09

**Harnessing Technology Strategy**

**Celebrating Outstanding teachers**

**Andrew Goodwyn, Aristidis Protopsaltis, Carol L. Fuller**

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# Executive summary

This report summarises the project undertaken by the University of Reading on behalf of Becta. The project focuses on how expert practitioners use ICT in teaching. The focus of the survey is first, on what constitutes good teaching for outstanding/expert teachers and second on their use of ICT (Information Communication Technology). The survey included teachers and teaching assistants (TA) from infant, primary and secondary schools. They were nominated by their peers and senior colleagues and have been characterised as either ‘expert’ or ‘outstanding’. The survey was regional in scope. The University of Reading has carried out the survey from June 2008 to April 2009.

The key aims of the project were to identify:

* What qualities practitioners think are needed for quality teaching
* How practitioners develop their expertise
* How subject expertise and ICT/Technology expertise interact

Another key aim of the survey was to collect information that will help to develop a typology of emergent best practices.

# Implications for policy

The key premise of the research was to investigate what the current workforce, both teachers and teaching assistants, actually do with technology. For example, the research did not begin with identifying the numbers of computers in schools in relation to pupils or how much money had been spent per capita on technology etc. Its fundamental aim was to identify emerging best practice amongst teachers who were seen firstly as, good teachers, and secondly, as effective users of technology in their teaching.

Previous research, especially that funded by Becta, has tended to investigate the generic characteristics of pedagogy in which ICT is somehow being used. It has also tended to focus on environments in which the ICT infrastructure is strongly established. The two most substantial reports, one on ICT and Pedagogy, the other on ICT and Pupil Attainment] concluded that there was a lack of real research evidence about what we know about effective teaching employing technology (Cox et al., 2003; Cox and Abbott, 2003).

There is a significant and welcome trend towards the recognition that the individual teacher is the key variable in any system. The influential Mckinsey Report (2007) reviewed the top performing education systems in the world and concluded that: ‘The quality of an education system cannot exceed the quality of its teachers’, ‘the only way to improve outcomes is to improve instruction’ and, ‘high performance requires every child to succeed’.

Education systems are rightly concerned to identify their best teachers, in England, for example, through the Advanced Skills Teacher and the relatively new, 2008, Excellent Teacher category. Other countries have comparable schemes e.g. Highly Accomplished Teacher and also Master Teacher [USA], Chartered Teachers [Scotland and Wales], Advanced Skills Teacher [Australia]. However, the AST scheme in England, has about 4,500 teachers, that is less than 1 in every 100 teachers; the AST scheme was not, therefore, used as the distinguishing characteristic for the sample. This research is therefore premised on identifying outstanding teachers who have also become very effective users of technology.

We have characterised these teachers as ‘***Digi-teachers’*** [see below for an extended explanation]. These teachers are not determined by their age, although the newer generations of teachers have more such teachers. They are also not characterised by the attractions of gadgetry per se. They are ‘Digi-teachers’ because it is normal for them to make best use of digital and other technologies, using technology is in harmony with their fundamental teaching approach. Finally they are concerned chiefly with the learning of their students and have a strong motivation to connect with their students’ lives, therefore they feel an imperative to embrace technology.

# Recommendations for Policy

The workforce contains a number of very good teachers who are effective and enthusiastic users of ICT [Digi-teachers], the proportion of those teachers within the profession is not known; **more such teachers should be identified and their innovative practice should be disseminated**.

Identifying and supporting those teachers would lead to many benefits to students and other teachers; **Digi-teachers make more difference than the number of computers in a school, therefore measuring the number of such teachers per school would be valuable.**

Most of these teachers are ‘self taught’; **they provide excellent role models for their colleagues and should have more recognition.**

Although ‘self taught’, such teachers identify that they would benefit from both more training and extended time to practice with innovative technologies; **Digi-teachers should be given release time to further improve their practice and to help others.**

Many teachers would value Teaching Assistants who are very competent with ICT; **Teaching Assistants need more ICT training**

Most teachers do not know the ICT capabilities of their Teaching Assistants; **there is a need to audit the ICT competence of Teaching Assistants.**

**Policy should shift towards developing and supporting teacher expertise rather than an obsession with technology itself and would be better informed by new research such as:-**

**Research focusing on defining expert use, rather than extensive use.**

**Research producing more qualitative insights e.g. case studies of Digi- teachers.**

**At least some research being more longitudinal in perspective.**

# Key findings

The findings of the current research can be separated into four broad categories. First, the demographic characteristics of expert practitioners, second the views of expert teachers about good teaching and the qualities that a good/expert teacher needs to have. Third, their relationship with technology, do they use it, how they use it and what are the benefits for themselves and for the students. Last, the role that they believe that teaching assistants play in using technology effectively.

## Demographic characteristics of expert teachers

The data included details about their age, gender, degrees, teaching subject, specialism in a subject, years in teaching, and number of schools worked in and responsibilities at their school.

The analysis revealed that the experts who took part in this study were relatively young. More than half (53.7%) of the interviewees were between 35 and 44 years old, while another 18.5% were between 25 and 34 years old. All teachers had a University degree while that was not the case for the teaching assistants, where only one had a degree. The majority (22.2%) of the teachers had a degree in Education, while only a 3.7% had a degree in ICT. On top of that, 83.7% of our experts did not have ICT as a main teaching subject. Moreover, a large proportion (25.9%) of them had no subject specialisation. The vast majority (83.3%) of them had substantial teaching experience, 4 to 15 years, and also they (87%) had worked in less than 3 schools. Finally, almost (88.9%) ninety per cent of the participants had more responsibilities in their schools than teaching alone and 31.5% of them had more than one responsibility.

## The qualities of good teaching/teacher

The interviewees identified the qualities that a teacher needs to have in order to be considered either as good or expert. These qualities can be categorised into behavioural qualities and academic qualities: The behavioural qualities refer to personal characteristics that are not solely important to teaching, but are useful in many aspects of the human life. These qualities include:

* Enthusiasm
* Patience
* Ability to listen
* Ability to inspire
* Ability to communicate/interact
* Liking/loving children
* Ability to understand students
* Ability to empathise
* Sense of humour
* Ability to have fun

The academic qualities refer to skills directly related to professional competence. These skills are essential for the teaching profession and include:

* Knowledge/Love of the subject
* Knowledge of the different learning types/styles
* Creativity and innovation

Some other qualities that teachers recognise as important to good teaching and they could see them in themselves are more task-oriented than the ones before and include:

* Good organisational skills
* Achieving results
* Achieving targets
* Use of technology that students are using and understand
* Keeping up to date with the way that young people are interacting

## Use of technology

The next theme of this research focused on the use of technology and its relation to good teaching. It seems that these expert teachers consider the use of technology as an integral part of their teaching. They use technology in every lesson and use different technologies depending on the subject they teach. The range of technologies varies from interactive whiteboards to the Internet, YouTube, Blogs etc. In more detail, the technologies are:

* Interactive whiteboards
* Cameras
* Video cameras
* Scanners
* Laptops
* PCs
* Projectors
* Internet
* Intranet
* VLE (Virtual Learning Environment)
* Microscopes
* Various software
* Cat-cams
* Lasers
* Email
* YouTube
* Facebook
* Blogs
* Podcasts

An interesting finding however, is the fact that the vast majority of these expert teachers have mastered these technologies by themselves; they are self-taught. The way they have learned is chiefly by trial and error.

Expert teachers recognise significant benefits in the use of technology for both teachers and students. One of the benefits relates to behaviour management and monitoring as well as motivation. They believe that technology improves the quality of the presentation of teaching material and opens up a new dimension for collaboration, communication and material sharing between colleagues. Materials are easily modified, up dated, backed up, distributed and shared among colleagues and students. Therefore, it seems that for expert teachers the benefits of technology can be seen not only in academic achievement but also in administrative and organizational activities where they can save time and become more efficient. Finally, expert teachers believe that there is an increasing expectation by students to use technology in their teaching.

In terms of benefits to students, teachers believe that students are able to deliver high quality work which might not be possible to do so otherwise. They are able to collaborate much easier but also work independently. Teachers believe that technology increases students’ interest during lessons and is inclusive as it helps the less able students with certain tasks, such as writing. Technology enables improvements to teaching and aids the tailoring of learning to suit the needs of learners.

## Teaching assistants and technology

Expert teachers value highly the TAs contribution to their classes. They believe that TA’s are a vital part of the classroom especially when technology is used. However, not all TA’s are technology confident and this can cause extra burden to the teachers. Expert teachers strongly support the idea of having technology ‘savvy’ TA’s in order to take advantage of their full potential. Teachers and TAs alike recognise the importance of the TA’s job and the need for schools to offer TAs the same ICT training as teachers. However, teachers feel that TA’s might sometimes be excluded from training due to limited funds.

# Introduction

The research undertaken by the University of Reading, and funded by Becta was designed to provide a framework describing how outstanding teachers use ICT effectively in their teaching. New technology provides excellent opportunities to support the process of knowledge building; however, the successful use of these tools is dependent upon the instructor and the design of the instruction (Reynard, 2008). We therefore set out to create a vivid description of teacher expertise, based on evidence of what expert teachers believe good teaching is, as well as exploring what teachers do in practice when teaching with ICT. We also sought to understand how the use of technology contributes to expertise. Research about the characteristics of expert teachers and teaching assistants will allow us to improve our understanding of expert teaching and consequently to construct better teacher preparation courses and staff development programs. The majority of the document is dedicated to reporting and analysing the findings of the research, the literature review is relatively brief.

## Expert teaching

There is not unilateral agreement on the definition of expertise in various domains in general and in teaching in particular. Different authors have adopted different definitions of expertise. Although, research on differences between novice and experts in different areas are common, the definition of expertise differs.

Sternberg and Horvath’s (1995) approach to expertise is a good starting point for our research, they define a simple, but robust, model. They identify three main areas where expert teachers differ compared to non experts. The areas are **knowledge, efficiency**, and **insight.** Sternberg and Horvath (1995) argue that expert teachers need very good knowledge of content and pedagogy. They also noted that tacit knowledge is very important and that this knowledge generally increases with experience on the job. An expert in the domain of teaching must have a very good knowledge of the subject-matter content and pedagogy, and must know how to apply teaching knowledge in a particular social and organizational context.

The second area they pointed out is efficiency. Sternberg and Horvath (1995) support that efficiency of expert teachers is related to their ability to automate well-learned skills, as well as their ability to effectively plan, monitor, and revise their approach to problems. Experts typically spend more time trying to understand the problem to be solved, than trying out different solutions.

The last quality that expert teachers must have according to Sternberg and Horvath’s (1995) account is insight. When experts apply knowledge and analysis to solve problems, they are more likely to arrive at creative solutions compared to non-expert teachers. Their solutions are both novel and appropriate. Expert teachers do not simply solve the problem at hand; they often redefine the problem and thereby reach original and insightful solutions. They are able to see the same problem from different perspectives compared to other teachers and therefore arrive at different, more original solutions. The project is informed by other studies of expert teaching (e.g. Hattie, 2003; Berliner, 2001; Hay McBer, 2000; McKinsey, 2007) and of teacher development over time (Day et al., 2007).

The current project also draws on the long-standing tradition of improving professional knowledge that leads to an improvement in practice. One key focus is the concept of developed practice. Dreyfus and Dreyfus (1986) five part structure has proven valuable in considering the development of teachers whose careers have long been understood in terms of experience related phases. The [original] Dreyfus model of Novice, Advanced Beginner, Competent, Proficient, Expert fits well with teachers’ own accounts of their development over time and with the participants in our study. The model is especially relevant because it stresses that someone can be expert in part of a domain, say teaching, but a relative novice in a new dimension, for example, using new technologies. Our teachers were identified firstly for being outstanding teachers and then secondly for being effective users of ICT. This categorisation is unique to this study. The identified teachers map well onto the various categorisations of expert teaching and onto the final stages [Proficient, Expert] of the Dreyfus model.

There is very little evidence available on what “expert practice” looks like in relation to using ICT in teaching. A previous project, conducted for Becta, by Goodwyn and Findlay (2003) on Literacies and ICT, showed clearly how some attributes of good practice were misplaced, meaning simply “extensive use” rather than “expert use”. This point is even truer about teaching assistants (TA) whose contribution to practice is not well understood and documented. The current study aims to help towards this direction by providing some insight into their role and contribution in using ICT in teaching. Such a contribution is highly significant for policy makers as teaching assistants (TAs) are clearly very important part of the Personalised Learning Agenda.

