-based solutions provides perhaps the only chance of participating in society and realising their full potential. (Becta, 2003)

ICT offers four key affordances to students with SENs: The primary and most obvious is compensation for disability by supporting reading, writing and communication, bypassing cognitive and physical barriers that students may have (Lewis, 1998). Secondly amplification of ability allowing users to demonstrate their full knowledge or skill in a particular area (Hawkridge and Vincent, 1992). Additionally Shaw and Lewis (2005) found that computerised presentation significantly improved the accuracy of responses and the focus of students with ADHD. A third effect is reduction of disaffection resulting in improved standards, self-esteem, self-confidence and time spent on task (Westwood, 1993). Finally students experience increased empowerment, affording authorship of significant product and control over their own learning environment (Ott, 1997), a notion that links back to the previous section on personalised learning.

In a similar vein, Pittard et al found that use of ICT with SEN students promoted improved achievement, self-image and independence. Use of digital images in
their writing was found to motivate those with emotional and behavioural issues in the writing process and also allowed them to display their work without the usual drawback of poor handwriting or presentation skills which in turn boosted their self-esteem and confidence. In special schools, ICT was often fundamental to enabling pupil communication which led to improvements in pupil motivation and participation. (Pittard et al 2003, p.16)

A 2009 Becta report titled “The impact of Digital Technology” found that digital technology can have a positive effect on both readiness for learning and integration of learners into the educational process. (Becta 2009). They speak of reduced student absenteeism increasing the schools percentage of students attaining the UK national target of 5 GCSEs. Of 181 underperforming schools that were removed from ‘Special Measures and Notices to Improve’, 82% reported that ICT had played a key role in their progress. Becta claim that technology can overcome barriers that prevent learners taking a full part in the educational process. However the same report also finds that “while learners responses to technology-supported learning are highly positive, links to measurable performance outcomes has been more ambiguous” (ibid, p.11).

Collaboration and group work is a methodology that benefits all students but especially those with SENs by developing socials skills and the ability to work constructively with others. This is discussed in the following section.

2.2.5 Collaboration among peers:

Multimedia learning has the potential to broaden the classroom environment to a much greater stage through the use of Web 2.0 based resources and tools such as podcasting, wiki based forums, collaborative online learning environments, blogs and video conferencing. These collaborative working environments can be used within the classroom, between classrooms or between partner schools depending on the required scope. Students can work collaboratively on documents or projects, working in parallel to add their own input and provide feedback or clarification on the work of others. This is particularly effective
where there is shared authorship of documents using cloud based services such as ‘Google docs’.

Garrison, Anderson and Archer developed an online learning model of critical thinking and practical enquiry in which they describe learning as occurring through the interaction of three overlapping core components: cognitive presence, teaching presence and social presence all of which can only co-exist in a collaborative learning environment. (Garrison et al 2001)

Salomon points out that a basic condition for real collaboration is the genuine interdependence of the participants based on the fact that the participants have individual complementary competences from which the group as a whole will necessarily benefit. (Salomon 1993). This concept is at the core of collaborative work and is the reason why mixed ability groups are normally encouraged.

In a collaborative project study by Tao and Gunstone, it was found that “during the process, students complemented and built on each others ideas and incrementally reached shared understanding and their conversational interactions showed that this led to conceptual change”(Tao & Gunstone, 1999).

In a case study on the impact of ICT on learning, Pittard et al, 2003 found evidence of

increased levels of peer interaction, with pupils advising and assisting each other in an informal type of peer tutoring, which appeared to facilitate a sharing of knowledge conducted in their own language”

(Pittard et al 2003)

However in a classroom environment peer collaboration can happen on a much simpler level, often because the shortage of computer hardware in the classroom has the benefit of students often working together in pairs which in turn fosters collaborative work.

Peer collaboration between students working together on tasks, sharing their knowledge and expertise and producing joint outcomes in learning is becoming a prevalent model in the use of Educational technology.

(Osborne and Hennessy, 2006 p.27)
From the preceding, it can be seen that the existing research is quite compelling on the benefits of ICT for students in term of better learning outcomes, development of cognitive and critical thinking skills, self differentiating learning, reduction of menial tasks, benefits for SEN students and opportunities to develop collaborative working skills. But what of the quality of implementation on the ground? This is examined in the next section both in a general and in an Irish context.

2.3 Quality of Implementation of ICT in practice:

Despite the foregoing evidence one of the key questions surrounding the implementation of ICT in education is whether it is being hyped simply because it is in vogue, putting pressure on educational leaders to promote it or whether it actually brings real value to the learning process for students. Whatever the answer to that question may be, one inescapable truth is the ubiquity of ICT in daily life outside of education, which in itself could be seen as a compelling argument for its inclusion in the school environment.

McFarlane found that some schools were caught up in the hype of measuring success using computer to student ratios without looking at the quality of use

Too often ICT and educational outcomes are treated as uniform entities and some kind of global one-to-one correspondence is sought. The most obvious manifestation of this is the prominence given to national reporting of computer to pupil ratios in schools with any improvement seen as clear evidence of progress. In practice the situation is more complex than some policy discourses imply

(McFarlane, 2002).

A Becta report from 2004 indicated that in the UK “relatively few teachers are integrating ICT into subject teaching in a way that motivates pupils and enriches learning or stimulates higher level thinking and reasoning”.

A 2008 report on Investing Effectively in ICT for schools published by the Irish Department of Education and Science (DES) shares McFarlane’s concerns
Up to now the focus of ICT in schools has to a large extent, been concerned with the provision of technology and resources. While this will remain an important enabling aspect of the initiative, we will only begin to make real and meaningful progress when the main focus shifts from the technology to its use by the learner. 

(DES, 2008)

The same report acknowledged the need for teachers to be supported in integrating ICT into their teaching. “Teachers must be provided with the necessary reasons, skills and technology to enable them to embed ICT in learning and teaching” (ibid).

Aviram and Talmi (2004) define a paradigm for the differing models of integrating technology into education. Echoing McFarlane, they firstly speak of the ‘administrative approach’, favoured by administrators and bureaucrats, which is primarily focussed on the desire to achieve a certain ratio of computers to students and where success is seen as the sheer existence of this equipment, without proper consideration of the use of equipment or the manner in which it is integrated into teaching. The second viewpoint is the ‘curricular approach’ where this technology is seen as serving some specific curricular aim in the given school curriculum or structure. They further refine the curricular approach into the ‘disciplinary form’ and the ‘integrative form’. With the former, ICT is treated as a subject in itself without any attempt to connect it to other learning activities in the school. In the ‘Integrative form’ ICT is seen as an integral part of the prevailing curriculum where its use is embedded in the delivery of the curriculum itself.

Now the quality of implementation shall be examined in the context of Irish schools.
2.3.1 Implementation in an Irish context

In 2008 the DES (Department of Education and Science) in Ireland published the results of an extensive study of the infrastructure, planning and use of ICT in Irish schools. In the primary school context the study involved a national survey of 1162 primary school teachers, 234 Principals and case study evaluations of 32 primary schools including 77 classroom inspections by the DES inspectorate. It found that Primary schools had a student computer ratio of 9:1 versus OECD recommendation of 5:1. The situation was somewhat better in post-primary schools with a ratio of 7:1. The study found that schools generally made good use of the ICT funding that was made available, but this funding is clearly insufficient as in almost all cases they spent considerably more than was made available.

The majority of teachers made some use of ICT in lesson planning and preparation with newly qualified teachers making more use than longer qualified colleagues. Only 30% of teachers rated their ability as intermediate or advanced with regard to teaching ICT mediated lessons. The classroom inspections recorded evidence of the use of ICT to facilitate teaching and learning in 59% of classrooms visited but only in 22% of lessons observed. Within this context 25% of all inspections showed a competent or optimal level of performance in relation to the use of ICT in the classroom. Use of ICT in lessons was most predominant in English, Maths, History and Geography. The evaluation found that many fifth class students could not perform basic computing tasks such as creating a new MS Office file or emailing a file attachment. There was greater usage of ICT in Special Education than in mainstream settings.

The key recommendations of the report are that priority should be given to the integration of ICT into teaching and learning, that teacher training should have increased emphasis on using ICT in teaching and that an increased range of CPD (Continuous Professional Development) courses be made available for teachers focussed on the integration of ICT into specific subjects and curricular areas.
Looking at the Irish situation in a wider European context, the same report references a 2006 EU study which found that Ireland falls below the European Union average in terms of use of ICT ‘in 25% of lessons’ (8% vs. 20.2%) and ‘in more than 50% of lessons’ (7.5% vs. 16.5%). A positive finding was that 91% of Irish teachers acknowledge that computers provide significant learning benefits for students, including increased attention and motivation (Department of Education and Science 2008). While attitudes of Irish teachers towards ICT in teaching are positive and around the European Union norm, Ireland ranks at the bottom of the EU table when it comes to satisfaction with ICT infrastructure and support. Specifically the main concern of Irish teachers is that they do not have access to sufficient digital content and digital content tools relevant to the Irish school curriculum. (ibid)

2.4 **Barriers to ICT Use by Teachers:**

The outcomes of the above DES report make unhappy reading for those tasked with integrating ICT into education. Why with the promise of such transformational change to education, have teachers not embraced this new technology with open arms? Surely if all the claims are true, their jobs should be easier, their students should be more motivated to learn and the resultant learning should be enhanced. Why has practice not lived up to promise?

In his book “Oversold and underused: Computers in the Classroom” Larry Cuban of Stanford University looks at how computers are being used for instruction in US schools, the changes if any they have brought to teaching and learning and whether or not they have delivered value for money. He explores and challenges the belief held by leading school reformists that investment in new technologies will radically alter educational practice allowing it to move away from traditional didactic methods to a system dominated by constructivism and student centred learning.

Cuban claims that despite all the investment in ICT infrastructure up to 2001, it had only delivered “a modest shift from non-users to occasional users and from
occasional users to serious users” (Cuban 2001, p.72). In terms of teacher numbers he further claimed that in 2001 half of middle school teachers were non users of ICT for classroom instruction, one third were occasional users with only one tenth using computers daily. (ibid) Comparing this with the more recent Irish findings in the 2008 DES report which found that only 8% of teachers were using ICT in one quarter of their lessons, it is clear to see that things have not changed radically since.

In terms of the quality of ICT usage, Cuban identified some startling shortfalls such as – “most students use of computers was peripheral to their primary instructional tasks” with “less than 5% of high school students integrated technology into their regular curricular and instructional routines” (Cuban 2001, p.132). More recent research by Mueller et al (2008) reports that many teachers are not comfortable with integrating ICT into their classroom lessons despite being competent ICT users outside of school.

In the ten years since Cuban’s research, technology has made huge advances especially in terms of portability, ease of use and increased content availability using networking and wireless access. However many of Cuban’s criticisms and fears remain valid.

Cuban’s research is of particular interest because of his theories as to why increased availability of computers has not translated into increased usage in the classroom. He first debunks the notion that teachers are technophobes or luddites, and says that the evidence shows that as a group of professionals they are generally favourably disposed to and enthusiastic about new technology. So what then is the problem? The first hypothesis proposed is the ‘slow revolution’ which describes how “technological change in larger society inexorably reshapes all institutions including conservative ones such as schools” which basically means that the change will happen in time but at a slow pace (Cuban 2001,p.155). The second is due to the historic, social, organisational and political contexts of teaching where deeply embedded beliefs influence educational practice and resist change. The third theory is termed ‘Contextually Constrained choice’ which takes cognisance of the autonomy that teachers have
over the content and the method of its delivery in their classrooms and the idea that they need to clearly see the benefits before they fully embrace change.

Mumtaz (2000) takes an approach that focuses on a deficit in resources summarising the key barriers to use of ICT in teaching as lack of teacher experience with computers, lack of on-site technical support, lack of help supervising children while using computers, lack of ICT specialist teachers, lack of computer availability, lack of time to successfully integrate technology into the curriculum and lack of financial support (Mumtaz 2000).

A 2004 study by Muir-Herzig prioritised lack of teacher time, limited access and high costs of equipment, lack or vision or rationale for technology use, lack of teacher training and support, and current assessment practices that may not reflect what is learned with technology (Muir-Herzig 2004). More recent research by Becta in the UK cite similar barriers (Becta 2009)

2.4.1 Overcoming the barriers

In an attempt to define a path for effective integration of ICT, Muir-Herzig recommends the following

Steps must be taken for technology to make a difference. Leaders of schools must include everyone at the beginning of the plan, not after technology arrives. Leadership in the school system must plan for technology. Teachers must change the way they teach. Classrooms must take on the student-centred learning methods. Teachers need to become facilitators. Students need to be allowed to use technology as a tool, which will enable them to collect, analyse, and create major projects.

(Muir-Herzig 2004)

Hennessy et al (2005) emphasise the importance of personal factors in ICT take up – especially teacher’s openness to change and recognition of the potential of technology (Hennessy et al 2005, p.159). The same report acknowledges that innovation and adaptation are costly in terms of the time needed for teachers to develop and establish new practices. Barriers identified include lack of confidence, experience, motivation and training; poor access to resources, unreliability of equipment, classroom practices that clash with the culture of student exploration and collaboration that are central to ICT use. (ibid)
Cuban’s analysis asserts that it is teacher’s resistance to change in general and how they manage change that is the key factor in predicting their willingness to adopt new technology. This shall be explored further below.

2.5 Teachers and Change:

This section shall look at what the existing research says about teacher’s openness to change specifically as regards ICT adoption. There are a number of demographic factors that complicate this analysis. In a 2008 paper Kumar et al proposed that the primary factors are age / time spent teaching, gender and training in computer usage. (Kumar et al 2008).

Regarding gender, Venkatesh and Morris found that in determining intention to use ICT, men focussed more on perceived usefulness whereas women focused more on the perceived ease of use (Venkatesh and Morris 2000 cited in Kumar 2008). Houtz and Gupta (2001) found that male teachers regard computer technology as a male domain with Gattiker and Nelligan (1998) concluding that male teachers have a greater tendency to try new technology (Houtz and Gupta 2001, Gattiker and Nelligan 1998 cited in Kumar 2008). Lee (1997) identified that male teachers were more confident in handling computers than female teachers. On the other hand Mehloff (2001), Sia (2000) and Woodrow (1991) reported that there was no significant difference in computer usage mean score based on gender (Mehloff 2001, Sia 2000 and Woodrow 1991 cited in Kumar 2008).

On the subject of age, Kumar found that “Age does affect teachers’ perception of information technology and its usage” and that younger, less experienced teachers use computers in a broader more transformational fashion since they are more likely to be computer proficient, will have more digitally focussed teacher education courses and will be less constrained by prior habits or attitudes that their older more experienced colleagues (Kumar 2008, p.111).
Martin and Lundstrom (2002) found that 60% of teachers with less than 10 years teaching believed computers in the classroom were essential compared with only 25% of teachers with more than 20 years of teaching experience. (Martin and Lundstrom 2002 cited in Kumar 2008)

Training in computer skills plays an important role in a teacher’s willingness to use computers. Angers and Machtmes (2005) state that teachers who receive 11 hours or more of curriculum-integrated training are five times more likely to say they are better prepared to integrate technology into their classroom lessons than those without (Angers and Machtmes 2005 cited in Kumar 2008). The 2005 study by Hennessy et al reported that “Despite a widespread commitment to integrating ICT, it was clearly accompanied by a feeling of externally imposed pressure” (Hennessy et al 2005). The effect of these top-down policies has been “a perception of eroded autonomy and a feeling of disempowerment in teachers”. The same paper reported a resistance by teachers to the notion of ‘bolting on’ ICT to the curriculum, using it simply because it is available, or its use is encouraged or expected. The teachers in the study did not automatically assume that because technology is being used, learning is being facilitated.

The pedagogic concerns included the dangers of uncritical use, the need to use ICT only where it enhances learning compared with other approaches and the potential sabotage of established subject cultures

(Hennesssey et al 2005, p.185)

Hennessy et al also advocate a staged, inclusive approach to ensure that teachers are open to ICT and comfortable with its introduction:

A degree of caution by teachers is inevitable. The widespread use of ICT is a relatively new phenomenon within education and the top-down approach which imposes ICT in subject teaching and learning, may lead to critical questioning of its value rather than a sense of ownership.

(Hennessey et al 2005)

Scrimshaw 1997 suggested that teachers clearly need to develop their own forms of reflective classroom practice regarding ICT if significant pedagogical change is to take place. (Scrimshaw 1997 cited in Hennessey et al 2005, p.186)
In addition, it is crucial that teachers are actively engaged in the change management process. Hennessy advocates that “the rationale underlying ICT initiatives needs to be made clear, and the intricate relationship between the ensuing curriculum change and pedagogical evolution recognised.” (ibid p.187)

Echoing the notion of teacher inclusion, Mc McCormack and Scrimshaw say that taking “the step of engaging teachers in discussions about pedagogy may encourage them to clarify and re-examine their views on using ICT” (McCormack and Scrimshaw 2001 cited in Hennessey et al 2005)
2.6 Summary

There are numerous studies highlighting the benefits of integrating ICT into education. These include better learning outcomes for students, better motivation and engagement, more intrinsic motivation among students, self-paced learning, elimination of mundane work allowing students to focus on core concepts and benefits for SEN students. There is also evidence that proper use of ICT can promote critical thinking and constructivist learning among students.

In addition to the benefits, there are warnings from other research that there is too much focus on ICT in schools, that there is too much funding for ICT to the detriment of other areas, that implementation is not being thought through properly and that learning objectives may be lost if teaching gets caught up in ICT.

In terms of actual implementation on the ground, the research says that it is inconsistent and that in many cases the quality of implementation is low especially with regard to integration into subject areas.

The literature review highlighted the key barriers to teacher’s use of ICT in the classroom. It says that this is a very complex issue and is tied up in teacher’s fears and attitudes to change. The key factors identified are lack of confidence, lack of support, lack of resources and access to equipment, lack of training, equipment reliability, poor technical support and most significantly time constraints.
Chapter 3  Methodology

3.1  Introduction:

This chapter will outline the procedure employed in evaluating the available methodologies for the research element of the thesis and justifies the rationale for the final research method chosen. The first section shall restate the research questions and provide some background information to the study including the demographics of the setting. The next section shall explore the different research paradigms and their suitability for different research situations. Based on this, the rationale for the research methodologies employed in this particular research study shall be justified. The final section gives consideration to the validity and reliability of the research and will address any limitations of the chosen research methodology.

3.2  Research Questions:

This body of research is concerned with evaluating the impact of the sudden widespread availability of state of the art ICT resources on pedagogical practice and attitudes towards technology in an Irish primary school and identifying barriers, if any, to fully harnessing this potential.

Following on from this, the following research questions were identified:

- Has this sudden availability translated into actual usage and if so, what is the quality of this usage?
- What are teacher’s attitudes towards using ICT and has there been a shift in these attitudes with exposure and usage?
- What are the barriers that limit fully exploiting these resources?
- What are the perceived benefits to student learning and engagement?
3.3 Research setting and Background to the Study:

The school in which the research took place is a primary school in the West of Ireland with an enrolment of approx 350 students. Up until academic year 2010/11 over half of the classes were housed in temporary pre-fabricated buildings which were located remotely from the main school building. Availability and use of ICT infrastructure was very hit and miss in the school, primarily due to outdated equipment, unpredictable performance and very poor internet connectivity. However September 2010 saw the opening of a new state of the art school building and the purchase of teaching laptops and visualisers for all teachers along with 60 new student PCs. School and parent council fundraising initiatives also allowed for the installation of Interactive Whiteboards in all of the new and existing classrooms. Every classroom in the school now has 4 fully networked PCs and there is a central computer room with 32 PCs along with an interactive whiteboard for teacher demonstration. The school is fully networked and this year has usable broadband connectivity for the first time.

The school therefore finds itself in a dramatically changed environment, physically and technologically, presenting an ideal test case to measure the rate of adoption of digital technologies among the teaching staff, the effectiveness of their implementation and any resultant changes in attitude among the staff towards the adoption of digital technologies.

The teaching staff in the school are relatively young with an average age in the early to mid thirties. The staff could be classified as being positively disposed towards the use of ICT in the classroom although their experience in using ICT in a teaching context would be limited primarily due to the limiting factors outlined earlier. The student population is primarily from middle class backgrounds and the school has a very inclusive enrolment policy including students with SENs (Special Education Needs) and students from the travelling community.
3.4 Methodological Considerations:

A number of research methodologies were considered and evaluated for suitability with regard to this particular study. The different approaches each have their strengths and weaknesses and the method chosen is a function of its suitability for the context in which it is to be used. The following section shall discuss the key attributes of these study methodologies and their application to educational research and in particular to the research undertaken in this study.

3.4.1 Qualitative versus Quantitative Research

Qualitative research is defined by Draper as being “concerned with the quality or nature of human experience and what these phenomenon mean to individuals” (Draper 2004, p.642). Draper further defines Qualitative research as being “interpretative and naturalistic, in that it seeks to understand and explain beliefs and behaviours within the context in which they occur” (ibid). Bell (2005) says that researchers using a Qualitative perspective are concerned with understanding individuals’ perceptions of the world, seeking insights rather than statistical interpretations of the world (Bell 2005, p.7).

The alternative approach is a quantitative one which is rooted in the positivist tradition where the research is concerned “with understanding and describing the study in terms of observable physical phenomena, with a focus on the quantitative measurement of these phenomena” (Draper 2004, p.643). The focus is on data collection, measurement and statistics often ignoring the human side of the situation such as attitudes, moral values, beliefs and motivations. Quantitative researchers gather facts and use techniques that are likely to produce quantifiable and if possible generalisable conclusions (Bell 2005 p7). As a criticism of the positivist tradition, Cohen says “Scientific explanation seriously diminishes the very characteristics that make humans human” (Cohen 2007 p18).
3.4.2 Case Study research

Yin defines a Case Study as “an empirical enquiry that investigates a contemporary phenomenon within its real life context, especially when the boundaries between phenomenon and context are not clearly evident” (Yin 1994, p.13). Additionally he states that Case Study research “arises from the desire to understand complex social phenomena, allowing an investigation to retain the holistic and meaningful characteristics of real-life events” (Yin 1994, p.3). He classifies Case Study research strategy as being an all-encompassing and comprehensive research strategy. The process relies on a detailed multifaceted exploration of a subject in a single case. Bassey (1981) said that “Case studies should be carried out systematically and critically, and that if they are aimed at the improvement of education, if they are reliable and if by publication of their findings they extend the boundaries of existing knowledge, then they are valid forms of educational research” (Bassey 1981, cited in Bell 2005, p.12).

One of the key advantages of a case study research is that it is carried out in a real life context allowing observation and information gathering in an environment that is highly relevant to the study. It allows the researcher to become immersed in the study seeing it up close and from different angles getting a feel for the dynamics and motivating factors behind it.

3.4.3 Action research

Somekh (2005) says of action research

Action research directly addresses the problem of the division between theory and practice. Rather than research being a linear process of producing knowledge which is later applied to practice settings, action research integrates the development of practice with the construction of research knowledge in a cyclical process. Instead of being research on a social setting and the people within it, it is research from inside that setting carried out by the participants themselves, or researchers working in collaboration with them

(Somekh 2005, p89)

Action research is an approach which is appropriate in any context where ‘specific knowledge is required for a specific problem in a specific situation, or when a new approach is to be grafted onto an existing system’ (Cohen and
Manion 1994 cited in Bell 2005 P8). The aim of action research is ‘to arrive at recommendations for good practice that will tackle a problem or enhance the performance of the organisation through changes to the rules and procedures within which they operate’. (Denscombe, 2002 cited in Bell 2005 p.8). Somekh states that one of the benefits of action research is to “to develop greater self-knowledge and a deeper understanding of ones own practice” which is an added advantage in the context of this particular study (Somekh 2005, p90).

### 3.4.4 Approach Adopted

After careful consideration of the various research methodologies available, a case study approach was chosen. The justification for this was on the basis that the key measurement of success of ICT rollout was closely linked to the attitudes of the teachers towards ICT. It was strongly felt that a positive attitude among the teaching staff coupled with increasing confidence in its usage (through usage) would translate into openness to its use, resulting in more effective and widespread implementation. The author was keen that the participants in the study were involved in a collaborative, collegiate manner rather than having the use of ICT imposed in a mandated or prescriptive way (which it was feared could have the opposite effect on take up). Through their active involvement in the research, including listening and reacting to their needs and concerns it was hoped that this outcome would be achieved. The intent was that the research would be a passive monitoring tool that did not artificially colour or bias the outcome. The only hard data that was collected was on the percentage usage of allotted time in the computer room. The key research methods employed were ongoing careful observation of practice, a questionnaire and a focus group study at the conclusion of the year.
3.5 **Research instruments**

The following section gives further detail of the primary research instruments used in the study which were a questionnaire and a focus group study.

3.5.1 **Questionnaire**

The questionnaire initially gathered data on teacher’s ICT skills and experience to try and generate a baseline for their expertise, comfort level and proficiency with computers. The balance of the questions sought information on teacher’s actual usage of ICT in the current school year and how this had impacted on their teaching practice and if their attitudes had changed positively or negatively over the period. Prior to distribution of the questionnaire, the teachers were given a broad outline of the aims of the research project at a staff meeting. All participants were assured of the anonymity of their replies and encouraged to be as honest and open as possible in their replies. In advance of circulation, the questionnaire was piloted with three teachers from different schools to ensure that the questions were interpreted as intended and that they were not posed in a ‘leading manner’. They were then distributed among all the staff including support teachers and the principal. All responses were based on a five point Likert scale. At the end of the questionnaire there was a facility for additional comments, opinions or concerns. Of the 19 Questionnaires distributed, 15 were returned, which is a 79% response rate. In addition to the questionnaire, the usage of the computer room timetable was monitored. All classes were allotted at least one hourly slot per week with 2 slots for the middle and senior classes. On a weekly basis each teacher checked a sheet in the computer room to indicate whether or not they had made use of their timetabled slot(s).