As Cox et al. (2003) concluded in their Literature review of ICT and Pedagogy, ‘Comparing the evidence of teachers using ICT in schools 20 years ago with that available today, it shows that there is a steady growth of innovative and experienced teachers able to use ICT to improve their pupils’ attainment. What is needed now is a way of helping more teachers and pupils benefit from these opportunities and experiences’ (p. 35).

This research project has successfully identified some of these innovative teachers, provided evidence of their perspectives on good teaching and demonstrated how they have achieved this capacity.

## Technology and teaching

The use of ICT in education aims to enable access to, and use of, digital resources for the benefit of the class as a whole and for the students individually. The role of the teacher in guiding and monitoring learning is not only preserved by technology but enhanced by providing the teachers with additional teaching tools. “High-quality direct teaching is oral, interactive and lively… It is a two-way process in which pupils are expected to play an active part by answering questions, contributing points to discussions, and explaining and demonstrating their methods to the class. Advances in technology means that ICT can now play an important role in the classroom, supporting the teacher and enabling whole class interactive teaching” (Armstrong et al., 2005, p. 456).

Nowadays technology plays an important part in school practice. Some strategies for using technology in schools include the use of information systems for monitoring and analysing learner achievement and progress, systems for managing and monitoring attendance and behaviour (lesson registration, parental alerting), greater use of technology to engage under-achieving pupils, especially creative and applied learning using technology, and supporting learner voice through online polls and forums (Hollingworth et al., 2008). Furthermore, using computer tools helps to decontextualise learning, to make explicit that which is implicit, and to accentuate that which is often unnoticed. They uniquely offer new ways to express and make visible key relationships and structures within the subject matter (Noss and Hoyles, 1996).

Used well, technology enables more effective and more personalised teaching and learning. It improves planning of teaching and learning, makes the learning experience more dynamic and allows education and learning professionals to engage more effectively with learners. It gives access to a wider and more tailored set of learning experiences and resources, enables learners to exercise more control over their own learning and increases opportunities for assessment which supports learning. Technology also enables professionals to share expertise and resources within and beyond their institution (Becta, 2008b).

Evidence demonstrating the value of technology for learning continues to grow. Around 80% of teachers agree that technology has an impact on engagement in learning, and around 60% reported that it enables them to better support learners’ diverse needs (Smith et al., 2008). Furthermore, the literature suggests a continuum in which new technologies initially support, then extend and finally transform pedagogy as teachers gradually find out what the technology can do. Familiarity, confidence and time are assumed to be the keys that unlock this gradual process of transformation. Moss et al. (2007) research shows that those taking the lead in using the technology in the most innovative ways often have had access to the technology for the longest period or are particularly committed to exploring what it can do in circumstances where they have time to experiment.

The use of technology in general and ICT in particular seems to offer some general benefits to both teachers and students. Flexibility seems to be central, with applications for all ages across the curriculum (Smith, 1999). Walker, (2003) also argues that the use of whiteboards increases teaching time, because teachers are able to present web-based and other resources more efficiently, while Gerard et al. (1999) argue that their use increases the opportunities for interaction and discussion in the classroom. Finally, whiteboard use increases the enjoyment of lessons for both students and teachers through more varied and dynamic use of resources, with associated gains in motivation (Levy, 2002).

On one hand, the benefits for teachers can be seen in the fact that the use of technology in general and interactive whiteboards in particular increases spontaneity and flexibility, since teachers can draw on and annotate a wide range of web-based resources (Kennewell, 2001). Furthermore, teachers are able to share and re-use materials, reducing workloads (Glover and Miller, 2001). Also, according to Smith (1999) the use of the interactive whiteboard can provide inspiration to teachers to change their pedagogy and use more ICT, encouraging professional development.

Equally, the students’ benefits include increased enjoyment and motivation, giving greater opportunities for participation and collaboration, developing students’ personal and social skills (Levy, 2002). In addition, ICT can reduce the need for note taking. Students are able to cope with more complex concepts as a result of clearer, more efficient and more dynamic presentation (Smith, 2001). Different learning styles can be accommodated as teachers can call on a variety of resources to suit particular needs (Bell, 2002) and students can be more creative in presentations to their classmates, increasing self-confidence (Levy, 2002).

However, appropriate and effective classroom use of ICT is found to be rare (e.g. Office for Standards in Education [Ofsted], 2001). In practice, established curricula and teaching methods remain in place under a thin coating of technological glitter, and available technology is often underused and poorly integrated into classroom practice (Hennessy et al., 2005).

Furthermore, the relation however between technology and expertise is sometimes unclear. As Prensky (2007) in his Becta report says: To use twenty-first century’s rapidly emerging technology effectively for education, we must invent best practices together” in other words we must examine emergent best practices, in practice. The best place to start then is the classroom, by investigating outstanding teachers doing what they do best, and this was exactly the focus of the project.

## Digi-teachers

The name ‘Digi-teachers’ was coined by the research team to offer a simple and distinctive term to cover this emergent group of expert practitioners. On checking, we discovered retrospectively, that it has been used informally on the web previously but we now present it as a useful term for the research and policy community more formally. These teachers fit with current views of expert teaching but they are not usually ICT specialists. One thing that distinguished them was a capacity to integrate ICT into their everyday teaching. They recognize that ICT both engages and motivates students, and therefore has benefits for classroom management, but they do not have an interest in the so called ‘whizz bang’ factor of ICT. For them technology is just one more element in their expert domain of teaching. One very powerful motivator for them is their intrinsic recognition of their students’ life worlds. They may, or may not themselves, be digital natives, that is not the point. Their students are, to varying degrees, steeped in the digital world and these teachers are completely focused on optimising their learning, therefore they must be a Digi-teacher.

# Method

The methodology is a mixed methods design using survey; telephone interviews, case studies and both qualitative and quantitative data analysis. A range of biographical information has been collected and analysed quantitatively. This biographical information (see appendix A) consists of:

* Gender
* Age range
* Degree/training
* Teaching Subjects
* Subject specialism
* Years in service
* Number of schools worked in
* Responsibilities at school

The qualitative methods are comprised of interviews and case studies, providing very rich and valuable data.

## Sampling

The project uses selected sampling based on peer identification. Peer identification as a method of expertise recognition can be problematic because of issues such as the popularity effect. Someone who is better known or more popular with their peers is likely to be identified as an expert (Weiss and Shanteau, 2003). However, other means of considering expertise also have many problems. For example, relying only on performance data such as examination and test results can be highly misleading. Peer identification, that is using experienced professionals’ judgement, is a good strategy to follow (Shanteau et al., 2003). It also allows for the identification of teachers who are not otherwise formally recognised by status e.g. Advanced Skills Teacher, Head of Department [secondary schools], Subject co-ordinator [primary schools].

It was additionally important that the source of the investigation, the University, was part of a very well established network of Partnerships with primary and secondary schools in the South Eastern region. The University and the schools are well known to each other as partners in Initial Teacher Training i.e. they are professional partners developing the teachers of the future. Such schools are therefore explicitly invested in developing and understanding expertise.

Using the University’s strong partnership network of schools, an introductory letter was sent to all Primary and Secondary Head Teachers on the 30th of May requesting nominations, if possible by the 20th of June. The total number of schools contacted was 650. From those schools, 200 were Secondary and 450 were Primary and Infant schools. Another reminder via email was sent again to the schools at the beginning of September. The schools were from the immediate surroundings of The University, including the Local Authorities of Bracknell Forest, Reading, Newbury, Slough, Windsor and Maidenhead, West Berkshire and Wokingham, all areas affiliated with the Institute of Education at the University of Reading. However The University Partnership extends beyond these LAs in all directions, for example, two schools from West London were also contacted. Thirty five (35) schools replied with a total of 93 nominations. From the 93 nominations 35 were from Primary and Infant schools and 58 from Secondary, as table 1 depicts.

Table 1. School Nominations

|  |  |
| --- | --- |
| **Primary/Infant** | **Secondary** |
| 35 | 58 |

From those 93 nominations 14 were teaching assistants (TAs) and 79 were teachers, teaching the whole spectrum of subjects. All 93 teachers and teaching assistants (TAs) were contacted via email to initiate communication, explore their intensions in participating in the project, and to schedule a telephone interview. All the details were kept in a database so as to make it easy to update and keep track of all the nominations and the interviews. Finally, more reminders were sent periodically to schools in our effort to attract as many nominations as possible.

## Interviews

The next step of the project consisted of semi-structured telephone interviews. A question bank was created covering three main areas: biographical information, teachers’ views of what makes a good teacher, and teachers’ views of the use of technology (see appendix C for question samples). The biographical information was important to establish an understanding of the stage of a teacher’s career. The questions about good teaching were informed by the literature on expert teaching but were kept as open as possible to adopt an essentially phenomenological approach. This was especially important as the dynamic of expertise *with technology* amongst the teaching population at large, has been little investigated

All schools were affiliated with the Reading University and they were a mixed range of attaining schools. All participants were nominated by the Head teachers, Deputy Head teachers, and academic staff affiliated with the Reading University, in order to make sure that their abilities are recognised and appreciated by their peers.

Fifty-four (54) interviews have been conducted in total. Twenty six (26), interviewees, were from Primary and Infant education and twenty eight (28) were from Secondary education. Out of those nominees forty seven (47), 87% of our sample, were teachers and seven (7), 13% of our sample, were teaching assistants (TA). In terms of gender, twenty-four (24) participants were males and thirty (30) were females (see Figure. 1).



Figure 1. Total number of participants and gender information

Twenty-one (21) teachers were from primary/infant schools and twenty-six (26) from secondary, while only five (5) TA’s were from primary schools and two (2) were from secondary school.

Table 2. Interviewees Spread

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Teachers** | **TAs** | **Total** |
| **Primary/Infant** | 21 | 5 | 26 |
| **Secondary** | 26 | 2 | 28 |
| **Total** | 47 | 7 | **54** |

Table 3 below shows the overall number of nominations, interviews and case studies that have been completed during the course of this survey.

Table 3. Project activities progress

|  |  |
| --- | --- |
| **Tasks** | **Progress** |
| **Teacher/TA nominations** | 93 |
| **Interviews** | 54 |
| **Case studies** | 13 |

Primary and infant education nominees teach all subjects while the nominees from secondary schools covered a wide spectrum of subjects, including:

* English
* Maths
* ICT
* Science
* History
* Languages
* Psychology
* Sociology
* Technology
* Design
* Art
* Business
* Music
* Geography

The broad range of subjects strengthens our data and will be helpful in identifying representative best practices that cover a wide range of subjects.

## Case studies

At the end of the interviews the teachers and TAs were asked if they would be willing to participate in a case study and the great majority. When the interviews were transcribed, the best candidates were identified and contacted via email. The best candidates were those who demonstrated the characteristics of expert teaching, who used a range of technology and who expressed a strong interest in continuing in the project. In practical terms, arranging a case study visit with teachers is very challenging in itself and the nature of case study visits is very time consuming, and many potential teachers could not be included for a variety of reasons. Thirteen (13) case studies in total were arranged and carried out. Twelve (12) case studies were filmed, and one (1) was done by observation. Twelve (12) participants were teachers and one (1) a TA. Six (6) of them were males and seven (7) were females. The TA was a female (see figure 2). Two short semi-structured interviews (case study episodes) were also conducted with the teachers, one before and one after the case study (see appendix D for question samples). The case studies were conducted from the middle of December 2008 until the middle of March 2009.



Figure 2. Case studies participants

## Material

### Telephone interviews

A pair of BT converse 1100 telephones was used to conduct the telephone interviews. A digital voice recorder, ICR-A181M by SANYO was used to record the interviews connected by a RETEL and a SANYO Speechtek Telephone Recording Connectors. Express Scribe Transcription Playback Software, a Microsoft Media player, and Microsoft Word editor were used for the transcription of the interviews.

### Case studies

A Sony DSR-PD170 Camcorder Review with a Sennheiser shotgun microphone was used to conduct the case studies. A Dell DVD multi-recorder RW was used to create multiple copies of the case studies.

## Procedure

### Telephone interviews

All the telephone interviews were conducted after a prearranged appointment with the teachers, at a convenient time for them. Most of the interviews took place during lunch time, between 12:00pm and 13:00pm or just after school between 15:00pm and 15:30pm. The vast majority of the teachers were contacted at their school. However, a small number were interviewed at their home usually after 18:00pm. Teachers were briefed about the project, were given the opportunity to ask questions and they were told that the interview was going to be recorded. The interview duration varied from 10 to 45 minutes.

### Case studies

All case studies were conducted after a prearranged appointment with the teachers at a convenient time for them. They were given the flexibility to decide the day, the time and the subject of the case study. All the case studies were conducted in a three month period, and all lasted for a lesson. Two short interviews were also conducted with the teachers, one before and one after the case studies. A copy of the filming on DVD was provided to all teachers included.

## Transcriptions

The transcriptions style is a smooth verbatim eliminating most of the “uhm's”,” ah's”, stutters and verbal tics (See appendix E for an example) but capturing everything else such as slang and emotions. Copies of the transcriptions were sent to those interviewees who requested a copy.

# Findings

## Demographic characteristics of interviewees

The findings in this section focus on the demographic characteristics of our sample. We collected information about their age, gender, degrees, teaching subject, specialism in a subject, years in teaching, and number of schools worked in and responsibilities at their school.

### Age

The first demographic characteristic obtained was age. The age of our expert teachers was grouped into four categories, which are 25-34, 35-44, 45-54, 55+. More than half (53.7%) of the teachers belong into the 25-34 category which is the category with the youngest participants. The 35-44 years old category holds 18.5% of the expert teachers while the 45-54 years old category counts for 24.1% of our sample. The last category, 55+, is the smallest category and only counts for the 3.7% of our sample. The trend revealed in this study shows that age alone does not define expertise, since 72.2% of our expert teachers are between 15 and 44 years old. The current participants were also identified and selected because of their competency in the use of ICT in addition to their teaching abilities. Therefore we can assume that it seems to be a strong relation among expertise in teaching with ICT/technology and age. The youngest the teachers the more familiar they probably are with new technologies and thus the more likely to use technology in the classroom. Our study found that only 3.7% of the expert teachers were over 55 years old. This result can have practical implications in schools and in policy making in general. For example, it seems that expert teachers and teachers in general of older age might need different type of training (more intense, more time) compared to their younger counterparts. On the other hand it seems that younger teachers use ICT in their teaching in regular base and thus their training might need to be more subjects related.

| Table 4. Age frequency and percent | | | | | |
| --- | --- | --- | --- | --- | --- |
|  |  | Frequency | Percent | Valid Percent | Cumulative Percent | |
|  | age 25-34 | 29 | 53.7 | 53.7 | 53.7 | |
| age 35-44 | 10 | 18.5 | 18.5 | 72.2 | |
| age 45-54 | 13 | 24.1 | 24.1 | 96.3 | |
| age 55+ | 2 | 3.7 | 3.7 | 100.0 | |
| Total | 54 | 100.0 | 100.0 |  | |



Figure 3: Information about expert teachers’ age

### Degree

The next demographic characteristic analysed was the University degree. All experts apart from 7 had a degree. The types of degrees varied considerably among experts. The majority of teachers, 22% had a degree in education. Other degrees included ICT, with a surprising low 3.7% of our sample, Languages with 5.6%, Science with 13% and the second highest, English with 11% etc, (see Table 5 and Figure 4 for a full list). There were also 13% of experts without any degree. However, all these experts without a degree were teaching assistants as Figure 5 illustrates.

| **Table 5. University degrees** | | | | | |
| --- | --- | --- | --- | --- | --- |
|  |  | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | English | 6 | 11.1 | 11.1 | 11.1 |
| Science | 7 | 13.0 | 13.0 | 24.1 |
| ICT | 2 | 3.7 | 3.7 | 27.8 |
| Geography | 2 | 3.7 | 3.7 | 31.5 |
| History | 1 | 1.9 | 1.9 | 33.3 |
| Psychology | 4 | 7.4 | 7.4 | 40.7 |
| Languages | 3 | 5.6 | 5.6 | 46.3 |
| Education | 12 | 22.2 | 22.2 | 68.5 |
| No degree | 7 | 13.0 | 13.0 | 81.5 |
| Other | 2 | 3.7 | 3.7 | 85.2 |
| Sociology | 1 | 1.9 | 1.9 | 87.0 |
| Law | 1 | 1.9 | 1.9 | 88.9 |
| Music | 1 | 1.9 | 1.9 | 90.7 |
| Food Science | 1 | 1.9 | 1.9 | 92.6 |
| Humanities | 1 | 1.9 | 1.9 | 94.4 |
| Media | 1 | 1.9 | 1.9 | 96.3 |
| Art | 1 | 1.9 | 1.9 | 98.1 |
| Fashion | 1 | 1.9 | 1.9 | 100.0 |
| Total | 54 | 100.0 | 100.0 |  |



Figure 4: University degrees



Figure 5: Expert teachers’ and TA’s degrees

### Subject taught

The next demographic characteristic of our participants was the subject they taught in their schools. Figure 6 shows the spread of the different subjects taught by all experts who participated in this study. Twenty one of them (38.9%) were teaching all subjects, while the subject with the second highest frequency (16.7%) was ICT. This result is not surprising since the current study focuses on the use of technology. However, it is very striking that 83.7% of our experts who seemed to be very competent with technology did not have ICT as their main teaching subject. This means that teachers used technology not because it was an integral part of their subject matter but because they consciously chose to do so. Other subjects included English, Math’s, Science, Geography etc as table 6 depicts. The current study has managed to obtain participants from a wide range of subjects.



Figure 6: Expert teachers’ teaching subjects

The vast majority of the primary and infant school teachers, 62%, taught all subjects. However, there were some teachers who only taught Math’s, 4%, ICT, 8%, and Music, 4% (see Figure 7). In primary education most (15%) TAs were supporting all subjects. However, it seems that there was a number (8%) of specialised TAs, who only supported ICT, as Figure 6 shows. On the other hand, that does not seem to be the case in Secondary education, since there was not a single TA specialised in one subject.

These results reveal a gap in TA’s specialisation in general but in secondary education in particular, that needs to be addressed. It seems that very few TA’s are specialised in ICT and that in turn can be counterproductive, according to the experts’ views, especially since ICT holds such a predominant position in the new curriculum. If we want students to obtain valuable ICT skills we need to provide schools not only with competent teachers but with competent TAs as well. These results also coincide with the qualitative results obtained in this study, from the experts’ interviews. Expert teachers stressed the need for ICT skilled TAs, and they underlined how important, practically, that would be in their classes.

| Table 6. Subject taught | | | | | |
| --- | --- | --- | --- | --- | --- |
|  |  | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | English | 4 | 7.4 | 7.4 | 7.4 |
| Math's | 3 | 5.6 | 5.6 | 13.0 |
| Science | 2 | 3.7 | 3.7 | 16.7 |
| ICT | 9 | 16.7 | 16.7 | 33.3 |
| Geography | 2 | 3.7 | 3.7 | 37.0 |
| History | 1 | 1.9 | 1.9 | 38.9 |
| All | 21 | 38.9 | 38.9 | 77.8 |
| Design & Technology | 3 | 5.6 | 5.6 | 83.3 |
| Languages | 4 | 7.4 | 7.4 | 90.7 |
| PE | 1 | 1.9 | 1.9 | 92.6 |
| Other | 1 | 1.9 | 1.9 | 94.4 |
| Sociology | 1 | 1.9 | 1.9 | 96.3 |
| Music | 1 | 1.9 | 1.9 | 98.1 |
| Food Science | 1 | 1.9 | 1.9 | 100.0 |
| Total | 54 | 100.0 | 100.0 |  |



Figure 7: Expert teachers’ teaching subjects

### Subject specialism and type of specialism

The following attribute that this study focused on was the subject specialism and the types of specialism that participants had. The majority of experts, 61.1% of them, had some short of subject specialisation, 25.9% had no specialisation, while, 13% were not sure if they had any as Figure 8 shows.



Figure 8: Expert teachers’ subject specialism

The highest subject specialisation amongst our expert teachers and TAs referred to ICT with 29.63%. The next highest percent was shared by two subjects, Technology and Design and Math’s, with 7.42% each. The category “other”, where modules like music were placed in, with 5.56%, followed. Next, the categories of English and Languages accounted for 3.7% and finally we had five categories with 1.85% each. These categories included Sociology, Art, History, Science and Geography. A large portion (33.33%) of our primary expert participants considered that they had no subject specialization.



Figure 9: Expert teachers’ types of subject specialism

Not surprisingly though, most of those experts who had no subject specialisation were teaching assistants. Only 7.7% of teaching assistants in primary education had some short of subject specialisation, while 11.5% had no specialisation and 3.8% were not sure if they had any. Similarly, in secondary education only 3.6% of our TAs had any sort of subject specialisation.



Figure 10: Expert teachers’ subject specialism in primary and secondary education

### Years of teaching

The next characteristic that this study looked at was the years of teaching and teaching experience was split into four categories. The first category included those experts with teaching experience of less than 3 years. The next category included those experts with teaching experience between 4 and 9 years and the following category comprised from the experts who had 10 to 15 years of experience. The last category included those experts with over 16 years of experience. The majority (64.8%) of experts had teaching experience between 4 and 9 years, while 18.5% had teaching experience between 10 and 15 years and 13% had more than 16 years of experience. Expectedly only 3.7% had teaching experience less than 3 years. This result is in harmony with the findings from the qualitative analysis, where the vast majority of experts recognised experience as having a significant contribution in their development without however being the only factor.



Figure 11: Expert teachers’ years of teaching

### Number of schools worked in

It seems that a very clear trend as far as the number of schools that experts have worked in exists. Eighty seven percent (87%) of them worked in less than 3 schools throughout their career, while another 11.1% worked in 4 to 6 schools. Only a 1.9% of our sample had worked in more than 7 schools. One could assume that stability might be a factor that allows teachers to flourish and develop their expertise.



Figure 12: Expert teachers’ number of schools worked in

### Responsibilities and type of responsibilities

With the next attribute we wanted to find out if teachers were more heavily involved in the schools affairs by having more responsibilities than teaching. We found that almost 90% (89.9%) of our expert teachers had more responsibilities than teaching, showing that expert teachers were keen to undertake additional responsibilities.



Figure 13: Expert teachers’ responsibilities

From those who had no responsibilities, 5.6% were teachers and another 5.6% were TAs. Seven point four per cent (7.4%) of them had other responsibilities in their school than teaching. This result reveals that highly skilled TAs were willing in undertaking more responsibilities in their school environment.



Figure 14: Expert teachers’ and TA’s responsibilities

The next step of our research focused on the types of responsibilities that our expert had. The teachers had to specify their responsibilities or to indicate that they had no responsibilities. The responsibilities range from “Head of department” to “Deputy Head”, “ICT Coordinator”, “Math’s Coordinator” and so on, see Figure 15 for the full list. We also had a category called “more than one responsibilities” for those experts who might had more than.

One very notable result is that the “more than one responsibilities” category was the one with the highest percent, 31.5%, showing that expert teachers not only undertake additional responsibilities but very often have more than one responsibility. The second highest percentage is shared between the expert teachers who were ICT Coordinators and those who had “Other” responsibilities. In the category “Other”, responsibilities related to assessment and performance were assigned along with extra curricula responsibilities. Both categories have 16.7%. The next category with 11.1% was the “Head of Department” category, followed by the “Assistant Head Teacher” category with 3.7%. Finally, six other categories, the “Assistant Head teacher”, “Training manager”, “Head of year”, “Deputy Head”, “Math’s Coordinator” and “Literacy Coordinator”, hold 1.9%. These results show that experts who are competent with technology hold a variety of responsibilities, not only related to ICT or technology.



Figure 15: Expert teachers’ types of responsibilities

These findings show that experts teachers do not only focus on their teaching role but they see themselves as part of the wider school community, undertaking additional responsibilities within their schools and aiming to farther their careers.

## Interviews

The findings of the interviews can be grouped into two themes. The first one looks into what expert practitioners think constitutes good teaching and the second one looks into how expert teachers say they use ICT and technology in their classrooms.

In the first part of our interviews we tried to find out the things that expert teachers like and dislike about their job, their aspirations and motivation as well as their beliefs about good teaching and what has help them to develop and become good teachers.