3.5.2 **Focus group Study**

At the end of the year a focus group discussion was held. There were five participants all of whom work as mainstream class teachers in the school in question. They were selected to ensure a wide representation from junior, middle and senior classes and to incorporate as broad a range of ICT abilities and experience as possible. Four of the participants were female and one was
male, a mix partly dictated by the gender mix of the staff. All the participants had freely volunteered to participate in the study. In advance of the discussion, some guidelines were given for the focus group setting – speak from experience rather than generalising – don’t be afraid to disagree or challenge opinions in a respectful way – be honest and upfront in what you say - participate as much as possible and it was made clear that the goal of the discussion was not necessarily to agree but to gain a deeper understanding. The author chaired the focus group using a list of prepared open questions and discussion topics, some of which had fallen out of the responses from the earlier Questionnaire. The discussion was recorded with the participant’s consent. The discussion lasted just under one hour and all participants engaged fully and enthusiastically.

3.6 Ethical Considerations

Ethical integrity is crucial to any study but especially when conducted in an Education setting. For this research the principal and Board of Management approved the study in advance and it was agreed that the identity of the school not be revealed in the thesis. All questionnaires were submitted anonymously, although some participants chose to identify themselves and the names of the focus group participants were replaced with pseudonyms in the transcript of the discussion. There was complete transparency in all aspects of the study and the staff were fully aware of the research project and any data gathering that took place. They were fully assured of the confidential nature of the study and that full anonymity was guaranteed.

3.7 Triangulation

Triangulation between the evidence produced from different research methods is the simplest common form of combining methods. Various reasons have been advanced for the use of combined methods triangulation, including increasing concurrent, convergent and construct validity, the ability to enhance the trustworthiness of an analysis by a fuller more rounded account, reducing bias, compensating for the weakness in one method through the strength of another
and in testing hypotheses. (Perlesz and Lindsay 2003 cited in Boyask et al 2004). Using different methods of data collection and triangulating or correlating findings increases confidence in the findings.

3.8 Reliability and Validity

Because the research was conducted in a single school setting, the sample size was relatively small. The research was limited to a single school because of the nature of the study and the unique dynamics presented within that local setting. In an effort to offset this limitation, the focus group participants were carefully selected to ensure as broad a mix as possible in terms of gender, experience and age. The setting in this instance is not typical of an average primary school in Ireland because of the significant one-off investment in ICT courtesy of funding for the new school building project. However in every other respect it is hoped that the sample is representative of an average primary school setting but the author does acknowledge that sampling error can occur and that care needs to be taken in extrapolating the results of the study to general usage.

3.9 Researcher bias:

Researcher bias is an inherent risk in this kind of qualitative analysis. The author works within the school setting where the research was undertaken and while every effort was made to remain detached and at a distance from the study, it is possible that preconceived ideas and beliefs could colour the outcome of the study particularly with respect to drawing of conclusions. To offset this possibility, the questionnaire was written in as open a manner as possible and the study was kept as factual and as impartial as possible ensuring that the participants were not influenced by comments or attitudes of the researcher. The focus group discussion was prefaced by a neutral introduction that did not pre-judge the outcome, the discussion prompts were closely based on feedback from the questionnaires and all participants were encouraged to be completely open and honest in their feedback with plenty opportunity provided for individual observations and feedback.
3.10 Participant bias:

Due to the fact that the study was conducted within a single school community where all participants and the researcher know each other and work together, there is the possibility of participant bias. This is a phenomenon whereby participants consciously or otherwise may provide untrue or exaggerated feedback either to indulge the interviewer or to reflect well on themselves or their teaching. To counter this effect the questionnaire was piloted, questions were posed in an open manner and all participants were actively encouraged to be as honest as possible and not to be afraid to challenge the status quo with their feedback.

3.11 Summary

The preceding chapter outlined the various research methodologies that can be used in a study of this kind and justified the selection of the chosen instruments. It defined the setting, the participants and the selection process employed. It addressed the reliability and validity of the data highlighting any inherent limiting factors that may impact on extrapolating the findings to a wider context.
Chapter Four  Findings

4.1 Introduction

This chapter details and illustrates the findings arising from this case study research. The research instruments consisted of questionnaires (Appendix A), a focus group discussion (Appendix B) and observation (Appendix C) during the study. The observation took place over the course of an academic year and the focus group was held at the conclusion of the research period. There were five participants in the focus group and 15 questionnaires were returned from the 19 distributed.

4.2 Demographic Profile of Respondents

The gender mix of the teaching staff involved in the study was 15 female (71%) and 6 male (29%).

In terms of age, 65% of the cohort were aged under 40 (Fig 4.1).

![Age profile of Staff](image)

*Figure 4.1 Age profile of respondents*
4.3 Personal ICT usage of respondents

To measure teacher’s feelings towards ICT, a number of questions were posed to measure ICT confidence and ability and also to measure their everyday usage of ICT outside school life. This is relevant as it can be a strong indicator of their likelihood of using ICT in their working environment.

In terms of personal use of ICT, all respondents said they use the internet for home browsing and personal email, 60% use online banking, 89% online shopping and 67% use social networking sites (Table 4.1).

<table>
<thead>
<tr>
<th>How frequently do you use the following Services?</th>
<th>Weekly</th>
<th>Monthly</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online Banking</td>
<td>47%</td>
<td>13%</td>
<td>40%</td>
</tr>
<tr>
<td>Personal Email</td>
<td>87%</td>
<td>13%</td>
<td>0%</td>
</tr>
<tr>
<td>Online Shopping</td>
<td>27%</td>
<td>53%</td>
<td>20%</td>
</tr>
<tr>
<td>Home Internet Browsing</td>
<td>87%</td>
<td>13%</td>
<td>0%</td>
</tr>
<tr>
<td>Social Networking Sites</td>
<td>60%</td>
<td>7%</td>
<td>33%</td>
</tr>
</tbody>
</table>

Table 4.1 Teacher’s personal use of ICT
In terms of self evaluating their own ICT expertise, the respondents were asked to rate their skills in different IT areas with the results shown in Table 4.2 below.

100% of teachers rated themselves as average or above in the important areas of Internet use and Microsoft Office applications. The areas that scored most ‘Poor’ ratings were understanding of network architecture at 47% and basic PC troubleshooting at 33%.

<table>
<thead>
<tr>
<th>How do you rate your Knowledge of the following computer skills?</th>
<th>Poor</th>
<th>Average</th>
<th>Above Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet use</td>
<td>0%</td>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td>MSOffice applications (Word, Excel, PPT)</td>
<td>0%</td>
<td>47%</td>
<td>53%</td>
</tr>
<tr>
<td>File Management</td>
<td>20%</td>
<td>27%</td>
<td>53%</td>
</tr>
<tr>
<td>Basic PC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Troubleshooting</td>
<td>33%</td>
<td>47%</td>
<td>20%</td>
</tr>
<tr>
<td>PC Architecture</td>
<td>27%</td>
<td>67%</td>
<td>6%</td>
</tr>
<tr>
<td>Network Architecture</td>
<td>47%</td>
<td>53%</td>
<td>0%</td>
</tr>
<tr>
<td>Using Search Engines</td>
<td>13%</td>
<td>40%</td>
<td>47%</td>
</tr>
<tr>
<td>Setting up user accounts</td>
<td>33%</td>
<td>67%</td>
<td>0%</td>
</tr>
<tr>
<td>Anti-Virus scans</td>
<td>27%</td>
<td>53%</td>
<td>20%</td>
</tr>
<tr>
<td>Updating Software</td>
<td>20%</td>
<td>53%</td>
<td>27%</td>
</tr>
<tr>
<td>File extensions (.doc .xls .jpg etc.)</td>
<td>27%</td>
<td>53%</td>
<td>20%</td>
</tr>
<tr>
<td>Internet Safety for Students</td>
<td>20%</td>
<td>60%</td>
<td>20%</td>
</tr>
</tbody>
</table>

Table 4.2 ICT expertise of respondents
4.4 Attitudes of respondents towards ICT

The next set of questions targeted attitudes towards ICT - the first question asking the teachers to classify their general ICT skills with only one of the respondents feeling their ICT skills were poor, 47% classifying their ICT skills as average and 47% as above average (Fig 4.2). This correlates well with the skills rating in table 4.2.

![My General ICT Skills are](image)

**Figure 4.2 General ICT skills**

The question on ICT confidence produced similar results with 60% claiming their ICT confidence was average and 40% above average (Fig 4.3).

![My ICT Confidence is](image)

**Figure 4.3 ICT confidence of respondents**
When the same question was asked in the context of using ICT in the classroom the answers were equally assured with 60% strongly agreeing they were comfortable, 33% agreeing but with one respondent disagreeing (Fig 4.4).

The negative response was accompanied by a qualifying comment on the questionnaire.

“While I am confident with ICT I do not feel as confident using it for teaching and it’s probably because I’m afraid it will let me down” (Appendix D)

<table>
<thead>
<tr>
<th>Comfort levels using ICT in the Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Percentage</strong></td>
</tr>
<tr>
<td>70%</td>
</tr>
<tr>
<td>Strongly Disagree</td>
</tr>
</tbody>
</table>

**Fig 4.4**  **Comfort levels using ICT in the classroom**

The same question was asked from a slightly different angle with the participants asked to respond to the statement “I’m fearful I’m not as ICT literate as I should be”. A large majority (79%) disagreed with the statement, 7% did not know but a significant minority (13%) agreed that they had reservations. Such uncertainty could translate into an unwillingness to use ICT for teaching, instead opting for more traditional teaching styles.
Teachers were asked to comment on whether they were more or less likely to use ICT in the classroom after having had the benefit of one year's exposure to and experience of the new equipment.

Significantly all replies were positive with 60% agreeing and 40% strongly agreeing that they were now more disposed towards ICT use (Fig 4.5). Comments from the focus group discussion were equally positive

“The availability of equipment this year gave me lots of motivation to use ICT and the more I used it the more comfortable I became”. Teacher D (Appendix B)

“I have improved a lot (at using ICT) and would now opt to use the computer in favour of doing something manually” Teacher B (Appendix B)

![My propensity to use ICT has increased through use]

*Fig 4.5  Increased propensity to use ICT*
4.5 **Barriers to fully exploiting ICT resources:**

The next block of questions in the questionnaire focussed on aspects of ICT that may challenge teachers possibly imposing barriers that negatively impact on its use.

When teachers are unsure of their ability with using ICT in the classroom they can find themselves operating outside of their normal comfort zone, where they are usually the person in control with mastery of their subject domain.

To measure this effect the first statement was “ICT will undermine my control as teacher”. 47% strongly disagreed with this statement, 33% disagreed. 6% did not know with 13% agreeing that using ICT could undermine their autonomy (Fig 4.6).

![Graph showing responses to the statement: Using ICT will undermine my control as a teacher](image)

**Fig 4.6**  
*ICT will undermine my control as a teacher*
Closely linked to the fear of erosion of autonomy is the notion that the students are more knowledgeable of ICT than the teacher and whether or not this threatens the teacher. 87% of respondents said they were not threatened by that possibility. Only 7% teacher agreed with the statement with 7% more undecided (Fig 4.7).

However feedback from the focus group discussion was quite positive and it was clear that most teachers actually welcomed the possibility that both themselves and the other pupils could benefit from such a situation.

“I had a senior class this year and learned a lot about ICT from the students”. Teacher A (Appendix B)

“If children have more knowledge about ICT, then they can offer information and thereby enhance the lesson” Teacher B (Appendix B).

![Figure 4.7 Fear that students are more knowledgeable about ICT](image)
Hennessy et al (2005) found that teachers can feel unduly pressurised to use ICT even if they have personal reservations. This was perhaps an increased risk in this study because of the considerable financial investment in ICT that had been made in the school. That said, while use of the new ICT facilities was clearly encouraged from management, there was no mandate to do so. However 87% disagreed they felt any such pressure, 6% were unsure while 6% agreed (Fig 4.8)

![I felt under pressure to use ICT this year](image)

**Figure 4.8 Pressure to use ICT**

To further validate the above response and measure the teachers’ personal enthusiasm for the new technology, the questionnaire posed the statement “If I had a choice I would not use ICT”. Fig 4.9 shows a resounding 93% of teachers disagreed with the statement.

![If I had a choice I would not use ICT](image)

**Figure 4.9 Free choice and ICT usage**
4.6 Teacher’s views on the benefits of ICT

In this part of the questionnaire, teachers were queried on the benefits of ICT for their students and for the quality of their learning.

There was a mixed response to the proposition that using ICT improves student’s concentration. 60% of teachers agreed or strongly agreed that it does but 27% didn’t know and 13% thought it does not improve concentration (Fig 4.10).

“It works well to really engage the junior classes and focus their minds on the topic in question” Teacher D (Appendix B)

“I find it engages students that would normally lose concentration when learning from a book” Teacher A (Appendix B)

![Figure 4.10 ICT and concentration](image-url)
The results were more positive as regards the benefits of ICT on student motivation and interest with a 100% positive response. (Fig 4.11)

![Bar chart showing ICT will increase student motivation and interest](chart)

**Figure 4.11 Student motivation and interest**

Feedback from the focus group discussion was all positive in this regard with comments such as

“Children tend to be more willing to participate when for example you are doing a history lesson using PowerPoint and allow the children to come up to the IWB and interact” Teacher A (Appendix B)

“I have seen children that would normally be slow to write, produce excellent work when writing on the computer - maybe it’s because the work produced on the computer can look so professional” Teacher E (Appendix B)

A closely allied question on whether or not ICT use increases intrinsic motivation in students produced similarly positive results, with 94% of respondents acknowledging the benefits. A common thread in the focus group discussion was that students had increased ownership and pride in their own work when created on the computers as opposed to when it was hand written.