### Good teaching

#### Enjoyment about teaching

Our research started with a general question about teaching. We wanted to know what expert teachers enjoy most about teaching. The vast majority of them revealed that the relationship with children is fundamental. They pointed out that their interactions with them are the most important factor in their day to day teaching life. Furthermore they underlined that being with children is very rewarding and never dull since no day is the same. Some of the responses were as follows:

*“What I am enjoying about teaching is the kind of characters that I am meeting within the children. Children are not like any other kind of product at all, so you never get the same day twice in teaching, it brings along a lot of positives sometimes also some challenges as well, so you never get the same day twice.”[Design &Tech, Secondary]*

This theme was common among all answers. On top of that, outstanding teachers are always most concerned about their pupils’ learning. The majority pointed out that children’s learning and achievement offers them satisfaction and a feeling of excitement. One characteristic reply mentioned:

*“Obviously the most exciting thing about teaching is to see children learning. For you to impart knowledge to them and for them to go away exited and motivated...to look at how they interacting with you and each other...just to see how they learn and different styles and things like that.” [Primary]*

On a similar vein another teacher pointed out that the opportunity to explore new ideas with the children and challenge their existing knowledge is very rewarding. For example he mentioned:

*“Exploring new ideas with children. Try to foster enquires and thoughts and so it’s not the same old stuff. I teach year 6, so they feel like they know education by now. So I try to challenge their perceptions and their expectations of education” [Primary]*

Finally, technology also seems to contribute towards their satisfaction from teaching. Teachers enjoy using technology because it extends their teaching practices. Expert teachers also seem to value the use of technology. They believe that a good teacher should be prepared to use new technologies in order to enhance pupils learning. For example, a primary school teacher mentioned:

*“Someone who is prepared to...take on the challenges and take on the new, especially with technologies, the new technologies, and use them to try and enhance pupils learning.” [Primary]*

#### Least enjoy about teaching

On the other hand teachers answers about what they least enjoy about teaching were more or less expected. They almost unanimously least enjoy the paperwork and any administrative work that is not related to the actual teaching. For example, some of the teachers mentioned the following:

* Admin tasks/paper work
* Marking
* Planning

*“Planning is something that it would be nice if it wasn’t so time consuming, but that’s that the way it is and we have to accept it.” [Primary]*

* Workload
* Behaviour management

*“Behaviour management. There are some very difficult children in my class this year.” [Primary]*

They recognise that some of these activities are necessary but all expressed their dissatisfaction in doing them. For example, whilst they understand that it is difficult to do without marking it is one of the things that they least enjoy in teaching.

#### Qualities of a good teacher

Expert teachers seem to have a very clear idea of the qualities a good teacher needs to have in order to be successful: These characteristics include:

* Ability to inspire

*“The ability to...inspire the children to want to learn...” [Design & Tech., Secondary]*

* Classroom management

*“...obviously the ability to control the teaching environment...” [Design & Tech., Secondary]*

*“I figured you might ask me that and so have been thinking about it. At the top of my pyramid it really does have to be classroom management, without that you can’t do” [TA, Secondary]*

* Enthusiasm
* Very good subject knowledge

*“...to be enthusiastic and knowledgeable about you subject...” [Design & Tech., Secondary]*

* Stay up to date/accommodate changes
* Ability to use new technologies

*“Someone who is prepared to...take on the challenges and take on the new, especially with technologies, the new technologies, and use them to try and enhance pupils learning.” [Primary]*

* Able to reflect on their own performance

*“A. I think a good teacher is somebody who can reflect on their own performance, they need to have very good subject knowledge, they need to be able to stay up to date and to accommodate the changes which will always happen.” [Design & Tech., Secondary]*

* Experience

*“I think experience definitely...” [ICT, Secondary]*

* Ability to communicate
* Liking/loving children
* Patience
* Flexibility
* Dedication

*“Somebody who’s dedicated. Somebody who is prepare to go that extra mile...” [ICT & Business, Secondary]*

* Ability to listen

*“You have to listen to what they are saying as well.” [Math’s, Secondary]*

* Having a good mentor/role model

*“I think probably also having had a couple of really good teachers myself have sort of inspired me to want to do teaching.” [ICT, Secondary]*

* Colleagues/School environment
* Love of the subject
* Love of children
* Ability to understand students
* Ability to empathise

*“Quite a few things I would say. Probably the first one, you have to, I think compassion, you have to understand where children are coming from.” [Math’s, Secondary]*

* Knowing the different learning types/styles
* Sense of humour

*“I think having sense of humour is crucial, you have to have a sense of humour, you can take things personally, or try not to. I know some times that it is difficult...” [ICT, Secondary]*

* Ability to have fun
* Be creative and innovative

#### More qualities of a good teacher

In this section we will describe the qualities that our expert teachers could identify on themselves. They seem to be able to identify which of those characteristics they hold, even though the majority of them seem to be a bit hesitant in admitting that they are good/expert teachers. However, some of the characteristics they mentioned here were not identified before. For example,

* Ability to organise

*“...somebody who’s prepared to plan good lessons, develop good resources...” [ICT & Business, Secondary]*

* Building good relations

*“...someone who is prepared to build up relationships with the students so there is a mutual trust between those sides.” [ICT & Business, Secondary]*

* Being friendly
* Ability to listen
* Being Patient
* Passion

*“I think it’s probably passion. I am very passionate about what I do. Again it comes to being a good teacher, if you love what you do, no matter what it is, you’ll be good at it, and I am one of the fortunate people that wake up in the morning exited to go to work. You know I love the aspect of teaching, and if you love doing what you do, you should be good at it, I believe.” [Math’s., Secondary]*

* Use of ICT

Their use of ICT was one of the factors that teachers felt was the reason for their nomination to the project by their peers or seniors. For example a secondary teacher mentioned:

*“Last year ICT was noticed as a subject that was needed a lot of work to improve in December by experts in our school and I worked really hard last year with ICT and developed it and we received our ICT mark in July...and I think that’s probably the reason that they nominated me, for all the work that I was doing with ICT throughout the school, not just on my own class.” [Primary]*

In the same way another secondary teacher stated:

*“I think I am very forward looking with my use and knowledge of ICT and I am also a champion in the use of ICT in the college...” [Design & Tech, Secondary]*

However, in some cases it was not only the use of ICT but the way it was used. Some expert teachers appeared to be able to find original ways of using ICT to enhance their practice. A very good example is a PE teacher from a primary school who said:

*“Probably the way I’ve used ICT, in sports at the moment, the way that...we now filming the children...particular at parents evenings, parents get to see exactly what we talking about through video rather than you know, particular in PE is difficult for parents to understand some times what we are always mean. They can actually see that on the screen.” [Primary]*

Other characteristics include:

* Being able to interact with children
* Having fun during the lesson
* Results
* Achieving targets
* Keeping up to date with the way that young people are interacting in the world

It seems again that the use of technology is considered as a key skill that has contributed in their development and sometimes in their acknowledgement as expert teachers by themselves and by their colleagues or their seniors.

#### Becoming a good teacher

Teachers and teaching assistants alike have a very clear view on the factors that contributed in their development, and helped them to become experts in their profession. One of the main factors discussed is experience. It seems that teachers and teaching assistants believe that with experience, the ability to reflect increases and this helps them to improve over the years. For example, a secondary Design and Technology teacher mentioned:

*“I think what helped me become a good teacher is undoubtedly the experience, that is my 11th year of teaching, and I think, I would like to think that I reflect very well on how things...went in the classroom, and that helped me improve over the years.” [Design & Tech, Secondary]*

Another secondary teacher in a more laconic way said:

*“Just experience I think.” [Design & Tech, Secondary]*

Mentoring also seems to be a vital and very valuable in their development. The majority of our experts valued very highly the guidance they received at early stages in their career by more experience colleagues. For example, a primary teacher said:

*“Support from more experienced members of staff, also being mentored and being observed and given positive feedback on how to improve my teaching. Being supported, generally by my senior leadership team.” [Primary]*

Another factor viewed as contributing towards teachers development was the opportunity to observe more experienced colleagues or other colleagues in general. They seem to value their knowledge and assistance whenever is available. For example, a secondary teacher mentioned:

*“Variety of different things. I think obviously very important is watching other teachers. Is important to see how the practices of other teachers, because you learn a variety of different skills. Also the great thing about watching other teachers is it confirms that what you are doing is right, because you know it’s a process...” [Math~s, Secondary]*

Personal commitment also seems to be high in their agenda. A primary teacher mentioned characteristically:

*“We have to have lots of that.” [Primary]*

Support from colleagues and enabling environment are also highly valued. A primary teacher pointed out:

*“...support from colleagues and management” [Primary]*

Training also seems to be important to development. Training provides the teachers with examples of good practices and helps teachers to reflect on their own practice. A secondary teacher mentioned:

*“I’ve also had some very good training experiences across the years as well, which has allowed me, again it helped me to reflect what I’ve done in the classroom, but also show me how others, where others have had success, and what practices I can use in the classroom to further improve the teaching” [Design & Tech, Secondary]*

Passion about teaching also seems to be very important in development. Some experts mentioned that teaching was always what they wanted to do and thus it seems that their passion is the driving force behind their personal development. Very similar to passion is their personal desire to improve. Expert teachers appear to be highly motivated and prepared to go the extra mile and continuously improve.

Some expert teachers also believed that technology has contributed towards them becoming better teachers. They think that technology has helped them to execute certain tasks much more quickly and thus allowed them to have more time to focus on the actual teaching compared to before when they had to spend a lot of time in preparing and planning their lessons. For example, a secondary Maths teacher stated:

*“...obviously the ICT, the use of computers have really made teaching more exciting in certain areas because it reduced the amount of time you look up work or create stuff and...it’s instant. So I say that has helped me to become a better teacher.” [Maths, Secondary]*

### Use of technology

The next part of our analysis focused on the use of technology in the classroom. We tried to explore the reasons that motivate expert teachers’ to use technology in their classrooms and also to get a glimpse of their practices.

#### Why technology?

Expert teachers seem to have a genuine interest in technology. Another reason for using technology was personal interest. For example, answers like “I always liked technology and gadgets” that shows personal interest were very common. More precisely a Design and Technology teacher said:

*“I think is a personal interest with me, because since when I was at school I enjoy computers, probably even come from a little bit of science fiction; I had that kind of interests since I was there and it something that stayed with me from my school through university and now teaching.” [Design & Tech, Secondary]*

Also, the subject that teachers teach seems to affect the use of ICT. When the subject requires use of technology (e.g. English and Media, ICT, Design and Technology etc) teachers not only teach the technology but they see technology as an integrated component and they use it as a medium for the organisation and the delivery of their lessons. An ICT secondary teacher said

*“Well I teach ICT so it’s an integral part really.” [ICT, Secondary]*

While a secondary Maths teacher continued:

*“...Every lesson I use is prepared using smart board software, which I find hugely beneficial. You don’t have to turn you back to the class to look at the board. All your examples are already prepared, all it’s there... so yeah, I find it very very useful...” [Maths, Secondary]*

Furthermore, they seem to value the diversity of the medium and the possibilities ICT opens up. In the words of a primary teacher:

*“The fact that it’s so diverse, and has so many applications, because it’s just not something that is done in a compute suite now, it is, we are teaching skills for life but also that can be use in a cross curricula...capacity.” [Primary]*

Expert practitioners seem to recognise the potential of ICT and to consider it as another medium that extends their practice. They believe that ICT improves the teaching experience in many different ways. For example, it improves students’ interest, helps them to monitor the class better etc. A secondary ICT teacher stressed:

*“The way that you can make lessons more fun, more interesting and...holds the interest of the students. You know I’ve come from teaching using the blackboard and the chalk, to using the whiteboard, using the interactive whiteboard and technology has developed in such as huge way, I can see the advantages of it. It helps me to monitor a class; it helps me to see exactly what’s going on in a lesson...its brilliant. [ICT, Secondary]*

Another primary teacher mentioned characteristically about behaviour management:

*“...I don’t have to turn my back to them anymore while writing on the board...“ [Primary]*

Similarly, a Math’s secondary teacher said:

*“...You don’t have to turn you back to the class to look at the board...” [Maths, Secondary]*

Furthermore, a secondary ICT teacher described a different way of behaviour management via technology. She said:

*“...we have a software, monitoring program called “Land School Teachers”, which allows me to see all of the students’ computers on my screen. I can see what they are doing. In a way this helps to monitor behaviour....” [ICT, Secondary]*

The next reason that expert practitioners mentioned as a factor that contributed to them using technology in their teaching is their background (industry). Some teachers had other careers before where they had to use technology as part of their everyday working life. For example, a secondary teacher said:

*“Simply the use of technology in industry where I have come from...is widely used and it just seems you know, is just common for me to use that within lessons.” [ICT, Secondary]*

Finally, these teachers recognise the world that students live in as being a technological one and so they reach out to engage with students using new media and new technologies that they know students will relate to. For example, a secondary ICT and Technology teacher mentioned:

*“My biggest thing comes from when I was at school – I could never access what I was doing so seeing my kids accessing something that they might not have been able too – like an English essay...like writing used to be such a barrier and it’s not so much a barrier anymore and it really helps their engagement, their learning journey and they are the digital age aren’t they? They sit at home and they’ve got five or six things going – you know, Face book, MSN etc. And we get them in school and we say “here we are – sit still and do this one task”. [ICT & Tech, Secondary]*

Furthermore, a language teacher noted:

*“...straight way you talk technology they know it. With plenty of teachers they would actually tell them how to do it….with me they try but I just look at them ‘you tell me what to do’... [Language, Secondary]*

Similarly:

*“...…it’s more motivating to the students because that’s what they’ve been brought up with...” [Technology, Secondary]*

The importance of entering students' technological world, rather than expecting the students to enter theirs, seems to be recognised by many expert teachers and it is seen as a very valuable feature of their teaching because it motivates students and increases their confidence as they are using tools that they are familiar with.

However, expert teachers believe that the use of technology does not in and of itself transform existing pedagogies. It can support, extend or transform teaching, depending upon the immediate curriculum context, the teacher’s purposes and the pupils needs. The main emphasis needs to rest with the appropriateness of the pedagogy, not the use of the technology per se.

#### Most used technologies

The most popular and effective use of technologies by our expert practitioners can be separated into three main categories, presentation, behaviour management and communication. It seems that especially with the use of the interactive whiteboard, but not exclusively, expert practitioners use various software and online recourses to present and communicate information. Another very popular use of technology relates to behaviour management in the classroom either by monitoring pupils activities on the computers or by motivating them and therefore improving their behaviour in the classroom. Last but not least, experts seem to highly value the opportunities for communication that new technology has to offer, technologies such as email, Web 2.0, blogs etc. These tools are used either for communication between colleagues or between teachers and pupils. The communication can either be concurrent or asynchronous.

The interactive whiteboard is the most common ICT medium used by expert teachers. They seem to use it in every lesson in various ways and a lot of times as a generic platform to combine different media, such as Internet, video, software etc. A representative example of what the teachers said is the following fragment coming from secondary Design and Technology teacher. He said:

*“Quite a few, I’ll try not to make it too much of a list. Within the classroom I have an interactive whiteboard with speakers as well, we use smart board software, which means I can also integrate Flash videos into the classroom, little plans of what I am showing up on that board, also any other media as well, sometimes short of sound clips or that short of things.” [Design & Tech, Secondary]*

Similarly, another secondary teacher mentioned:

*“I love using the interactive whiteboard, and it’s not only for PowerPoint presentations, because there are interactive websites that you can go on to and you can actually show...you know, video clips and to do things and have stuff that work so...” [ICT, Secondary]*

It has been noted though in the bibliography that interactive whiteboards are not always used interactively and can actually reinforce teacher-centred styles of delivery (Levy, 2002; Kennewell, 2004; Knight et al., 2004). Rather than transforming teacher’s pedagogy, the interactive whiteboard can be relatively easily assimilated into existing ways of working. As Glover and Miller (2001, p. 257) note, interactive whiteboards are least effective and have limited impact on teaching and learning when teachers ‘fail to appreciate that interactivity requires a new approach to pedagogy’ and there may be a tendency for whiteboards to be used more as an ‘interest enhancer than as a new approach to learning’ (Glover and Miller, 2001, p. 269). However, that does not seem to be the case here. Expert teachers seem to use the whiteboards not just interactively, but also as a platform, presenting multimodal media and creating a very vibrant collaborative learning atmosphere. An example of the variety of technologies that expert teachers use in their teaching can be seen in the following verbatim very clearly:

*“... it’s demonstrating to the pupil how they can become independent learners, and it’s so much easier doing that in an environment where you have the resources to do that. So the interactive whiteboard allows you, I think, to help students become independent learners, because you can demonstrate...its better how to do things. So I like the interactive whiteboard, we have a software, monitoring program called “Land School Teachers”, which allows me to see all of the students computers on my screen. I can see what they are doing. In a way this helps to monitor behaviour. It also allows me to see good practice, which students are actually creating really good piece of work and I can pull that computer screen up to on the interactive whiteboard. You can use some peer assessment; assessment for learning can be used in that instance, you can say look all “Suzan” has you know, created that spreadsheet let’s have a look at it, let’s comment on it. You can pull up individual works on it and you can also do it as a method of control as well, cos if the girls going on a website, they are not suppose to be, you can see it and you can actually block them from using the Internet. You can send them a personal message...” [ICT, Secondary]*

Using the interactive whiteboard as a platform expert teachers use a large number of different software such as AB tutor, Bbox, Roma, Flowol, Dreamweaver, Photoshop to mention a few. A description of how a software is be used during the lesson is given by a secondary Design and Technology teacher, who uses a software called AB tutor. He explained:

*“...use AB tutor software, what that does is, on my computer I am using in the classroom it will transmit the image from that computer to all the others, that means I can demonstrate a software, I can use it that way. It can also work the other way around because I can what’s on their screen without having to physically turn my head and have a look around. And there is also other tools on that software which I can’t honestly say I used this regularly but there is such facility you can actually can open a chat window with pupils in the classroom and there was one situation where had a pupil who had broken her leg, she wasn’t able to physically come up to the lesson and within that software you can plug a microphone into the computer that you are at and you can broadcast audio to the computer somewhere else in the college, and she was actually down in the library, I was able to talk to her through the network to the library and help her with her lesson. So she was still able to do the same as the other pupils.” [Design & Tech, Secondary]*

The current findings echo the findings of other researchers (Becta, 2004), who found that the interactive whiteboards serve as platforms that blend multiple media and different software. Also, interactive whiteboards were by far the most popular answer.

Other technologies that expert teachers used were: cameras and video cameras: A secondary teacher said about cameras:

*“I have a camera on my desk in order to show small things, it might be text or equipment or material...” [Design & Tech, Secondary]*

While about video cameras another secondary Design and Technology teacher explained:

*“I then have a video camera which I use to video any practical demonstrations that I am using.” [Design & Tech, Secondary]*

Technologies such as scanners, laptops, PCs, projectors, Internet, Intranet, VLE, microscopes, cat-cams, and lasers were also frequently used. For instance an ICT secondary teacher described:

*“I suppose the web site for one...because the pupils are all familiar with that, familiar with using the internet and most of them have got it at home, if they haven’t got at home they are able to access it at school and there is a lot more, there is now available via “Uniservices” the company who runs our website. There is a lot more available, they are developing and...I have also been doing is...a website called Yacapaca.com is developing online quizzes, like multiple choice quizzes like...for my A levels groups...and they’ve just like quick fire multiple choice quizzes and things, which is really useful.” [ICT, Secondary]*

The use of many different media during lessons was common. A technology teacher for example describing the different technologies used in his classroom, said:

*“...I also have a projector, interactive whiteboard, sound system, DVD player, microscope, a whole range of software for teaching electronics, I then use laser, technology with cat cam, so I am massively into cat cam, using lasers with TNT rotors, so the whole gambit, absolutely everything.” [Design & Tech, Secondary]*

Another group of technologies that focus more on communication between the teacher and the students or the students themselves are: emails, YouTube, blogs, and forums. An example of how forum were used can be seen in the words of a secondary teacher:

*“On the web site, the schools web site, we’ve been developing forums, I did it last year as well so pupils can ask each, ask a question and...they may even help themselves with answering it or I will pop occasionally and make something and...” [ICT, Secondary]*

In a recent ICT review (Becta, 2008a), researchers found that the use of Web 2.0 technologies and social software (such as blogs, instant messaging, wikis and online discussion groups) to support learning is still extremely uncommon. However, expert teachers seem to use these in their work, by setting up for instance, Facebook groups related to a course or using the build-in VLE discussion forums capabilities where students can communicate with each other, discuss questions they might have on certain topics, with the teacher monitoring the whole process and acting only whenever there is a need. In that way collaborative and independent learning takes place at the pupils pace, and the learning becomes a continuous process.

#### Innovative use of technology

During our interviews expert teachers described some examples of new, original, or even innovative ways of using of technology in their teaching. In the example below, a secondary education teacher uses the VLE to organise coursework work and delivery, setting a countdown clock and a podcast with instructions.

*“I’ve put on there as well coursework count down for my year 11, so going through their courseworks they can, one of the pages on their part of the VLE they can click on and they can see literally how many days how many sessions they’ve got remaining. There is obviously the info from the two other websites; I have created a podcast to give them some verbal instructions on there.” [Design & Tech, Secondary]*

On other occasions the teachers were experimenting with technology trying to find new applications for it. For example, a Design and Technology secondary teacher experimented with an “Elisa” type of programme. This program stimulates communication between humans and machine. He created a chat program with information about design and technology. The students can go there type their question and receive an answer. The answers can be modified and updated by the teacher. That expert described his actions as follows:

*“I’ve experimented, still experimenting a little bit, with something which I call virtual teacher, and this is...are you aware of “smart for child” ... There is, I think it’s called the Turing test, I am not sure, where computers pretend to be humans, so you can chat to them...there is...it’s American basically, called Pandora’s Box and on there you can actually create...run your own hatbox and what I’ve put together on there, there is a chat box with short of knowledge about design and technology, which is my main teaching subject, and then...have something special with that, still little bit something I’m...maybe a little bit like a hobby than something that I use all the time. Something that I’ve compute its use and they can short of question, and I can go on there and then if it hasn’t done correctly I can programme it to give a better response next time. It is something that interested me from few years back, and I’ve got to do.” [Design & Tech, Secondary]*

Another way of using technology was for coursework submission and communication between teachers and pupils. A teacher used the Internet for coursework submission, feedback, and all sorts of communication activities between her and the pupils. In more details:

*“...we are using the schools website a lot more, so students are posting homework on the website, teachers can mark it and post back a reply with marked work, students, students and teachers can set up forums and blogs where they can actually ask questions and help each other...and that’s going to be a very very useful feature.” [ICT, Secondary]*

Another interesting way of using technology was in role play. The children have the opportunity to use cameras to record themselves, and then reflect, comment and validate their performances and the performances of other pupils. This activity excluding the obvious benefits in assessing performance, it had also created a very enjoyable learning environment were pupils expressed and enjoyed themselves while learning. A primary teacher characteristically described this activity:

*“Probably the “Digiblue” which is really good. We are doing a lot of staff with role play, the children they are doing the role practice and they just using the words they retelling a story with them, which was a particularly successful lesson, and they were read and acting the story of the three little pigs, they had the “digiB” and they recorded themselves, what they did, and then we watched it back as a whole class on the interactive whiteboard, and that was...it was just brilliant, and their response to each other, and they were talking about who did a really good job as a bad wolfed and what they liked about each other’s performances, and it was really a good way to be able to get the children to think about what they have done, and be able to relook at it, it was very successful.” [Primary]*

Another novel way of using technology came from a secondary Geography teacher. The teacher used mapping software, websites, data loggers and GPS to convey geographical and weather related concepts and to display visually, difficult information. He described his attempts as follows:

*“Use mapping software (Map Point) with years 10 and 11 for course work. Used to collect data outside, that students then bring back in. Used to work out maps of influence, for example to establish how far they have travelled. Also use a variety of websites to create maps. Finds that visual representations are useful to convey ideas, for example North/South divide....Outside the classroom they use GPS. Will plan a route then walk around the school. Good for teaching longitude and latitude, generally difficult concepts. Again discusses how the visual is useful...Invested in data loggers. These are hand held devices that log weather and have been very successful and popular with students. Data is collected on temperature, pressure, wind speed etc. This is then compared with data on the web, does it match? Concepts associated with weather are often difficult to convey. This approach makes it easy for students to see what the concept is, regardless of ability. The static station they have was expensive but ineffective as students appear to respond to being involved with the equipment.” [Geography, Secondary]*

Another very interesting use of technology comes from a secondary PE teacher who uses video for feedback at parent evenings. By doing this he was able to discuss with the parents’ possible issues concerning their children’s performance and also demonstrate their performance.