“I find that some children who are hard to motivate take more pride in their work on the computer and are more motivated” (Appendix D)
87% of teachers felt that their lessons are more interesting for the students when they incorporate ICT. However, more interesting lessons may not always translate into better lessons in terms of meeting learning objectives and this view was shared by the staff with 73% agreeing, 20% unsure and 7% disagreeing with the proposition that “My lessons are better when I incorporate ICT” (Fig 4.12)

![Bar Chart](My lessons are better when I incorporate ICT)

**Figure 4.12 Are lessons better with ICT?**

In the focus group, a number of teachers agreed that there are times when traditional delivery is more appropriate for a lesson and that there is a risk that ICT can be overused, possibly detracting from the learning objectives. When the discussion turned to trainee teacher’s and their use of ICT while on Teaching practice, two participants reported witnessing what they felt was an overdependence on ICT mediated lessons.

“You have to have variety. Teachers on teaching practice have an over-reliance on the IWB and do very little work using the children’s hands and concrete materials”. Teacher D (Appendix B)

“A student had a lesson prepared for the IWB and her PC would not co-operate – she did not have a backup plan or alternative method to use” Teacher B (Appendix B)
“I feel that as a teaching method the student teachers I have worked with are totally over reliant on the IWB to the point where the children are sick of looking at the IWB” Teacher D Appendix B

The next three questions on the questionnaire measured whether or not teachers see ICT as being of more benefit to some students than others and if so, where the greatest gains are to be had.

The first of these statements posited that “ICT benefits some students more than others”. The response rate was strongly positive with 93% agreeing and 7% disagreeing (Fig 4.13).

![Figure 4.13  ICT benefits certain students more than others](image-url)
When asked if ICT is of benefit for high achieving students a significant majority of 80% felt that it did. Three respondents commented that it allows for extension work at their own pace implying that it is self-differentiating learning. (Fig 4.14)

![ICT benefits High achieving students](image)

**Figure 4.14 Benefits for High achieving students**

An even more significant majority of 93% felt that ICT benefits students with Special Education Needs (Fig 4.15). There were no negative replies to this question. This is not unexpected as many students with SENs or learning difficulties can also often have short attention spans and so are more likely to be engaged by multi media or interactive type presentation.

![ICT is of use in differentiating for SEN students](image)

**Figure 4.15 ICT benefits for SEN students**
“I had a student with dyslexia and the only time he was confident enough to write was on the computer and he was a whizz with spell-check” Teacher E (Appendix B)

“For some children what the teacher says goes in one ear and out the other when it comes to history and geography – when they watch a video clip or animation they can focus and take it in” Teacher D (Appendix B)

I feel it’s great for both sets of children because they are all working at their own level” Teacher C (Appendix B)
All respondents agreed that their students had experienced increased ICT exposure this year as a result of the new equipment. Of these 93% strongly agreed, a fact that was emphatically backed up in the focus group discussion. This exposure was both in terms of ICT mediated lessons in the classroom and hands on computer use in the computer room.

Usage of the computer room timetable was monitored over the year and 80% of the timetabled slots were utilised.

Figure 4.16 shows 87% of teachers reporting that their student’s ICT skills had improved over the year which would be expected based on the results of the previous question but this also vindicates the quality of this ICT exposure.

During the focus group the infant teachers commented on the fact that most junior infants were able to navigate their way around the PC without assistance and that by the time this crop of students reach the middle cycle they should be very proficient in ICT. (Appendix B)

![My students PC skills have improved this year](image)

*Figure 4.16 Gains in student’s ICT skills*

The same question was posed in terms of teacher’s gains in ICT use with 80% of teachers reporting a personal improvement.
4.7 Time Factors

A commonly cited barrier to teachers embracing ICT is lack of time – time to learn new technologies, time to find resources, time to prepare material for lessons, time spent setting up equipment etc.

73% of teachers reported spending increased time preparing lessons that integrate ICT (Fig 4.17).

![Bar Chart: Time spent preparing ICT based lessons](chart)

Fig 4.17 Time spent preparing ICT based lessons

However this effect was tempered by comments in the focus group discussion (Appendix B) where a number of teachers reported that it was an investment that would cut down on future workload when the prepared material was saved. It was also reported that this extra time was reducing with usage and proficiency gains and as teachers built up banks of resources, bookmarked websites etc.

“It can take a long time to find resources and prepare lessons on PowerPoint but once the work is done it saves time down the road” Teacher E (Appendix B)

“I am getting smarter at saving my presentations and book marking good websites so that I can use them again and again” Teacher F (Appendix B)

“We are getting better at sharing stuff between us as a staff. It’s so easy to share files” Teacher B (Appendix B)
On the subject of time constraints, 73% of teachers reported not having enough time to find ICT teaching resources (Fig 4.18). This correlates well with the fact that the same percentage reported increased time spent preparing ICT mediated lessons.

**Figure 4.18   Lack of time to find resources**

On the question of whether ICT will result in reduced teacher workload, the results were quite mixed. Figure 4.19 shows that 53% said it would reduce workload, 20% were unsure and 27% felt it would increase workload.

**Figure 4.19   ICT and teacher’s workload**
4.8 Subject factors

The literature review discussed ‘subject specific’ factors with regard to ICT, in so far as it can lend itself more easily to some subjects than others and it can also be more difficult to find resources for certain subjects.

Teachers are often concerned that they will not have time to fit ICT into the school day and still meet their recommended time spent on each curricular subject. The counter argument to this is that if ICT is properly integrated into curricular areas, this should not arise.

In this study 60% of teachers surveyed felt that ICT did not impact on their timetabling of other subjects while 13% claimed it eroded time spent on other subjects (Fig 4.20).

![Figure 4.20 ICT versus timetable compromise](image_url)
Closely aligned with timetable concerns is the ability of teachers to properly integrate ICT into the various subject areas.

A significant 93% of teachers claimed that they are able to integrate ICT into their subject areas which in theory should allow them to use ICT constructively while at the same time spending the required time on each curricular area (Fig 4.21).

87% of teachers said that ICT is more suited to some subjects than others. When further questioned on the 3 subjects for which they use ICT most often, 69% use it for literacy, 54% for Maths, 46% for geography and 46% for history.

“Absolutely, it was easy to integrate, especially for subjects like history and geography. There are lots of websites and historical videos that add variety to the lesson. It’s great” Teacher B (Appendix B)

“There are useful resources on phonics for infants and we integrated these into our teaching” Teacher D (Appendix B)
When surveyed 87% of respondents claimed that they know how to use ICT in their teaching (Fig 4.22)

![Figure 4.22 I know how to use ICT in teaching](image)

When asked if ICT should be taught as a discrete subject the results were very split with equal numbers agreeing as disagreeing (Fig 4.23). One teacher commented that students need a certain amount of training in how to use a software package before you can expect them to use it to do work on a particular subject (Appendix D).

![Figure 4.23 ICT as a discrete subject](image)
4.9 Training

Another commonly cited issue for teachers is the area of continuing professional development in ICT.

87% of teachers in this study say that they need further training in ICT (Fig 4.24). Significantly 73% of the same group claim that to know the areas in which they need this training.

In the focus group it transpired that training in the use of the IWB software was most in demand. There was also interest in learning basic troubleshooting skills. It also transpired that some of the teachers are undertaking ICT courses in their own time.

One participant expressed concern over ensuring that training was pitched at the right level for her ability based on courses she had attended in the past.

“I think it’s up to the teachers to go off their own bat and in their own time to arrange for training. I did a course last Summer and it was not what I needed. It was too basic and I already knew how to do what they taught”. Teacher C (Appendix B)
4.10 Equipment issues

If technology is not dependable teachers will most likely not use it as they simply cannot afford to be let down at the point of delivering a lesson to a class of thirty expectant children.

Therefore the teachers’ perceived reliability of the ICT infrastructure over the past year is seen as an important metric in interpreting the results from this study and for this reason a number of equipment related questions were included in the questionnaire.

The vast majority of teachers (93%) felt that the ICT infrastructure had worked reliably in the past year (Fig 4.25). The same percentage stated that they were happy with the level of ICT support in the school with 87% of respondents stating that any ICT problems experienced in the last year were fixed in a timely manner.

![Figure 4.25 Equipment reliability during the study](image)

**Figure 4.25 Equipment reliability during the study**
Results were mixed on how to deal with equipment issues, with 53% of respondents claiming they know what to do in the event of a technical issue while 33% do not (Fig 4.26).

![I know what to do if I have a technical problem](chart)

**Figure 4.26  Fixing technical problems**

In terms of attitude towards technical problems, a reassuring 80% would try to fix such an issue before calling for help.
4.11 Investment in ICT – Value for money?

When the ICT budget was discussed at a staff level in advance of the school building project, there was a noticeable uncertainty among some teachers at the proposed spend in ICT infrastructure with some teachers feeling it would be better spent in other areas.

There was also much debate on whether the school should kit out a dedicated computer room or purchase a quota of student laptops and a mobile charging trolley, the idea being that the laptops would be timetabled, shared and wheeled between rooms. There was significant expert advice (from the NCTE and the ICT advisor from a teacher training college) that advocated the laptop route suggesting that it was the way forward. Based on visits to other schools using both systems, the staff made a decision to go the Computer room route. This decision was made primarily because it was felt that a dedicated, timetabled computer room would get more use, fears of long setup time with the laptop solution but also because of reliability concerns with laptops.

The questionnaire posed a number of questions to elicit staff response to the decisions taken, after having used them for a year. On the proposition that “Investment in ICT for schools is money well spent” there was unanimous agreement that it was value for money with 87% strongly agreeing (Fig 4.27).

![Investment in ICT for schools is money well spent](chart)

**Figure 4.27 Is ICT value for money?**
To differentiate between the benefits for students of working independently on computers versus being taught using interactive resources on an Interactive Whiteboard, the teachers were asked to state which they thought was more important – IWBs or a computer room. 73% felt that the IWBs i.e. teaching through ICT was more important (Fig 4.28).

**Figure 4.28 IWBs or student PCs?**

On the subject of Computer room versus laptops the teachers were asked their opinion as to which was the best solution now that they had the experience of using the computer room. 60% said the computer room was better with a significant 40% saying they did not know (Fig 4.29). This data should be interpreted on the basis that they have not had experience in using the laptop model.

**Figure 4.29 Laptops or PC suite?**
Because this school went from a low base in terms of ICT in June 2010 to state of the art the following September, the teachers were asked whether it would be better to have phased in the change or to have gone with the ‘Big Bang’ approach that was adopted. 93% of respondents felt the sudden availability was better (Fig 4.30). The feeling was that it forced an irresistible culture change that encouraged take-up.

**Figure 4.30  Big Bang or phase in ICT?**

“The availability of equipment this year gave me lots of motivation to use ICT”
Teacher D (Appendix B)

The discussions chapter will discuss these findings in light of the literature reviewed and the research questions of this study.
Chapter Five  

Discussions

5.1  Introduction

This section of the paper elucidates the research findings and evaluates them in the context of the literature review. This discussions chapter will be presented by research question.

5.2  Teachers attitudes towards ICT and any shift in those attitudes

When this cohort of teachers were queried on their personal ICT usage and asked to rate their proficiency with ICT, 100% of the group said that they use computers for home internet browsing and personal email with all respondents classifying their ICT confidence as being average or above average. 100% of the group also rated themselves as average or above average in terms of internet skills and knowledge of Microsoft Office applications. Usage figures were more modest for online banking, social networking and financial transactions such as online shopping and banking. Similarly for more technical ICT issues such as basic troubleshooting or understanding of PC and network architecture, where approximately one third of respondents rated their skills as poor.

Such positive results on personal usage and attitudes towards ICT are encouraging and are consistent with the findings of Larry Cuban (2001) who concluded that teachers are not luddites or technophobes and that as a group of professionals they are favourably disposed to and enthusiastic about new technology.

The fact that 65% of the cohort are aged under 40 years of age may be a factor in the high positive response rate, a correlating factor identified in numerous studies including Gattiker and Nelligan (1998), Gan (2001) and Sia (2000). In terms of such a study, such a high adoption rate of ICT in their personal lives should increase the likelihood of use in a classroom environment. Hennessy et al
(2005) emphasise the importance of personal factors in ICT take up including awareness of the potential of technology, experience, confidence and access. Clearly lack of access to ICT is not an issue in this school because of the investment outlined in the introduction chapter.

Use of ICT for personal use may not necessarily translate into a willingness or ability to deliver ICT mediated lessons in the classroom. However when presented with the statement “I am comfortable with using ICT in the classroom” there was a 93% positive response of whom 60% strongly agreed with the statement. It is significant that this response was at the end of the trial year when all teachers had experience of using the new ICT resources. This figure is high when compared with the results of the Department of Education and Science (2008) survey which found “Only 30% of teachers rated their ability as intermediate or advanced with regard to teaching ICT mediated lessons” (DES 2008)

It is also clear from the results that the teacher’s attitude towards ICT has become more positive as a result of this exposure with 100% of teachers saying that their propensity to use ICT has increased through use over the year. During the period of observation, a palpable shift was observed in culture and attitude towards ICT. Enthusiasm could clearly be seen from teachers who would previously have been slow to use ICT. 80% of teachers reported an increase in their own ICT skills over the previous year. Two representative comments from the focus group were

Teacher B “I would say I have improved a lot over the year and would opt to use the computer in favour of doing it manually” and

Teacher A “My knowledge would still be pretty basic but I can get around the system – If I have problems I ask as there is plenty expertise in the school”. (Appendix B)

A reason often put forward as a barrier to full ICT integration in education is fear of the unknown and teacher’s uncertainty with moving out of the comfort
zone of their own subject domain (Hennessy et al 2005). An extension of this fear is the notion that teachers could find themselves in a situation where the student knows more than the teacher which would not be a normal situation for teachers especially in a primary school setting. Becta (2003) spoke of teachers expressing concern about exposing their ICT limitations to students. 80% of the teachers in this study disagreed that ICT would undermine their autonomy in the classroom with a significant 87% of respondents stating they would not feel threatened if the students were more knowledgeable about ICT than the teacher. This is supported by teacher A in the focus group discussion who stated

“I would not be bothered or embarrassed by it” (Appendix B).