*“...we now filming the children...particular at parents’ evenings, parents get to see exactly what we talking about through video rather than you know, particular in PE is difficult for parents to understand some times what we are always mean. They can actually see that on the screen.” [PE, Secondary]*

#### The most effective technologies

As far as the effectiveness of the technology is concerned, most teachers noted that it depends on the subject they are teaching at the time. However, the interactive whiteboard seems to have the edge because of its ability to combine multimodal inputs and uses. A very enthusiastic answer mentioned in a few words:

*“It really depends on the task. I think from being used the most, I would say the interactive whiteboard...” [Primary]*

*“It will have to boil down to the interactive whiteboard, because it’s...just makes learning come alive.” [ICT, Secondary]*

The interactive whiteboard was greatly appreciated by the vast majority of our expert teachers. The whiteboard potentially affords interaction if the teacher perceives that it can be used in this way, and uses appropriate software that also affords interaction. Pupils take an active part in the lesson using the whiteboard to present their work. For example a Geography secondary teacher said:

*“...lots of interactive things, it’s also good for kids like using the interactive whiteboard to present...” [Geography, Secondary]*

Another reason given for using interactive whiteboards is its ability to directly support interactive whole class teaching. Something which is apparent in the following verbatim:

*“...the interactive whiteboard because, is the whole class teaching when you want to show everybody something all at the same time or you want to play something to them, that’s probably the best one.” [Primary]*

The current results echo the results found by Moss et al. (2007). They argued that interactive whiteboards can foster a more interactive style of whole class teaching through features that encourage pupil participation in this setting, through use of the touch-sensitive screen. They also enable flexible use of a broad range of multimedia resources and specialised software that supports or enhances a wider range of learning styles. The dynamic visual dimension of the medium can make it easier to model abstract ideas. It can increase the pace of teaching by making it easier to move between texts on screen as well as revisit materials deployed earlier

Computers, projectors and visualisers seem to be very effective as well and some of their benefits are similar to those of the interactive whiteboard. For example the ability to display material to the whole class is an attribute share by a combination of a computer and a projector. Similarly, a visualiser can be used to display contents to the whole class. Smith et al, (2005) also supported that some of the interactive whiteboards benefits could be achieved through other combinations of computer technology that relay the contents of the computer screen to whole class through data projection.

*“The most effective is the computer with the projector... Because the students can see what it is that you are trying to describe as opposed to gathering around the desk to look at you know, I don’t know if you remember the old days, gathering around the bench, gathering around the desk, they don’t need to do that now, it’s up there, large as life...things as small as thousands of millimetres up on the screen or you know dangerous casting of metal that are videoed live, brought there from a safe environment, I think that, the visual side to it is probably the strongest. Second to that I think is, pupils being able to present their work using ICT. The quality of the work they present, they way that they communicate I think is 500% better when they use ICT when they do it, when they just try to do it with pen and paper.” [Design & Tech, Secondary]*

The Internet also rated very highly for its effectiveness by our practitioners. Expert teachers use the Internet regularly with their students particularly for research purposes. They also take advantage of the opportunities for communication offered by email. Experts seem to appreciate the communication possibilities and independence that the internet has to offer to them and to their pupils. An ICT secondary teacher described its use:

*“I like to...email is a fantastic communication tool now for those pupils and myself because if I set let’s say I set pupils a homework task... or say they are straggling with their coursework, I say they can email me and you know I try to get back to them, if I am at home to give them a hand.” [ICT, Secondary]*

Expert teachers also seem to value highly and use effectively various online learning environments available to them, environments such as the “Knowledge box”.

As more and more schools are using VLEs, expert teachers seem to be the first to explore its capabilities, by posting material, sharing resources, using the forums and taking full advantage of its capabilities. An example of its use can be seen below in the description of an ICT and Business secondary teacher. He said:

*“...The Intranet, the VLE environment, lots of things. They all come together really.” [ICT & Business, Secondary]*

In the same vein a secondary ICT teacher described:

*“...we are using the schools website a lot more, so students are posting homework on the website, teachers can mark it and post back a reply with marked work, students, students and teachers can set up forums and blogs where they can actually ask questions and help each other...and that’s going to be a very very useful feature.” [ICT, Secondary]*

However, its use is not as widespread wet since not all schools have a fully functional VLE system. In those that have though, expert teachers seem to take the lead and explore its potential before anybody else.

Different software also seems to be valued highly for its effectiveness. Experts use a variety of software available and often pioneer the introduction of new software in their departments and schools. For example, a secondary Design and Technology teacher described the effectiveness of the AB tutor software through its demonstration capabilities:

*“I think with all of those there is a lot of things which, I think that the most effective one out of all of those, if there was one thing that somebody said you can keep it, but you can lose everything else, I think really with that, probably would be the AB tutor, the ability to show pupils what you are doing in your computer screen, even if I didn’t have the smart board I could still show them...” [Design & Tech, Secondary]*

Finally, videos and podcasts seem to be valuable teaching tools. Expert practitioners used videos and podcast either to video the pupils and allow them to see their actions afterwards, or to present information to them via existing videos, for example in a Spanish language lesson, using a video in Spanish.

*“I would probably say...I think the videos, making them into videos and pod cast is the most important. It allows children to see exactly what is happening, whether it just be them videoing themselves in some activity, they can identify exactly what they are doing and then give to themselves feedback on their procedure.” [ICT & Business., Secondary]*

Another popular use of podcasts seemed to be for revision purposes. A math’s teacher argued about it:

*“And also with the podcast, it enable them to access, say something they have a problem with if they are doing revision, and when they are doing long revision they can jump into their iTunes and look at their podcasts how that suppose to be done. It really enables them to refresh their memory.” [Math’s, Secondary]*

However, it is important for the effective use of technology not to have any technical problems.

*“.... So I like using laptops...interactive board I like to use, is very important in my teaching if it works, I have had a lot of problems with it this term, not working.” [Geography, Secondary]*

Views like this one are consistent with other research findings that claim that in order for ICT to be effective a high level of reliability and technical support needs to be available, to minimise problems when they occur (Levy, 2002). Keeping also in mind that experiencing technical problems with the hardware is more likely to occur where teachers are less technologically competent overall (Moss et al., 2007), then technical support becomes vital for the effective use of technology when teachers are less technology savvy.

#### Learning the technologies

Expert teachers mentioned three different ways of how they learnt to use these new technologies. Almost unanimously they stated that they were self taught and the way they learnt was by trial and error. This was by far the most common answer, and it can be seen in the answer of a primary teacher:

*“Well, I’ve never had any training, no. I just picked up along the way*.” *[Primary]*

However, most of them acknowledged the importance of training, pointing out though that it should be followed by practice time, something that is not always the case. Teachers often commented on the lack of time to practice and master a technology, on the necessity to do so and on its benefits in helping less technology savvy teachers to get rid of their insecurities regarding the use of technology. Finally, help from colleagues was the third most common answer among our expert teachers.

Very often though, teachers mentioned all three ways of learning at the same time. For example, one Design and Technology secondary teacher mentioned:

*“Some times I’ve had a little bit of instruction...being trained by other colleagues and quite a lot of the time, it’s been about me having a go and trying something else, maybe following a few written down instructions but probably mostly gradually learn to use things by taking a little bit of a chance sometimes.” [Design & Tech, Secondary]*

In the same vein, another secondary teacher said:

*“Well, a lot of it is through trial and error and we had training you know some has came to the school to train on it. I’ve been on an interactive whiteboard course as well. So I’ve been on courses and its trial and error.” [ICT, Secondary]*

#### Technology as a tool to resolve challenges and/or problems

Expert teachers believed that the use of technology has helped them to overcome certain challenges or problems in the classroom. They claimed that with the use of technology was easier to get the message across and improved behaviour management. For example a secondary school teacher said:

*“Yes, definitely. This monitoring software allows you to actually see who is not listening and they doing their own thing, and it allows you to immediately stop it, when students know that you can do that they tend to stop doing it.” [ICT, Secondary]*

In addition, it seemed that expert teachers recognised the value of technology as a motivational tool which also affected pupils’ behaviour by making them more eager to pay attention in the lesson. More precisely, a primary school teacher stated:

*“Having the interactive whiteboard...definitely helps with behaviour, in having that, having the opportunity to something that is more exiting and more visual for the children, definitely helps.” [Primary]*

Another challenge that expert teachers were able to face with the use of technology was to address the needs of pupils with certain difficulties in accessing the curriculum. For example, pupils with writing difficulties could type in instead of write whilst, pupils with reading difficulties could find alternative media of information than text books alone.

Technology was viewed as related to the pupils’ world and way of life. New technologies seem to improve communication according to some of the teachers. For example a teacher in a college mentioned:

*“...there were some times messages that I get quite late in the day, came from email and there is maybe not enough time to give the kids that message in a verbal way or by putting them up on the physical notice board in the past, and having the VLE means that pupils even if they are absent from the school, they can look at that information, interact with it and may use it with those... and still share their opinions, even if they are not physically in the school.” [Design & Tech, Secondary]*

#### When is the technology used during teaching?

It seems that for the expert teachers of this study the use of technology was highly integrated into their teaching. They tended to use it in every lesson for a considerable amount of time, recognising its value, but at the same time without neglecting the importance of the teacher in the class. They see technology/ICT as a valuable tool that adds a very flexible and attractive way of presenting and getting the message across. The most common answers were:

* 100%-the whole time
* most of the time
* in every lesson

However, they acknowledge that the teacher remained the most important learning facilitator and use of technology does not improve the teaching practice by default.

#### Benefits of using technologies in teaching

Expert teachers saw a large amount of benefits for both themselves and the students in using technology in the classroom. They argued that one important advantage was the fact that they had, via Internet, instant access to vast amount of resources, easily accessible. They could use these resources to either prepare their teaching material in advance or to respond for example to a pupil’s question in the class, by finding relevant material instantly. A secondary ICT teacher said about:

*“I suppose take for instance the Internet, is a huge resource these days” [ICT, Secondary]*

They also seemed to strongly believe that the use of technology had many benefits in behaviour management. With new software teachers were able to monitor behaviour when pupils worked on the computers. An example of a teachers referring to that software is the following:

*“...we’ve also just being trialling some monitoring coursework... We manage to have a demo installed in one of the rooms on some of the computers. That’s been a big help because the main problem area is when pupils go on the Internet when they shouldn’t be...easily distracted I must say” [ICT, Secondary]*

In addition, the use of technology seemed to make admin work much easier and faster, it saved time/quicker, allowed for backups and therefore made the life of a teacher much easier. Considering that administrative duties are the thing that teachers mostly dislike in their job, it seems that the use of technology can greatly improve this aspect of teachers’ life. A common argument among our expert teachers can be seen in the word of a secondary ICT teacher:

*“I think it is a time saver for me, for other people it may seem a bit of a hindrance, they might thought they have to involve technology because is the new way forward...and they may well be very much still...I suppose the old school if you like... You can copy and paste things you can...there is a lot of resources that are already available, quite often free on websites, such us ...the TES website, there is the teacher’s resource bank on there, people up load resources they’ve done and...you can download them and manipulate them.” [ICT, Secondary]*

Another teacher focuses more on the ability to organise materials more easily, noting:

*“I think that the benefits of using technology for the teachers is that it enables them to organise information and to...be able to structure what they do in the classroom so whereas before you might have recorded things down on paper, for example use the example with the smart board software. If I’ve got a pupil who’s been absent from one lesson then the old fashion way will be to photocopy another pupil’s notes, where as what I can do now is I can recall that information back up again, I can even go back weeks or months, maybe even years now, to what I’ve previously taught, and in that way is very fast to access that...” [Design & Tech, Secondary]*

In the same vein, another Math’s teacher argued:

*“Being able to save any form of document, work sheets, you can just save it and reuse it all the time, so there is a massive benefit. You don’t have piles of files, and paper and worksheets that you have to work through, you can just have folder on your desktop, which I do, with the variety of different activities I need to do. For that it benefits all teachers in reducing that time.” [Math’s., Secondary]*

One more argument on the benefits of using technology focused on the ability to refer to previously presented information during the lessons (no need to rub out the board), especially when the interactive whiteboard was used.

On the other hand, expert teachers saw many benefits for the students as well. It seemed that lessons were more interesting for the pupils, more interactive, and their motivation was higher. This is obvious in the following extract taken from the interview of a secondary ICT teacher:

*“For the pupils it makes it more interesting for them rather than sitting and writing in an exercise book for instance, I never liked it, that’s all I used to do when I was at school was writing down notes from an exercise book, you know there are so many interactive presentations that can be done on individual computers and also using the interactive whiteboard so you’ve got the ability to get the whole class involved, get them coming up and answering questions on the board rather that people calling out the answers they can come up and move things around...” [ICT, Secondary]*

The positive effect on motivation seemed to also have a positive effect on the pupils’ behaviour. Teachers also believed that the use of technology promotes independent learning. For example, a secondary Design and Technology teacher explained:

*“Hard to put it into sentences, I mean everything we just said...The benefits for the students is that they can access information, they can take responsibility for their own learning, they become more independent in their learning...” [Design & Tech, Secondary]*

Another area that the use of technology could help pupils according to our expert teachers is with the low achievers. For example pupils could use technology to create better presentations, check their spelling and so on, and therefore their end product will be much more professional compared to the same work without the use of any technology.

Finally, teachers believed that technology helped students to share ideas and communicate much more easily, something viewed as having a very positive effect in students’ educational and social environment.

#### Pupils’ involvement in the use of technology during the lessons

Expert teachers actively seek pupils’ involvement when using technologies in their teaching. Children were always involved in the use of technology unless there was a shortage of equipment. Even when there was not enough equipment for everybody, teachers encourage the students to share and use it in turns.