Teacher B added “If the children have more knowledge about the ICT functionality, then they can offer information and thereby further enhance the lesson”. (Appendix B)

Another explanation for teacher’s lack of engagement with ICT is that sometimes they feel it is imposed on them from above. There is evidence that they are not consulted and do not feel part of the decision making process and often resent the pressure to include ICT in their practice. Hennessy et al (2005) reported that “Despite a widespread commitment to integrating ICT, it was clearly accompanied by a feeling of externally imposed pressure”. It can be the case that if teachers feel such pressure they use ICT begrudgingly or not at all and the quality of use will be poor.

In this study the issue of pressure is not a significant factor as 93% replied that, given a choice, they would decide to use ICT in their teaching and when specifically asked whether they had felt under pressure to use ICT during the school year only one respondent said they had. The very fact that the teachers were aware of and involved in this study could have put them under such pressure but could also have increased their buy in and ownership by virtue of the fact that they were being consulted as stakeholders in the process.
5.3 Perceived benefits to student engagement and learning

One of the key research questions in the study was to measure the effect on student learning and engagement as a result of the use of ICT in instruction. The areas that were looked at were student concentration, motivation and interest in the lessons and learning outcomes as a result of the use of ICT.

When asked if ICT improved student’s concentration, the survey results were mixed with 40% either unsure or disagreeing. However there were some very positive comments in the focus group discussion:

“I find that when they are working in the computer lab you could hear a pin drop they are so engrossed in what they are doing” (Appendix B)

Teacher C “The fact that they are used to watching TV at home, the whiteboard is almost comparable and engages them straight away” Teacher B (Appendix B).

On the question of motivation the replies were far more conclusive with 100% of teachers agreeing that ICT improved student’s motivation and interest in lessons.

“It’s great for their confidence – one pupil in particular who’s always on the wrong page in class is one of the best in the computer lab...the other children ask him how to do things on the computer and I would rate him as one of my weaker pupils academically – it’s great for his confidence” Teacher A (Appendix B).

These findings concur with the literature review which highlighted numerous other studies that identify positive effects on student attitudes and motivation such as Becta (2009), Webb (2005) and Pittard et al(2003). In particular Becta (2009) reported high levels of motivation towards achieving personal learning goals and high levels of motivation towards gaining positive feedback on
individual competence. The same Becta report also highlighted better pupil behaviour in classes where ICT was used and improved quality of work in terms of appearance and presentation.

While respondents felt that lessons were more interesting and varied with ICT, they were less convinced that the lessons were better in terms of learning outcomes, with 27% of teachers either disagreeing or undecided. This has parallels with Becta’s findings (2009) where they reported “While learner’s responses to technology supported learning are highly positive, links to measurable performance outcomes have been more ambiguous” (Becta 2009, p.11). The more bells and whistles that are attached to a lesson the greater the risk that the fundamental learning objectives of the lesson could get lost in the process. This is the balance that the teacher must maintain in ensuring that the ICT complements the lesson and the learning outcomes, rather than becoming the lesson in itself. Hennessy et al (2005) argue that teachers must “resist the seductive nature of ICT and the temptation to use it for its own sake” and must focus on the learning objectives.

An interesting outcome from the focus group discussion was the suggestion that teachers have to avoid an overdependence on ICT in teaching and that it if not monitored, it can be overdone with the medium becoming the message.

“You have to have variety in the classroom and it cannot all be about the board (IWB) and interaction” Teacher C (Appendix B).

“Sometimes the lesson just calls for pen and paper. You don’t have to add the computer to every lesson to engage the children” Teacher B (Appendix B).

“I feel that Teaching Practice students can have an over reliance on the IWB and they do very little work with the children’s hands and with concrete materials” Teacher D (Appendix B).

On the questions that probed whether ICT had special benefits for students with special education needs (including high achieving students) over 90% agreed it
had. A number of teachers commented that it allowed for self paced learning and allowed for automatic differentiation by content and pace.

“I find that it suits all children because they are working at their own level”
Teacher C (Appendix B)

“Some learners learn by looking and others by hearing so it depends on learning style” Teacher F (Appendix B)

These findings are widely supported by published research. Ott (1997) reported that students experience increased empowerment affording control over their own learning environment. Pittard et al (2003) found that use of ICT with SEN students promoted improved achievement, self-image and independence.

A major success indicator of this project is whether or not the students saw an increased contact time with computers or with ICT mediated lessons. The answer was an emphatic yes with 93% strongly agreeing that their students had increased ICT exposure in the past year and 87% saying their student’s ICT skills had increased over the same period.

5.4 Effect of Widespread availability – Rollout

The key differentiating factor in this study as compared with previous similar studies is the nature and speed of the implementation of the rollout. When the school closed for holidays in June 2010 it was poorly equipped with ICT infrastructure, only to reopen in September in a new building with a brand new network, reliable Broadband with sufficient usable bandwidth, a dedicated PC suite plus an interactive whiteboard and teaching laptop per classroom.

Prior to the new kit-out considerable work was carried out by a sub group from the staff in deciding the best way to spend the investment. The main area of debate centred around whether it was better to setup a dedicated PC room with desktop PCs or to invest in a set of laptops and a mobile charging trolley. Input was elicited from the staff, from the Education centre, from other schools in the
area and from the NCTE. Two solutions were evaluated based on other school’s experience, recommendations from expert groups, flexibility of each solution, reliability of each solution, logistics within the school itself and the resultant usage each solution was predicted to have. The PC room solution was chosen primarily because it was perceived as being more reliable, was more likely to be used and had virtually no setup time. The questionnaire and focus group discussion included a number of questions designed to measure the success or otherwise of the chosen strategy.

When the teachers were asked if “Investment in ICT is money well spent” there was a 100% positive response of which 87% strongly agreed. This is very significant as it vindicates the decisions made in terms of capital spend and is a strong indicator that the equipment purchased is being put to good use. Within the school ICT use takes two main forms – one is ICT mediated instruction using the laptop and IWB within the classroom and the other is independent ICT work by the students in the PC room or project work on the classroom PCs. When asked to say which was more important 73% opted for the IWB and laptop over the computer room.

The debate on PC room versus a bank of laptops was revisited after the first years experience with 60% saying the PC room was better and the other 40% undecided. The significant undecided rate is not unexpected as the teachers queried only have experience of the PC room solution.

The staff were also explicitly asked their opinion on the fact that the implementation of the ICT solution happened in a Big Bang manner in so far as the new server, the PC room, the teaching laptops, interactive whiteboards and the additional classroom PCs were all introduced at the same time. Logistically this made sense from the point of view of the new school building but the major unknown was whether or not it would result in greater take-up as there is an argument that a phased in solution would allow people slowly acclimatise and build up their skills and experience over time. The route chosen could have been a culture shock that may have intimidated some teachers. When queried 93% of teachers said the approach adopted was better while one respondent was unsure.
This is seen as a significant outcome from this study suggesting that complete immersion can lead to more rapid and effective adoption of new technologies.

5.5 Barriers to teachers fully exploiting resources

Lack of time is a commonly cited reason for poor utilisation of ICT by teachers with claims that they do not have the time to up-skill and learn new technologies, to find or create e-resources or to setup equipment in a classroom context (Becta 2003, Haydn and Barton 2008). In particular Haydn and Barton speak of teacher’s time as “being a very precious resource in education” (Haydn and Barton 2008).

This was supported in the findings of this study with almost three quarters of teachers saying they spent more time preparing lessons that integrate ICT over traditional book based lessons. However a number of teachers also said that once the material was sourced or created it could often be used again for future classes provided it was saved in the right manner.

“You tend to put in more time in the first year that you have the class (creating e-resources) but in the years that follow you have the links and Power Points saved for future reference. This is more worthwhile than a chart that you may display for five minutes that is worn and frayed after 2 years and needs replacing” Teacher E (Appendix B).

Similarly when teachers were asked if they had enough time to find teaching resources three quarters claimed that they did not. On both the previous questions, it was commented that the time spent locating and creating resources was reducing as their skill level and familiarity increased. Teachers also reported sharing of resources among themselves creating further efficiencies. This agrees with the findings of both Becta (2007) and the Irish DES (2008) who found teacher’s preparation time reduced with experience. “Once teachers have mastered the technicalities involved with classroom-related hardware and
software, they can enhance their teaching by delivering content and concepts more effectively and efficiently and release time” (Becta 2007 p.67)

Despite these obvious time issues for all teachers, when they were specifically asked if ICT would result in a reduced workload 53% said it would, 27% said it wouldn’t with the balance undecided. This indicates that many teachers are looking beyond the immediate workload and recognising that there are long term savings to be made in terms of reusable content, sharing of resources between teachers, building up skill levels through continuous usage, better teaching resulting in better learning outcomes for their students etc. There is also an acknowledgement that teachers will work more efficiently as their expertise and knowledge base grows. Continuous day to day usage of technology as opposed to occasional use will ensure these skills are kept current and fresh.

5.5.1 Equipment reliability

Another oft cited barrier to ICT in the classroom is reliability of equipment. Mumtaz (2000) emphasised the importance of robust technical support and teacher confidence in equipment reliability as being key motivating factors in teacher take up of ICT. Teaching takes place in a pressurised environment where a teacher simply does not have time to deal with technical issues with a class waiting

Five minutes trying to get that web link to work or to fix the sound issue with the projector can result in a lost audience. If a teacher cannot rely on the technology working on demand it can be a very fraught business preparing to deliver a lesson based on electronic resources. It defeats the purpose if there is a requirement to have paper or manual backups for every lesson.

The DES (2008) report found that Ireland ranks at the very bottom in Europe when it comes to teacher’s satisfaction with ICT infrastructure, with 85% of Irish teachers wishing their was better support and maintenance for ICT in their schools.
Prior to the rollout of the new equipment in this school, it certainly was the experience of these teachers that the limited ICT that was available could not be relied on to work. There was a real risk that past experience could have negatively impacted usage of the new technology due to lack of trust in the reliability of the new setup. However after the first full year working with the new equipment 93% said that ICT had been reliable in the school over the past year, 93% had been happy with the level of ICT support and just over half the respondents said they knew what to do in the event of a technical problem.

This equipment reliability and growing confidence in the equipment as expressed in the study could reasonably be interpreted as being a significant factor in the high level of adoption recorded in the study.

5.5.2 Training in ICT

Teachers simply cannot afford to learn ICT skills on the fly in the classroom and therefore need specific training. The DES (2008) report recommends a national framework for ICT continuing professional development focussing on ICT integration into subject areas.

This requirement was borne out by the results of this survey where 87% of teachers said they needed further training in ICT. 73% of teachers claimed to know which areas in which they needed this training. 80% of the teachers have received ICT training of some sort already much of it in their own time and at their own expense. One teacher commented that any training she had received had been in how to use software packages but not in how to integrate it into her teaching (Appendix D).

However while acknowledging the need for and the benefits of training, some teachers felt that any ICT training they had received to date was not necessarily pitched at the right level for them by virtue of the fact that it was delivered to a group with differing levels of expertise. This is a point made in successive Becta studies when they speak of the need for 'effective’ training for teachers which must be tailored to their specific needs.
“I did a Summer course (IWB training) and after the training I felt better equipped and prepared to use the equipment. The combination for me of regular use and training makes me feel I have improved and am using it better” Teacher E (Appendix B).

The reality of building ICT skills especially with software packages, is that once you have been exposed to an initial overview of the capabilities of the package and some top-level techniques, there is no substitute to honing your skills through practical use and trial and error although as explained this ‘playing around’ is not practical in front of a class of students. One realistic option is individual tuition using online tutorials which can be self paced and tailored for an individual’s specific needs. This may be a shrewd investment for school ICT training budgets.

In the focus group discussion there was a feeling that newly qualified teachers have an advantage in ICT skills as they study how to use ICT in the classroom as part of their college training and are encouraged to use it as part of teaching practice stint in the classroom. However this was tempered with a belief that there may be an overemphasis on ICT at the expense of more traditional Chalk and Talk teaching skills.

“I feel that the Teaching practice students I have worked with in the Junior classes are totally over-reliant on the IWB to the point where the children are sick of looking at the IWB” Teacher D (Appendix B).

“I had a TP student who had prepared a lesson on the IWB and her computer would not co-operate on that particular day and she did not know what to do – she did not have a back up plan or alternative teaching method to use” Teacher B (Appendix B).

This is a significant finding and may have implications for teacher training colleges and future teaching graduates.
5.6 Summary:

The most significant finding of this research study is that the big bang ICT implementation strategy delivered in terms of increased teacher utilisation of ICT in the classroom. It seems to have created an environment where availability and involvement translated into enthusiasm and all were swept along on this tide of change.

This in turn delivered in terms of gains in teacher’s confidence and competency in ICT and also in student’s exposure to ICT mediated instruction. Teachers found that the more they used ICT, the more likely they were to use it again. In terms of student benefits teachers reported gains in student learning, concentration and motivation when ICT was used in the classroom.

The study identified the key barriers to using ICT and these were broadly similar to those highlighted in the literature review.

The final chapter will identify the main conclusions of the research and offer recommendations to address the issues raised.
Chapter Six  Conclusion

ICT has become an integral, ubiquitous and inescapable part of modern life, that pervades our working and personal lives through online shopping, online banking, social networking, entertainment, internet searches, email and on demand content all available on pocket sized mobile devices. Today’s students entered this world as ‘Digital natives’ to whom technology is part and parcel of who they are and it is inconceivable that the education system that serves them can remain outside this revolution. Failure to properly integrate ICT in schools will fail these students in terms of lost learning opportunities but also in terms of fully equipping them for the world in which they operate.

However educational researchers have long-grappled with identifying how to realise the true value of ICT in education and just how it can be successfully integrated into the existing structures. This is further complicated by the rapidly changing nature of technology itself which can often result in research being out of date by the time it is published. Combined with this are the complex dynamics and human variables within a school environment that make pure cause and effect analysis impossible.

This chapter will identify the main conclusions of the research and offer recommendations to address the issues raised and for further research.

6.1  Teacher’s attitudes to ICT

One of the key findings of this study is that increased access to good quality ICT in schools results in higher rates of adoption, leading to increasingly positive attitudes among teachers and better quality integration in the classroom.

The teachers in this study were found to have a high level of ICT usage in their own personal lives and rated themselves strongly in terms of ability and confidence in using technology. Over the period of the research the teachers reported growing enthusiasm for and propensity to use ICT in their teaching.
This indicates that with increased availability and access to reliable equipment comes higher usage, with usage comes confidence leading to increased ability and increased likelihood to use ICT in the classroom. In addition the teachers in the study were all the while building their resource banks while becoming more efficient and adept at creating and sourcing resources.

Another important factor to emerge from the study was the benefit of including the teachers as stakeholders in the decision making process. Prior to and including the rollout, the teachers were consulted on the options available and were made aware of decisions taken. This ensured that they felt part of the decision making process and did not feel externally imposed pressure to use ICT. Including teachers and keeping them informed can bring the teachers on board resulting in ICT being used for holistic reasons genuinely benefiting the learning and teaching process. In this study the participants showed maturity and confidence in their attitudes to ICT with a good understanding of how it can be used while recognising the pitfalls of over use.

**Recommendations**

School management should consult all teachers when decisions are being made on ICT. School expectations on ICT use in the classroom should be clearly communicated to staff who should be supported as much as possible in its implementation. All schools should have a clear and well communicated policy on ICT integration which should be reviewed frequently as needs and technologies change. Teachers should be encouraged to share ICT resources among themselves preferably using shared access on the school server partitioned by class grade and subject to ensure easy retrieval.

### 6.2 Student learning

The study found positive benefits for both student learning and engagement. Teachers reported that students showed increased motivation and interest in learning and were more engaged in lessons. When the students used the
computers for independent learning or project work the perceived benefits were greatest particularly in terms of student motivation and willingness to succeed.

However it was also clear from the research that some respondents felt that there is a risk of overusing ICT in teaching. Such overuse could cause a dilution of core skills and erosion of learning objectives. A number of experienced teachers commented on the almost complete dependence on ICT shown by student teachers, to the potential detriment of traditional teaching techniques and student hands on activity. The research raises an interesting question around future teaching graduates and highlights the possibility that the focus of their training may be over biased towards ICT use and they may not have the same depth of traditional teaching skills as older teachers.

One of the clear benefits from the research is the self differentiating nature of ICT mediated learning for all students but especially for SEN students at both extremes of the spectrum. It allows self directed and self paced learning to suit the ability level of the learner.

**Recommendations**

Teacher training colleges should ensure a balance is maintained between ICT mediated and traditional teaching methods. Use of ICT should be optimised for students with special education needs and similarly gifted students should be given opportunities to extend themselves. Teachers should be encouraged and incentivised to integrate ICT into their teaching. Specific training should be offered in this regard.

**6.3 Implementation and rollout strategy**

The study produced some interesting results in terms of identifying the best approach to the rollout of ICT and where money is best spent. The staff expressed a narrow preference for a permanent PC room or ICT suite as opposed to a portable bank of shared laptops. The permanency of the PC room solution, its perceived reliability and the lack of setup time were the main deciding factors
for the teachers. Where budgetary constraints exist, a significant majority of respondents said they would prioritise the provision of interactive whiteboards and teaching laptops over a dedicated PC room.

Reliability of equipment and robust technical backup were highlighted as key factors for teacher’s willingness to use ICT. If teachers cannot depend on the technology working on the day, then they are unlikely to plan lessons around its use.

On the key issue of the speed of implementation of ICT rollout, there was almost unanimous agreement that sudden full implementation is preferable to a gradual rollout over time. It is clear from the study that the teachers felt that the sudden big bang approach adopted, resulted in complete ICT immersion forcing an irresistible culture change that is more likely to be embraced by teachers.

**Recommendations**

Resources should be made available to schools to enable installation of ICT infrastructure that is fit for purpose. In order to maximise take-up among teachers, schools should endeavour to provide a full ICT solution up front rather than phasing it in over time. Schools should have in place a clear escalation process for technical problems and teachers should be trained in first level troubleshooting. In addition to the practical and cost benefits it should also further develop teacher’s confidence and self sufficiency in using ICT.

**6.4 Barriers to use of ICT**

In this study the key barriers to teachers fully exploiting the potential of ICT, emerged as time constraints both in terms of finding resources and building up skills in ICT use, fears over reliability of equipment and lack of training. There were also some concerns around lack of available resources in certain subjects.

Time issues became less significant the more the teachers used ICT in the classroom. Because of the big bang rollout strategy implemented, the teachers
immersed themselves in the technology and the more intense their engagement the quicker they learned. The learning curve was steep but proficiency built quickly through constant usage, and skills that were learnt were built on rather than lost over time, as can happen when usage is more intermittent.

Teachers reported that while they spent more time preparing lessons in the early stages they were confident that building a bank of resources would ultimately reduce workload. They also reported increased efficiencies in preparing ICT mediated lessons as their skills improved.

While training remains a big concern for the teachers in this study they are aware of the training they need but expressed a desire for the training to be tailored to their specific needs.

In order for teachers to embrace ICT and integrate it in a meaningful way it is vital that these barriers be minimised.

**Recommendations**

School ICT budgets should include provision for training. Time should be made available to teachers to carry out this training. ICT training should be followed up immediately by hands on experience in the classroom to hone and build on the skills learned. Training should be tailored to the teacher’s specific level and needs. Online self paced tutorials may be the best option to achieve this. Teachers should be encouraged and facilitated to share resources and knowledge.

**6.5 Summary**

This study shows teachers to be generally enthusiastic and positive in relation to integrating ICT into education. It also highlights a number of barriers to achieving this integration, including training, equipment issues, time constraints and limited teaching resources. These barriers need to be addressed in a
meaningful way if this teacher enthusiasm is to be fully harnessed. The teachers are the ones that will ultimately drive the change in the classroom and they must be on board for it to happen.

When properly consulted, resourced and supported, teachers can and will drive the process forward, building their skills and confidence while improving student learning outcomes through effective ICT integration in the classroom.

Leadership must come from the top down and there must be a clear school vision for ICT that is collaboratively planned and regularly reviewed. The measurement of success should not be the number of PCs or IWBs installed in a school but the level and quality of ICT usage among teachers and its impact on student outcomes.
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**URLs:**


Appendix A

ICT Questionnaire
ICT Questionnaire

Please circle one of the following class groupings:

I teach a Junior Class / Middle Class / Senior Class / Support class

<table>
<thead>
<tr>
<th>My General ICT Skills are</th>
<th>Poor</th>
<th>Average</th>
<th>Above average</th>
</tr>
</thead>
<tbody>
<tr>
<td>My ICT confidence is</td>
<td>Poor</td>
<td>Average</td>
<td>Above average</td>
</tr>
</tbody>
</table>

How would you rate your knowledge of

<table>
<thead>
<tr>
<th>Internet use</th>
<th>Poor</th>
<th>Average</th>
<th>Above average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office applications (Word, Excel, PowerPoint)</td>
<td>Poor</td>
<td>Average</td>
<td>Above average</td>
</tr>
<tr>
<td>File management – creating new files and folders</td>
<td>Poor</td>
<td>Average</td>
<td>Above average</td>
</tr>
<tr>
<td>Basic PC Troubleshooting</td>
<td>Poor</td>
<td>Average</td>
<td>Above average</td>
</tr>
<tr>
<td>PC architecture</td>
<td>Poor</td>
<td>Average</td>
<td>Above average</td>
</tr>
<tr>
<td>Network Architecture</td>
<td>Poor</td>
<td>Average</td>
<td>Above average</td>
</tr>
<tr>
<td>Using search engines</td>
<td>Poor</td>
<td>Average</td>
<td>Above average</td>
</tr>
<tr>
<td>Setting up user accounts</td>
<td>Poor</td>
<td>Average</td>
<td>Above average</td>
</tr>
<tr>
<td>Running anti-virus scans</td>
<td>Poor</td>
<td>Average</td>
<td>Above average</td>
</tr>
<tr>
<td>Updating software (flash, anti-virus, adobe etc)</td>
<td>Poor</td>
<td>Average</td>
<td>Above average</td>
</tr>
<tr>
<td>File extensions (.doc .xls .jpg etc)</td>
<td>Poor</td>
<td>Average</td>
<td>Above average</td>
</tr>
</tbody>
</table>

How frequently do you use the following:

<table>
<thead>
<tr>
<th>Online banking</th>
<th>Weekly</th>
<th>Monthly</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check personal email</td>
<td>Weekly</td>
<td>Monthly</td>
<td>Never</td>
</tr>
<tr>
<td>Online shopping</td>
<td>Weekly</td>
<td>Monthly</td>
<td>Never</td>
</tr>
<tr>
<td>Home internet browsing</td>
<td>Weekly</td>
<td>Monthly</td>
<td>Never</td>
</tr>
<tr>
<td>Social Networking sites</td>
<td>Weekly</td>
<td>Monthly</td>
<td>Never</td>
</tr>
</tbody>
</table>

Please rate the following Statements:

<table>
<thead>
<tr>
<th>I am comfortable using ICT in the classroom</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Don’t Know</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using ICT will undermine my control as a teacher</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>------------------</td>
<td>----------</td>
<td>------------</td>
<td>-------</td>
<td>----------------</td>
</tr>
<tr>
<td>I’m fearful I’m not as ICT literate as I should be</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>I’m nervous the students know more about ICT than I do</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>If I had a choice I would not use ICT in teaching at all.</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>ICT will increase my job satisfaction</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>Introduction of ICT will reduce my workload</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>Introduction of ICT will improve the quality of my student learning</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>Introduction of ICT will increase student motivation and interest in lessons.</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
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<tr>
<td>ICT will increase my student’s concentration span</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
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<tr>
<td>My lessons will be more interesting for</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
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<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
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<tr>
<td>the students if I use ICT</td>
<td>ICT will benefit certain types of students more than others</td>
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<td></td>
<td>ICT benefits high achieving students</td>
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<td></td>
<td>ICT will allow the students become more involved in their learning and increase intrinsic motivation</td>
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<td></td>
<td>ICT will be of use in differentiating learning for SEN students</td>
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<td></td>
<td>Investment in ICT for schools is money well spent</td>
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<td></td>
<td>I know how to use ICT in my teaching</td>
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<td></td>
<td>I know where to get software resources for teaching</td>
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<td></td>
<td>I have enough time to find ICT teaching resources</td>
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<td></td>
<td>ICT should be taught as a discrete subject rather than</td>
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<td></td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
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<tr>
<td>I am able to integrate ICT into my subject areas.</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>ICT is more suited to some subjects than others.</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>IWBs in classrooms are more important than a PC room?</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>I am happy with the level of ICT support in the school.</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>I know what to do if I have a technical problem with a piece of equipment</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>I would have a go at diagnosing a problem myself before calling for technical assistance</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>I need further ICT training</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>I know the areas in which I need training</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>I managed to use my PC Room time without compromising my timetable</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
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<td></td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
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<tr>
<td>My lessons this year were better when I used ICT</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>I spend more time preparing lessons that integrate ICT</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>My ICT skills have improved this year</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>My propensity to use ICT has increased with usage</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>I have shared ICT resources with other teachers</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>I felt under pressure to use ICT this year</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>The ICT (equipment, network, broadband) worked reliably this year</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>ICT issues were fixed in a timely manner this year</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>Suddenly having all this equipment made available last September was better than it appearing piecemeal</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don’t Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
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</tbody>
</table>
drip fed.

A computer room is more useful than a shared trolley of laptops.

My student’s PC skills have improved this year.