*“Yes they are. I try and make a couple of...I can call them starters I supposes, using the smart board software and get the people to come up front and maybe move a word to where the correct icon or if we just learn take for instance year 7 about tables, to let quickly label the table tool bar, just a little thing to get them going. I try and involve the pupils as much as I can.” [ICT, Secondary]*

The current findings are in agreement with findings about the effective use of interactive whiteboards by other researchers. Effective use of whiteboards requires that they should be used by students as well as teachers (Kennewell, 2001, Becta, 2004). We can argue therefore, that the effective use of technology in general requires active involvement by students, especially if we consider that very often interactive whiteboard is used as platform for other technologies.

In close conjunction with this result is the explanation of the technology itself to the pupils, whenever it is used.

#### Explaining the use of the technology to pupils

Expert teachers recognised the importance of explaining the technology to pupils whenever they use it. They thought that explaining to the pupils why they used technology into their teaching was a vital part of their teaching process. For example, a secondary teacher mentioned:

*“Yes, I think that’s quite important because I think sometimes need to assume because they are young people they know everything about the Internet and so forth and that means that it’s very important as adults and as role models, we demonstrate not just how to use the software as in how to write a word document but also how to use...the more of [un w] such as forums and the idea of the Web 2.0, whether thinking about the information there...putting online, and also responding to other people who got the information and I mentioned before the VLE, and I think that something that surprised me a little bit, pupils do need that type of guidance...” [Design & Tech, Secondary]*

Another Maths teacher said:

*“Absolutely, this is what we are doing. I mean when I introduce animation, videos, there is a lot of explaining of why, how things are happening. They jump on it very quickly obviously because they are very computer literal.” [Maths, Secondary]*

A few teachers mentioned that they do not explain the technology as much as they should, and that mainly this has to do with time constraints. However, sometimes expert teachers do not see the need to explain the technology to the pupils because as they said, its use is obvious to them.

#### Students’ expectations about the use of technology

An important finding of our research is that expert teachers believed that their pupils expected them to use technology. Since pupils nowadays use technology in every aspect of their lives, they believe that their teachers should also use technology. Moreover, they argued that since most schools have technology available, students rightly expect their teachers to use it. A secondary ICT teacher for example mentioned:

*“I think it will to a certain degree, because they personally are improving their skills they also are able to keep up slightly more what the pupils are aware of and are able to use themselves. I don’t think that it’s gonna be very long until there is gonna be touch screen monitors in every class...” [ICT, Secondary]*

Another secondary teacher said:

*“Yes, definitely they...every teacher have a laptop, every teacher should be using it and every classroom got a projector, so yes.” [Design & Tech, Secondary]*

In a slightly different way, it seems that pupils expect teachers to have at least a basic understanding of various technologies. For example, a secondary teacher argues:

*“I think they expect...teacher to have at least the very basic grasp of the technology, possibly to the same level that they have and I think possibly as with all...any lesson or any subject the pupils want to come in and they want to be shown something new or shown they can improve on. So I think automatically because of their home experience, they come in and they want to learn more than we are there at.” [Design & Tech, Secondary]*

These assumptions are in agreement with other studies that have found that students also draw on their out-of-school uses of ICT and they support that this impacts on learning in the classroom (Facer et al., 2001; Kent and Facer, 2004).

#### Becoming effective with technology

Another important finding of this research has to do with what expert teachers think would help other teachers to become more effective with technology. They believe that the most effective way for the teachers to learn and master new technologies is “time”. They stated that what teachers need is time to play or “give it a go” with the technology in order to master its use and overcome their fear. Taking into account that research (Hennessy at al., 2005) has shown that lack of confidence and experience are two of the contextual factors which can act as barriers to using ICT, then the current finding about the importance of practice time becomes even more evident. The expert practitioners of this study believed that very often training is ineffective because teachers do not have enough time to practice and master the technology. However, it has to be noted that expert teachers did not undervalue the importance of training but they strongly supported the need for extra time to practice, something that, as they said, is often missing. For example, a secondary Design and Technology teacher said:

*“I think they need to be given the time and the training, access to technology, being shown by other colleagues...” [Design & Tech, Secondary]*

Similarly a primary teacher argued:

*“Time to learn to...use it, and there isn’t often much time. You might have a new piece of software for example, it may well be very effective for you classroom but you don’t have the time to look at it, you are not gonna use it.” [Primary]*

Training is also considered as very important. In a primary teacher’s words:

*“Training...that would be invaluable really and the opportunity to see other people do it and to learn from these other people, I think is invaluable. To the ICT conference I went last year as the ICT coordinator, really I mean we have got chance to see different programs working to be able see how other people use it, and that’s have taught me so much in one day.” [Primary]*

Some other answers to the question of what would help more teachers to become effective with technology, included: more resources, technical support, being shown or trained by colleagues and also opportunities to observe other teachers. The matter of technical support is very important for all teachers including experts. Other researchers (Becta, 2004; Levy, 2002) investigating the effective use of interactive whiteboards also found that a high level of reliability and technical support needs to be available, to minimise problems when they occur.

Some other teachers noted that the role of a good ICT coordinator and leadership is very important in adapting technology into teaching. When the senior management team is able to see the benefits that technology has to offer and supports the teaching staff, then the use of technology is incorporated successfully into the classrooms. A very appropriate example is the following:

*“I think it’s really important that the leadership team in the school are very ICT focused and then they know how to put the support across to the individual teacher so...If the leadership team are really into ICT and they can see the benefit of it then obviously is a kind of, is a stepped system, if teachers can see it coming from above, then obviously it feeds down, I think is really important to have somebody in place, like the ICT coordinator, who can train staff and help them and support them rather than kind of leaving people to their own devices. I mean training and support are really important...to work properly.” [Primary]*

These findings echo the finding of other studies focusing on technology in general and on interactive whiteboards in particular, where it has been noted that teachers need sufficient time to become confident users and build up a range of resources to use in their teaching (Glover and Miller, 2001; Becta, 2004). Furthermore, according to Moss et al. (2007) familiarity, confidence and time are assumed to be the keys that unlock the gradual process of pedagogic transformation and lead to effective use of technology. Therefore, one can argue that this conclusion is strengthened even more by our experts suggestion that time is the most important element for technology competence among less technology savvy teachers. Innovation and adaptation are costly in terms of the time needed to develop and establish new practices and time will help teachers to gain the required interpersonal and pedagogic skills to use ICT in their classrooms and also improve their confidence, experience and motivation.

#### Factors that enabled integration of technology

Having the infrastructure in schools seemed to be the most important factor that has enabled teachers to use technology. It is essential for schools to provide teachers with the necessary resources and technical support. When that happens, teachers are more likely to use them, experiment, and blend them into their teaching, finding new ways of conveying the message across. For example, a Design and Technology college teacher mentioned the following:

*“I think the investment that came into our department and also our school or college. I think without the investment we will be doing thinks in exactly the same way we did, maybe, 10 years ago. I think the investment has to be there and... it has to be something where...you have staff or you have people who can control that many or those resources, who also keeping up to date with the latest technology.” [Design & Tech, Secondary]*

Other factors that have influenced teachers adaptation of technology includes, experience, experienced practitioners/colleagues, mentors that were using technology and even advisers at borough level. However, having the technology available was by far the most popular answer.

#### The role of TAs in using technology effectively

The current study also examined the views of expert teachers about the role of teaching assistants in the use of technology in the class. Expert teachers underlined the need for technology savvy teaching assistants. They highly valued their contribution in the class and they regarded them as an important component of the teaching practice. A secondary teacher stressed the need for technology savvy TA as follows:

*“I think the learning assistants need to be able to use it effectively and that’s probably where we fall short at the school. They don’t really know, and as a department, an ICT department we actually finding quite difficult to sign learning assistants who have the technology ability to help students in ICT. So that I think is probably a weakness, but they are extremely helpful in other areas by identifying which students shouldn’t sit next to each other and if it is too difficult for a student to take on board.” [ICT, Secondary]*

A primary education teacher also mentioned:

*“Really important. It’s really important that they are involved and they share their enthusiasm and that’s something that we’ve been working on. I’ve got, one of my teaching assistances in particular , she is, she is very enthusiastic about it, she is not very skilled in the use of ICT, so we’ve been doing a lot of work with her on training her up to build her confidence in doing it, because I think, her being more confident in helping the children to do it is so important and the children seeing that...it’s ok that Miss “Maisson” isn’t so confident and she is learning from you, and they understand that and it seems to be helping.” [Primary]*

Expert teachers also pointed out the significance of the TAs contribution in working with technology, in small groups. They emphasise the importance of the TA to be technology literate in order to assist the pupils in their tasks. This idea can be seen in the following passage:

*“...TAs need to have a clear understanding of the use of technology in order to further the education of the individual child, especially with such things as group work or individual, pair work and computers, if the assistant is not sure of what is happening the children will not progress at a stage or developmental process as they should, they’ll be stranded because they will held back by the lack of assistance by an adult who should be assisting them.” [Math’s, Secondary]*

Teaching Assistants are highly involved in helping the low achievers, and therefore it is important to be able to use technology in order to help these students improve their performance.

*“If they can plan for...in the lesson, support...I am using laptops, we’ve got 4 per year group at the moment that needs to plan for, they can help the lowers type in they work in the computers or anything and outside of the classroom...we have some of the little ePC things, which I wouldn’t buy any more of, but I’ve given a few to TAs for the really high special needs children, so they are just then choosing if and when to use it as an incentive or actually to do the work on the computers, so again they are typing, and they want to do the typing as opposed to not wanting to pick up a pencil.” [Primary]*

## Case studies

Thirteen case studies were conducted in total. The expert teachers were teaching a variety of subjects. Five teachers were from primary education teaching all subjects while the rest of them covered various subjects such as: ICT, English, Languages, Design and technology, etc, as figure 16 illustrates. The subjects of the case studies will be reported in the next sections along with a description of each study.



Figure 16: Case studies participants and subjects taught

The expert teachers whom we observed were very vigorously involved with their pupils and they led many of the activities. They created maximum opportunities to learn and no time was wasted. The environment was very purposeful and businesslike but at the same time there was a great deal of interaction between the teacher, the teaching assistance and the pupils with the pupils. These observations are in line with McBer (2000) research findings about teacher effectiveness.

### Case study 1

A male teacher was the participant of the first case study. He is a primary school teacher and he teaches year 3. The subject of the case study was Use of ICT in a literacy lesson, “Poems to perform”, Unit 1, Autumn 2. They were also two TAs involved.

The objective of the lesson was to perform a poem using a computer. The children chose and prepared poems or stories for performance, identified appropriate expression, tone, volume and use of voices and other sounds. They used software called “photo story 3”.

Other technology used by the teacher and the pupils was: visualiser, computers, interactive whiteboard, premade digital photos on digital cameras/visualise. The teacher used these technologies to demonstrate the software and to show them they needed to do in their tasks. The children used computers and work in groups of fours or fives. There were two TAs in the class who together with the teacher overseeing all the groups. One group used the interactive whiteboard. At the end of the task the pupils showed their work on the whiteboard and they were commenting on the things they like and didn’t like.

### Case study 2

A female teacher was the participant of the second case study. She is a primary school teacher and she teaches year 2. The subject of the case study was literacy. The lesson took place in the ICT suite and one TA was also present.

The objective of the lesson was to understand that words, images and sounds can convey different elements of a narrative for a reader and to write a traditional narrative about the main characters using words, sounds and images. They used software called “2creatastory””. Some extra images if the characters were available in print for pupils with individual educational needs.

Other technology used by the teacher and the pupils was: interactive whiteboard, computers, projector, “Synchroeyes” software.

The teacher demonstrated on the interactive whiteboard the characters of the story, Cinderella. The children had sample images and they had to create their own images and story by reverting the behaviour of the characters. They had to think about what the characters saying and thinking. The children created their own presentations with text sound and images. The teacher and the TA were assisting the children throughout their task. At times the teacher selected students work and displayed them on the interactive whiteboard. At the end they all discussed and evaluated samples of each other’s work and they also discussed how the sound, images and text work together to create different models of the story.

### Case study 3

A female teacher was the participant of this case study. She is a secondary school language teacher. The subject of the case study was year 12 Spanish. The lesson took place in the ICT suite.

The objective of the lesson was to understand the use of “Ser” and “Estar” after students’ request. The technology used by the teacher and the pupils was: interactive whiteboard, computers, projector, Internet, YouTube.