Please answer the following Questions:

Did you have a computer timetable in your classroom this year?

_____________________________________________________________________
_____________________________________________________________________

List the 3 subjects where you used ICT more often this year:

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

List the subject where you had most difficulty finding resources:

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

Of your weekly PC room slots, how many did you use on average (answer to nearest of 25%, 50%, 75%, 100%)

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

Any other comments you would like to add:

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

90
Interviewer:

You are all very welcome to this focus group meeting. As you know I am conducting research into the impact of ICT on teaching and learning but in particular I am interested in your views on the fact that this school went from a very poor infrastructure to becoming a very well equipped school this year.

I have selected this group on the basis that we have a broad cross section of the class groupings from the Junior cycle to Middle cycle and Senior cycle.

I would appreciate if you can be as honest as possible in your feedback, highlighting any negatives as well as any positives. If there have been any barriers to successful use of ICT please highlight these during our conversation.

These are some ground rules for the discussion:

• Only one person speaking at a time.
• Speak from your own experience rather than generalizing
• Don’t be afraid to disagree or challenge others in a respectful way.
• Participate as much as possible
• The goal is not to agree but to gain a deeper understanding.

Interviewer:

Can you please comment on the statement “ICT undermines my control as a teacher”
Teacher A:

I have the opposite opinion as it adds to your discipline as it makes the lessons more interesting as the kids are less likely to be distracted when they are more engaged in something that they are interested in. Children tend to be more willing to participate when for example you are doing a history lesson and if you can bring up PowerPoints and allow the children to come up to the board and allow them more interaction and thereby adds to your ability to maintain discipline.

Interviewer:

Would you ever feel that perhaps with using ICT to teach that the children may know more about how the ICT works than you do and if so how would that make you feel or would it bother you if that were the case?

Teacher A:

I would not be bothered or embarrassed by it.

Interviewer:

Is there anyone else maybe have experience of this perhaps more so in the senior classes where there may be greater potential to be undermined by this?

Teacher B:

No, I don’t think it undermines but rather it enhances your teaching and allows you access to lots of resources on-line. Regarding whether the children may have more knowledge about the ICT functionality, then they can offer information and thereby further enhance the lesson.

Teacher A:

I had a senior class this year and learned a lot about ICT from the students.

Interviewer:

What are the benefits of ICT on teaching both for the student and the teacher?
Teacher B:
ICT makes the learning more interactive for the children – by not just sitting there reading out of a book or sitting there listening to you reading out of a book. Also they no longer have to continually write in their copybooks but they can do projects, PowerPoint presentations and research on the internet which makes it more interesting for them.

Teacher D:
In relation to infants if for example you are going through points with them in class such as in nature and maybe you mention frogs, then straight away you can almost immediately bring up for them, on the internet, information on the lifecycle of the frog and you do not need to flick through books or pictures in that way for similar information. It works well to really engage the junior classes and focus their minds on the topic in question.

Teacher D:
Yes it allows you to raise items that you may not have prepared information on but with the internet access and white board you can Google the topic and cover it there and then and engage the children on it.

Teacher A:
I find it engages students that would normally lose concentration when learning from a book.

Teacher B:
The fact that they are used to watching TV at home, the whiteboard is almost comparable and engages them straight away when you bring up something on the screen.

Interviewer:
Has anyone noticed that after having a good lesson with ICT and you then move to a pure paper based lesson, that perhaps there is something missing and that it is not as captivating for the children?
Teacher C:
No I think that you have to have variety in the classroom and that it cannot be all about the board and interaction. They need to be….

Teacher B:
Sometimes the lesson just calls for pen and paper. You don’t feel that you have to add the computer to every lesson to engage the children.

Interviewer:
How has including ICT teaching methods impacted your preparation and planning? In particular has it made it easier, has it made it harder, does it take more or less time, do you feel more prepared if you have included ICT?

Teacher E:
I think that sometimes once you have found the right website and the right resources that this does allow you to eventually to cut down your preparation time. However, finding the right information sometimes is difficult and that does take time. Having said that once you do find them you will obviously have the resource forever and the correct links etc. for say teaching that class again but finding them and preparing for example presentations and flip charts etc is quite time consuming.

Teacher B:
Sometimes as already mentioned you can at short notice Google something and this is a benefit to add to your preparation as you can perhaps add a You-tube video to enhance your lesson.

Interviewer:
Going back to the question do you feel that ICT teaching methods have extended your preparation time or has it reduced it?
Teacher E

It can take a long time to find resources and prepare lessons on PowerPoint but once the work is done it saves time down the road.

Teacher F

I am getting smarter at saving my presentations and bookmaking good websites so that I can use them again and again.

Teacher A:

I agree with the previous point made in that initially it takes time to look up particular topics and subjects. You sometimes might spend for example an hour just researching and still need to finish your preparation. But likewise as previously mentioned if you happen to have the same class for a number of years in a row then you can just refer back to material previously prepared with a lot less time and effort required.

Teacher E:

I suppose it would be more appropriate to say that you are having to invest more of your time initially rather than negatively saying that preparation using ICT is taking up a lot more of your time all of the time. You tend to put in more time for the first year that you have the class but it is rewarding in the years that follow in that you still have that class to teach and the links and PowerPoint’s etc are saved for future reference. This is also a lot more worthwhile than a chart that you may display for five minutes that is worn and frayed after 2 to 3 years and needs replacing.

Teacher A:

I feel that it is a lot easier now for students graduating and preparing for classes having the use of ICT equipment to prepare for classes. When compared to when one left college 15 years ago and had to put a lot of emphasis on the preparation of manual teaching methods such as flip charts etc. A lot more time was required initially for each class than nowadays. Preparation these days is done on a memory stick and the ‘cut stone and concrete’
resources that are now available to graduates makes life a lot easier.

Teacher C:

I have noticed that students doing teaching practice are uploading their lessons on the classroom laptop and it is available to the classroom teacher which is a great example of sharing of resources and using ICT for this purpose. This can then be further shared from class to class and when the teacher changes for one year to another that teacher can also share their ICT resourced work with the incoming class teacher. Further the incoming teacher is taking over the classroom laptop and will have access to the saved files and links and other class information that the previous years teacher had prepared. Additionally over time when you build up experience of looking up websites you find you are building up a knowledge of these for each subject over time.

Interviewer:

What about saving information and links and book-marking are you becoming more efficient and proficient at this? For example if you had topics that you covered this year with your class and you have the same class next year would you be confident that you would remember what and where you saved your subjects and topics from this years e.g. on memory stick/laptop for next year?

Teacher E:

Yes we are definitely good at this and additionally we are good at sharing the better websites with each other and lists have been circulated as well of the good websites which is useful. Also the Mary Immaculate Training College have a list of resource websites that some teachers use and share among themselves and this is divided into classes and subjects also teachers know for sure that if there is a particular category or area that they are researching then it will be found using these lists.
Teacher B:
We are getting better at sharing stuff between us as a staff. It’s so easy to share files.

Interviewer:
Now I have 2 questions that I think we have half covered already. The first is are my lessons more interesting for students when I include ICT in them? How many people would agree that the classes are more interesting?

Teacher D:
You have to have a variety. Teachers still feel that you could become over-reliant on the interactive white board and this would not be good for the students. Teachers have noticed that when ‘teaching practice students’ are with them they notice that they have an over-reliance on the interactive white board and they do very little work using the children’s hands and concrete materials. Children would not for example sit in front of the TV all day as this would not be good for them and in the same way therefore they need exposure to other teaching methods which exposes them to non-computer type work. Having children use their hands and concrete material has to be part of their day. This in particular has been the experience in the junior classes.

Teacher E:
I have seen children that would normally be slow to write, produce excellent work when writing on the computer – maybe it’s because the work produced on the computer looks so professional.
Teacher B: Also in senior classes when you use PowerPoint it can engage the children for a while and it makes the lesson more interesting rather than reading it from a book but in the senior classes if you want pupils to take down something then it becomes no more exciting for them than reading it out of the book. While its easier for the teacher, in that you just scan it and put it up on the board, this it does not necessarily enhance the lesson for the student as from their point of view it is not any different than having it read from a book.

Interviewer:
For a lesson where part of the introduction might be on the white board as an interactive resource and then follow it with a written lesson, do you feel that the interactive element always adds to the lesson?

Teacher B:
In the senior classes you would find that there are very useful resources such as quizzes at the end of some lessons and even after written exercises the children will still really engage as they enjoy quizzes very much and the IWB is a great facility for this purpose. Also having the wireless mouse that you can move around the room allows each child to participate with ease in the interaction. Having the active voting sessions is another very useful facility.

Teacher D: Over-use is always a danger as the children will get bored however, if the variety remains. If you put on video every now and again it remains interesting but if you had video clips every day the novelty factor is lost.

Interviewer: Which students benefit more from ICT is it the strong students or the weaker students or the students that might go to learning support for example?
Teacher C:

I find that from bringing my class to the computer room once a week that we are working our way through different websites – Crickweb, Topmarks and we are on the Literactive now, and I find that it is great for both sets of children because they are all working at their own level. They are introduced to the websites in the classroom and when they go down to the computer room you look at what they are all working on and they are all on a different page in the website and therefore it caters for both groups of children and they are all work at their own level.

Teacher F:

It depends on the type of learning – most infants if they are not using their fingers for example in a maths lessons – something concrete like that  some learners learn by looking and some learn by hearing so it depends on the learning style.

Teacher E

I had a student with dyslexia and the only time he was confident enough to write was on the computer and he was a whiz at spell check.

Interviewer:

Does ICT allow the stronger student to take things to the next level and work independently?

Teacher B:

It can but not necessarily always at school. I had some doing power point presentations (a project) and some of the children were bringing them home and coming back with very good work and others did not seem to have the same access at home. Or others may have been limited at what they were able to do at school but then they were great at helping each other and learning from each other.

Interviewer:

Does it improve group working?

Joint response:

Yes
Teacher A:

Its good for their confidence. I find with some pupils in my class who find it very hard to concentrate for example in class at a book or written work, one in particular who is always on the wrong page in class but I notice that down in the computer lab he can be one of the best in the class. Its great for the child’s confidence. Sometimes the other children may go over and ask him how to do things on the computer and I would rate him as one of my weaker pupils academically. So it is great for his confidence.

Teacher C:

I find that when they are down in the computer lab and they are on a website that has sound and requires the use of headphones that you could hear a pin drop they are so engrossed in what they are doing. This is also relevant to the earlier point on control and discipline as they put their hands up when they need you and you would rarely get that discipline in the classroom. The ICT room can give you great discipline.

Interviewer:

Let’s talk about integrating ICT with other subjects and not just working with ICT as a separate subject. How do you manage to integrate it with such subjects as history, geography, science, English and so on? Was it easy to integrate?

Teacher B:

Absolutely yes it was easy to integrate. In particular subjects as history and geography which have such limited teaching resources, there are lots of websites that you can do activities on, show children historical videos to add variety to the lesson. Its great.

Teacher D:

For some children what the teacher says goes in one ear and out the other when it comes to history and geography – when they watch a video clip or animation they can focus and take it in.
Teacher A:
Subjects as well such as Gaeilge – there unfortunately are not enough websites. It would be really great if you had websites which you allowed you to do activities such as matching up etc but there are very few. Whereas for other subjects as the previous speaker mentioned there is an endless supply of ICT resources. Another subject that do not have enough websites is SPHE (Social Personal and Health Education).

Teacher B:
In English sometimes a lot of websites are very Americanised and geared towards the American curriculum – these are not at all suitable.

Teacher C:
In the infant classes this year we started of the year doing numeracy and we would have integrated whatever they were doing through activities on numeracy and towards the end of the year as we moved on to literacy we were integrating with literacy activities alphabet etc. So for infants definitely for numeracy and literacy integration with ICT was easy.

Teacher D:
There are useful resources on phonics also which are useful for infants and we also integrated these into our teaching.

Teacher C:
Yes there are a lot of useful interactive websites for infants Topmarks, Crickweb, Literactive, ABC, ’Star Fall,

Interviewer:
Has anyone used ICT to carry out science experiments and have ICT as the only means to carry out science experiments?

Teacher B:
I have a great website that I use for biology called health.org. It outlines details on for example the skin, the eye and the ear and all body parts; it’s a lovely interactive website with text and then at the end there is a quiz. The children themselves as well as myself with them, use it a lot.
Teacher A:

BBC science website for children is also a very good website. It is very interactive and helps them to visualize concepts.

Teacher F:

Its also helping children to practice experiments, e.g. we are doing it in class and they are also doing it themselves on the computer and so it is helping them to practice without you having to remind them and be with them doing it.

Interviewer:

Technical problems this year - did you have any technical problems that would make you say I am not going to use ICT again as it is unreliable.

Teacher B:

I thought things went really well and I never really worried about the network going down or the internet not working 'cos to be honest it really didn’t.

Teacher A:

Now as we are starting year two I would expect that we will have a lot of expense with projectors and bulbs and laptops.

Teacher B:

All the IWB projectors are gone dim and will need new bulbs.

Teacher A:

ICT for schools is a big investment and maintenance accordingly is a heavy cost for schools. When you look at the long term requirement it is expensive for a school.

Teacher F:

The amount you are going to spend on a box of chalk versus what you spend on IWB.

Teacher B:

But having said that I don’t think that anyone is not going to use the ICT equipment because it is not working properly. I don’t felt that anyone has stopped using equipment because of problems – the problems experienced have not been that severe.
Interviewer:
You can trust the systems enough that the internet would be up and that the server would be up.

All:
Yes

Teacher F:
Yes and that the problems are manageable in the short term and that they can be fixed without too much difficulty.

Interviewer:
Tell me about your comfort levels and confidence with regard to using ICT and how much you have improved throughout the year with using ICT with the use and exposure in the last year. Maybe if we going around the group and if you each could tell me if at all you feel it has improved or a little or what?

Teacher C:
Yes I definitely fell more comfortable as I feel I would have been at a low level and I am quite happy at my low level but everything I achieve at that low level is adding to my comfort in using the equipment.

Teacher B:
I would say yes I feel I have improved a lot and I would now opt to use the computer now in favour of doing something manually as I would find it to be much more efficient for preparation etc. e.g. worksheets etc. I enjoy searching for websites and finding interesting areas for the children to learn from.

Teacher A:
My knowledge would still be pretty basic but I can get around the system and I have improved but if I have any problems I ask people around the school as there is plenty of expertise in the school. It has improved but it would still be quite basic.
Teacher B:
The availability of equipment this year gave me lots of motivation to use ICT and the more I used it the more comfortable I became.

Teacher F:
I suppose it is like anything that the more you use it then the more you know how to fix something etc, if I try one website and that does not work out then I can try another website etc and I would not feel that I am an expert but my comfort level has improved.

Teacher E:
Yes I would be comfortable and would definitely be more comfortable than last year. I did a summer course for the week and I did always feel that I could do more and so after the training for the week I really felt better equipped and prepared to use the equipment. So the combination for me of regular use and having the training makes me feel I have improved and am using it better.

Teacher A:
Yes I definitely have improved and in particular with using ICT in the classroom because having infants for the last few years the big thing was if you tried to put 2 working on the computer in the room and something would go wrong you would be constantly distracted to the 2 from the class at the computer and I possibly did less because of this but this year now I am much more comfortable in using them in the class. I use them every day and I give the children 20 minutes access to the computers in the class and this is where I have become more confident by finding the time and using them more in the classroom.

Interviewer:
Is that because they are infants they are better able to use them because of the computer room experience?
Teacher D:
No I think that it was because we have been doing it since the start of the school year in September and the fact that we have more available computers and I am not so worried that the children will damage them and therefore I am more relaxed and more confident myself.

Teacher C:
The extra computers now also allows a whole group to work on computers now whereas before it might just be 2 children and now the whole class block of say 4 can work at the same time. As a teacher you are not trying to timetable 2 at a time to use computers and life is easier with the extra. That was very difficult previously and a negative to computer usage in the classroom.

Interviewer:
What element of the computer equipment has been more beneficial this year has it been the IWBs in the classroom or the fact that we now have a computer room or something else? If you were to pick one which is the better investment?

Teacher C:
Both

Teacher B:
Does the internet qualify?

Interviewer:
The internet is a given really but what I am referring to really is having a dedicated computer room with the kids working more independently with computers or for the teacher using lessons to teach through computers, which is the more beneficial?
Teacher B:

I suppose I would tend to do more of the teaching the lessons through it rather than regularly going to use the computer room every week. I would tend to go to the computer room when I think that a particular lesson would be enhanced by going down. The fifth class children (10/11) did one French lesson per week in the computer room and that was excellent and very interactive and there were programmes pre-prepared.

Teacher A:

I find the computer room excellent as I go down every week and the fact that you know that you have an hour every week – its timetabled, you organize your lesson. We covered Microsoft Word and PowerPoint this year and these are 2 big things that they have done and a lot of them would not have had any experience at all at the start of the year. I notice that they have all picked up both of these and not only through the one hour a week in the ICT room but also most of them at home would also do follow up through having the website as homework they would carry it on at home that way and it really brought them on. The computer room resource does benefit them greatly.

Interviewer:

Would you say that when you compare this ICT exposure that these children now have compared to previous classes you would have thought that this has benefited the children through much more contact time in the computer room and therefore much better experience with ICT at school.

Teacher A:

I would yes. I find the computer room resource excellent.
Teacher F:

Having the computer room avoids unnecessary disputes over trying to divide computer time in the classroom where we previously only had 1 or 2 computers in the classroom. The computers in the room also tended to distract from core subject time for the 2 individuals who might still be working to finish something on the computers and their time has gone into core lessons. Whereas the computer room allows everyone teacher and pupils to work on ICT equipment together and deal with the same subject matter at the same time whether problems or learning. Its much more a more efficient way of working for all.

Interviewer:

Training in ICT. Do people feel that have enough training and just need to continue using the equipment and learn as you go along or if you feel you need specific training what do you think you might look for?

Teacher B:

I think that there is always more that you can learn about the ‘active inspire’ (Interactive whiteboard software) say more resources on how to use it. We seem to get familiar with elements of it and we use those all the time. I’ve seen examples of what it can do and I don’t know how to do those things or how to go about it. So on-going training would be great.

Teacher E:

I did a Summer course (IWB training) and after the training I felt better equipped and prepared to sue the equipment. The combination for me of regular use and training makes me feel I have improved and am using it better.
Teacher F:
I would like to know more about troubleshooting so that if something goes wrong I know how to fix it. I would like more training in that area as well. Also when other teachers ask you for help its nice to have in-house knowledge. Sometimes it can be a simple solution and it would be good for the school not to have to incur the call-out fee for simple things. Perhaps if someone on the staff could be an IT Technician as well as being a trained teacher.

Interviewer:
Do you think that the Department of Education and the school are genuinely committed to training on ICT for teachers and really look after the needs for training?

Teacher F:
The principal in the school has always been extremely interested in ICT and in having computers in the school. Barefield NS had computers when no other school had computers. The Department of Education don’t appear to be as committed as the principal of the school.

Teacher C:
I think that it is up to the teachers to go off their own bat and in their own time to arrange for training. I did a course last summer and it was not what I needed. It was too basic and I already knew how to do what they taught.

Teacher B:
There is not a lot of support for those who are afraid or not experienced in using ICT unless you go and do a summer course yourself. The onus is on you as an individual teacher to do some training.

Teacher F:
You can do an ECDL course or something like that.
Interviewer:
Do you think that newly qualified teachers coming out of training college now have an advantage over established teachers? Are they better than established teachers?

Teacher F:
You mean the fact that the ICT is well covered with them in college? They do have an advantage. The IWB training that they would have, would be streets ahead of what the established ‘non-ICT college trained’ teachers have.

Teacher B:
Not necessarily as they will have to keep up to date with training over the years themselves. Anyone using it is learning every day so it balances out over time.

Teacher A:
The newly qualifieds do certainly have a lot more exposure to ICT while they are in college e.g. all of their assignments are done through ICT – whereas years ago people were writing up their assignments.

Interviewer:
Back to your earlier point (Teacher D), do you think that newly qualifieds are over-reliant on ICT teaching methods?

Teacher D:
I do feel that as a teaching method the students that I have worked with in the infant classes are totally over-reliant on the IWB to the point where the children are actually sick of looking at the IWB.

Teacher B:
I had an example where I had a student who had prepared a lesson on the IWB and her computer would not cooperate on that particular and the training student did not know what to do – she did not have a back-up plan or any alternative teaching method to use.
Teacher D:
Other teachers have had this experience with student teachers also and it highlighted to them the lack of training in what to do when the ICT equipment lets you down and the need to be able to manage and teach without it – where established teachers have the advantage of experience in working without ICT.

Teacher F:
It’s almost like colleges say the IWB, internet and laptop are the way to go and there is no ‘what it they don’t work’ plan.

Interviewer:
Are established teachers in danger over time of becoming over reliant on the use of ICT?

Teacher F:
It’s still too soon to say as we really are only using ICT properly for a year now.

Teacher B:
I still err on the side of caution and have a manual backup for lessons.

Teacher D:
ICT is great when used to your advantage but not to do your job for you. Too much computers is not good for kids as it can be too solitary.

Interviewer:
Do the kids get less time ‘doing’ when teachers teach using PCs. Is it back to the workbook culture? Are they doing less independent work from scratch themselves?

Teacher B:
I think they do more work because instead of me photocopying a worksheet and them filling it in I display it on the board and they have to take it all down from the IWB.
Interviewer:
One final Question. If there was one thing you would change about how we as a school deal with ICT what would that be?

Teacher B:
More access to relevant training. We have lots of different levels of ability among the staff so we all have different training needs. If we all get the same training then that’s not going to work. I’ve been to 2 sessions like this and it was a problem. There was no progression for me.

Interviewer:
What about resources?

Teacher B:
I think we are ok now that we are building them up and bookmarking.

Teacher A:
It’d be great if the junior kids had more timetabled slots in the computer room. Maybe an hour and a half per week. Their slot is too short as it can take them a long time to get started and they are slow at typing.

Teacher D:
The infants of today will be fantastic on computers by the time they reach middle and senior classes.

Interviewer:
Would we have been able to say that about our school a year ago – that all the children would be proficient on computers by 3rd or 4th class?

All:
Definitely not.

Interviewer:
Thank you very much for participating and being so open and honest in your feedback.
Appendix C

Observation Records
Over the course of the research the author observed practice in the school with regard to patterns of ICT usage and teacher’s attitudes towards ICT use. Much of this was qualitative and was based as much on sentiment as anything else.

In the months preceding the opening of the new school extension, ICT options for the new school was on the agenda at two staff meetings. Teachers were asked for their feedback on the best way to spend the ICT budget that was allocated by the Department of Education for the new school building.

There was a sense of excitement at the idea that the school would be properly kitted out for ICT. The staff were pretty divided over whether we should invest in a PC suite or buy 30 laptops with a charging trolley and wireless access. Everybody had a chance to provide their input and it was agreed that a sub group of 4 teachers would be tasked with making the final decision.

The PC room was timetabled from September and usage of the allocated slots was high from the first week back at school. Over the course of the year the computer room usage was tracked using a tracking sheet that teachers ticked when they used an allocated slot. The average usage was 80% over the 9 month period. There was great enthusiasm from the students for the new facility. This enthusiasm was equally matched by the teachers and there was a real buzz about it. There were one period in the year when usage dropped to 50% which was around the school Spring concert when classes were spending lots of time on rehearsals and curricular time was at a premium.

There was a sense of collegiate atmosphere among the staff in getting up to speed with the laptops and IWBs. More knowledgeable staff were assisting others and there was lots of talk in the staffroom about new features they had discovered on the whiteboards. This phenomenon persisted throughout the year and there was much sharing of resources and good websites using the school server and via email between teachers.

The author observed 2 ICT based lessons over the year.
The first was in a Junior class where I observed a maths lesson on number sets. The lesson exposition was followed up with an interactive web resource from Woodlands Junior school Kent. The engagement from the young children was fantastic and they were attentively waiting their turn to come to the board to match a set by moving objects on the IWB. What was particularly remarkable was the attention that all the children paid while others were doing the activity. There was a real sense that the children were fully engaged and consolidating what they had learned.

The second lesson observed was a fifth class science lesson where the children were learning about the three states of matter – solid, liquid and gas. This lesson took place in the computer room. Initially the teacher explored the theory with the children on the interactive whiteboard. She then introduced them to a web resource on BBC.co.uk/schools which was a virtual experiment for children. Each child then conducted their own virtual experiment on the PC and recorded their results. The children could vary the temperature to change the state of the liquid. The graphics showed clearly how the molecules behaved differently at different temperatures which would not necessarily have been apparent with a real life experiment. It was clear that every child fully grasped what was happening due to the fact that they could conduct their own experiment for themselves. In a normal classroom situation some children could be on the periphery of work like this due to group dynamics. The activity complemented the lesson very effectively and the learning objectives were achieved for the students.

Over the course of the year there was a clear comfort level creeping into the teachers’ practice with ICT and there was a sense of it becoming second nature.
Appendix D

Comments from Questionnaire

Details of additional written comments on the questionnaires.
“ICT has been a joy all year, reliable in the main and good broadband speeds and good laptops. IWB is taking time to learn but that’s par for the course”.

“As principal I am delighted with the positive response of the teachers to using the computer room”.

“Overall I am very happy with the teachers positive response, irrespective of skill level to the ‘introduction’ of all the new computer equipment that came with the provision of the new school facilities”.

“I need more training in how to use ICT in my lessons”.

“While I am confident with ICT I do not feel as confident using it for teaching and it’s probably because I’m afraid it will let me down”.

“Preparation of lessons involving ICT can be time consuming but it’s getting easier”.

“Confidence around ICT has increased due to its availability throughout the school”.

“As I had a senior class this year I felt I learned a lot of ICT from the students”.

“They also learned a lot from each other by pairing children who have a lot of ICT experience with those that had less”.

“The number of PCs available in the classroom made a big difference to the amount of time the children had access to the computers”.

“The computer room has made a big difference. The children are always enthusiastic and have undertaken independent research at home to have extra material prepared for each weekly slot. Although the children are working at their own computer I have observed much more teamwork and co-operation between them and they are all willing to help each other and learn while there”.

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“Students have to learn basic ICT skills so sometimes you have to do specific ICT lessons that are hard to integrate into other subjects”.

“I find that some children that are hard to motivate to work, especially writing, take more pride in their work on the computer and are much more motivated”.