The lesson began with a five minute exercise that re-caps on previous work with the use of the interactive whiteboard. Pupils come up and drag different words into the correct “verb” columns. Then they watch a YouTube video on the use of the verbs. However, due to a technical problem they only partially watch the video. Pupils use a website called “conjuguemos” and [www.languagesonline.gov.uk](http://www.languagesonline.gov.uk) to work on 3 online exercises. At the end, they receive their feedback instantly. The lesson continues with another video to practice listening and it ends pen and paper exercise about the different uses of the two verbs.

### Case study 4

A male teacher was the participant of this case study. He is a secondary school teacher and he teaches French and Sociology. The subject of the case study is French.

The objective of the day’s lesson was that students will be able to identify and name various physical ailments in French. Using Text Match Linguscope students worked individually, in pairs and as teams.

Coming into the room students collect a hand held remote (Quizdom) and register it with the whiteboard. Throughout the lesson the whiteboard is in constant use; both interactively between students and as the medium by which the teacher delivers the content for the lesson.

The lesson began with a five minute exercise that re-caps on previous work and, as the allocated time draws to an end, the music from Countdown begins to play loudly. The teacher uses the interactive whiteboard to teach the various physical ailments. Students are engaged and appear to be enjoying the lesson and, as it draws to an end, it is clear that they are also anticipating the final exercise in which they will get to use their remotes. This activity is also timed and requires that students vote on the correct French word for various body parts. The number of correct and incorrect answers are then displayed graphically immediately after the vote.

### Case study 5

A male teacher was the participant of the fifth case study. He is a primary teacher and he teaches ICT in all years. The subject of the case study was e-safety. The lesson took place in the ICT suite.

The objective of the day’s lesson was to understand the dangers when using computers and the Internet. The technology used by the teacher and the pupils was: computers, projector, Internet, VLE.

The lesson began with the teacher explaining the dangers of using computers and the Internet. All the information is projected on the board. The teacher covers issues such as being safe on the Internet, using email, using pictures and videos, instant messaging, passwords etc. Then the students log on onto their computers, in pairs, played a maths game and explore the schools VLE.

### Case study 6

A female teacher was the participant of this case study. She is a secondary ICT teacher. The subject of the case study was year 9 ICT. The lesson took place in the ICT suite.

The objective of the day’s lesson was to understand and use Excel formulae. The technology used by the teacher and the pupils was: interactive whiteboard, computers, projector, Microsoft Excel, monitoring software.

The objective of the day’s lesson was to work a given coursework, which required implementation of an account database for a medical practice in Microsoft Excel.

The lesson began with a five minute quiz that tests existing knowledge and re-caps on previous work. The pupils received feedback immediately and the overall performance of the class was displayed on the board. Knowledge gaps were identified and explained by the teacher. Pupils also voted to show how far in the coursework have gone. The pupils work on stage 6 which requires them to create formulae. The teacher explains on her monitor to pupils who have troubles starting their work while the rest of the students are working individually. The marking scheme was displayed on the whiteboard the whole time. The teachers inspected the progress and helped the students throughout the lesson.

### Case study 7

A female teacher was the participant of this case study. She is a primary teacher and ICT coordinator in her school. The subject of the case study was literacy, and the year of the class was 6. The lesson took place in their standard class. One TA and one special support assistant were also present. The special support assistant was only working with a specific student.

The objective of the day’s lesson was to learn the differences between narratives and scripts. The technology used by the teacher and the pupils was: an interactive whiteboard, and a projector. The children also used a personal whiteboard with a pen.

The lesson began with a re-cap of the previous lesson. Then the teacher uses interactive whiteboard to note the differences between narratives and scripts using different colours. It highlights the different types of clauses using the smart board’s colouring capabilities. The children then work in pairs and in small groups. A group of children along with the TA used the whiteboard, the rest are using pen and paper. When all have finished, do the same exercise in the whiteboard and the teachers explains any problematic areas. The TA was mainly working with the group who used the whiteboard.

### Case study 8

A female teacher was the participant of this case study. She is a secondary teacher and ICT coordinator in her school. The subject of the case study was ICT, and the year of the class was 9. The lesson took place in their ICT suite.

The technology used by the teacher and the pupils was: an interactive whiteboard, a projector, computers, Microsoft Excel, AB Tutor. The objective of the lesson was to work on a previously given spreadsheet coursework. The specific task was focusing on the design of a medical cost database. The students set their own individual objectives and identified the grade they would like to achieve at the end of the lesson.

The lesson began with an online exercise via the smart board to test existing knowledge. Feedback was given instantly and the teacher identified and discussed problematic areas with the pupils. Then she used slides on the whiteboard to describe each section of the lesson. Next, she used Microsoft word via the whiteboard to demonstrate how to do the changes. The students then worked individually under the sound of acoustic music. The teacher could monitor all the students work from her monitor and give appraisals via software. She also displays samples of students work. At the end of the lesson the students used the self assessment: AQA GCSE test to assess their performance against the target they set at the beginning. They also identified how they can improve and what they should have as homework.

### Case study 9

A female teacher was the participant of our ninth case study. She is a primary teacher. The subject of the case study was literacy and ICT, and the year of the class was 5. The lesson took place in their regular class. There were also one trainee teacher, two TAs (mothers), and special needs’ assistant.

The technology used by the teacher and the pupils was: an interactive whiteboard, a projector, laptops, video, and Microsoft PowerPoint. The objective of the lesson was to learn about adjectives by using descriptive and persuasive language in a holiday brochure, and to learn how to create a brochure of a chalet.

The lesson began with questions that tested existing knowledge. A YouTube video was displayed and the children had to write down as many descriptive words as they could. Due to a limited number of laptops students had to work on different task. Half of the students used a laptop to create a brochure and the other half worked in pairs and used paper brochures to identify adjectives they would like to use in their own work. The teacher demonstrated the use of technology and students actively participated in the demonstration.

The children are working on their tasks. The teacher is mainly focusing on the group with the laptops while the TAs on those working with the paper brochures. At the end of the lesson the teacher presents a very basic description of a chalet and the students had 2 minutes to improve the description individually. The best 6 descriptions were presented by the students. Last, all voted on the best features list.

### Case study 10

A male teacher was the participant of this case study. He is a primary teacher. The subject of the case study was maths and the year of the class was 6. The lesson took place in their regular class.

The technology used by the teacher and the pupils was: an interactive whiteboard, and a computer, laptops. The objective of the lesson was to identify and record steps or calculations needed to solve a problem or a puzzle, using symbols where appropriate.

The lesson starts with a maths game using the fruit box on the smart board. The students solved a number of puzzles explaining their reasoning and describing the processes. The lesson continued with another game called “got it”. The teacher demonstrated the game with a pupil on the whiteboard and then all worked in pairs. The final part of the lesson the students used laptops in pairs to access an online game. The teacher helped them to access the site by providing guidance.

### Case study 11

A male teacher was the participant of the eleventh case study. He is a secondary technology teacher. The subject of the case study was computer aided design (CAD) and the year of the class was 9. The lesson took place in their ICT suite.

The technology used by the teacher and the pupils was: an interactive whiteboard, computers, PowerPoint, YouTube video, and Excel. The objective of the lesson was to create an advert about a product that the students have designed before, using Microsoft PowerPoint.

The lesson began with a YouTube video of a very new advertisement as an example. Then he demonstrated from his computer how to access the file they had to work on. The students used PowerPoint to create a slide show using animation. The teacher assists the students throughout the lesson either by verbal instructions or by hands on. The last part of the lesson included a pen and paper test. The instructions and the questions of the test were delivered on the students computer screens. The students marked their colleagues work and the teacher recorded the marks in a spreadsheet. Feedback was given instantly by answering and explaining certain questions.

### Case study 12

A male teacher was the participant of this case study. He is a secondary literacy teacher and the subject of the case study was English and the year of the class was 11. The lesson took place in their regular class.

The technology used by the teacher and the pupils was: a laptop, projector, PowerPoint, Heinemann Interactive Software (audio file). The objective of the lesson was to explore the meaning of a poem “Not my business” through an analysis of language, structure and form.

The lesson began with a word wall poem displayed on the board where the students had to focus on the structure and identify its characteristics. Then a slide show was used displaying different people. The students were asked to identify them and talk about them first in pairs and then in the class. Afterwards, the students listen to the poem via the interactive software and talked about their initial impressions and thoughts. They also listen to the poet himself to read his poem and compared the two versions structurally. The teacher gives some background information about the poet and the poem in PowerPoint slides. He also let them know that he would upload the slides on the VLE.

### Case study 13

A female teacher was the participant of our last case study. She is a primary high skill teaching assistant and the ICT technician of the school. The subject of the case study was ICT, and the year of the class was 3. The lesson took place in their ICT suite. There was also one teaching assistant in the room.

The technology used by the teacher and the pupils was: computers, Compose Word Junior software, a CD player and a music CD. The objective of the lesson was to use software to organise and reorganise musical phrases using ions and to begin work on a longer musical composition on the theme of spring, summer, autumn or winter.

The lesson began with Vivaldi’s four season’s music. The children discussed what the music could represent and they chose one of the four seasons to work on. Then the teacher released the program and demonstrated with the help of the children how it works. The teacher made some changes on the themes and the children could see everything on their screens. After the demonstration, the children logged on with their own user names and passwords. They used the software to create their own compositions and the teacher and TA helped them out with whenever they needed to. At the end some of the creations were presented to the whole class the children tried to recognise the seasons.

# Conclusions and Discussion

The current study investigated teachers’ expertise in relation to ICT. The first part of the study focused on the demographic characteristics of our expert teachers. The results shown that many of these expert practitioners were relatively young but at the same time had considerable teaching experience. They hold various degrees with BSc in Education being the most common while only a handful of them had a degree in ICT. They taught all subjects and they had worked, typically, in less than three schools in their career. Finally, they had taken on additional responsibilities and duties in their schools and the majority of them had more than one responsibility.

Steinburg and Horvath (1995) in their work about expertise suggest that knowledge is key in developing expertise, but that knowledge only increases with years of teaching. Interestingly in this study, more than half of teachers were in the youngest age range and almost three quarters had teaching experience of between four and nine years. Whilst clearly no longer novices, 90% of these teachers also had additional responsibilities in their schools, suggesting that personal commitment and motivation are more important than ‘years on the job’ in developing expertise.

Within their classrooms, they created an environment similar to the one described by McBer (2000) in their study about teacher effectiveness. They found that effective teachers create learning environments which foster pupil progress by deploying their teaching skills as well as a wide range of professional characteristics. Outstanding teachers create an excellent classroom climate and achieve pupil progress largely by displaying more professional characteristics at higher levels of sophistication within a very structured learning environment.

Expert teachers seem to have a very clear idea about the qualities that expert practitioners need to have. The underline the importance of subject knowledge, pedagogic competency, enthusiasm, passion, sense of humour, love for children, empathy, and willingness to go the extra mile among other characteristics. They seem to consider as important all the attributes, knowledge, efficiency, and insight, that Sternberg and Horvath (1995) suggested in their work on expert teaching. As well as personal characteristics, teachers in this study also point to the importance of mentoring, opportunities to observe other teachers and time to practice new skills as significant factors in developing their own expertise.

Expert practitioners use a variety of technologies through their lessons. They usually use more than one technology during their lesson and they distinguish between technologies depending on the subjects they use and the aims they would like to achieve. For instance it is very common to use interactive whiteboard with software for monitoring pupils’ actions, giving feedback, online games etc to increase interest, attention and create a fun environment.

In addition, they seem to believe that the use of technology makes them better teachers, because it improves their teaching material, enables better cooperation and sharing of good practice among teachers, and supplies them with a very adaptable teaching tool that they can tailor to their needs. The sharing of ideas and resources among teachers has also been recognized as effective practice by other researchers (Levy, 2002; Becta, 2004). They also recognise that technology, when used efficiently, reduces the preparation time and extends their capabilities.

Expert teachers use new problems as opportunities to expand their knowledge and competence, and technology seems to be one of the best means to that end. Teachers see the use of technology not as an unsolved problem but as a challenge that will improve their teaching practices. It seems that they are driven by their own passion for personal development and technology can be a challenging new way to improve and develop. That almost all of these teachers were self taught is therefore suggestive of high levels of personal motivation and commitment to the classroom.

Aside from the skills required by all teachers, expert teachers also recognise an important link between engaging students in the classroom and the cultural and social world that young people inhabit. They recognise that technology is an integral part of young people’s life worlds in terms of everyday use and in the ways that young people interact with each other and so see as relevant an ability to engage with students using media they recognise and enjoy. They feel that ICT brings them closer to students and provides a common ground for communication. This notion seems to be very closely related to the argument that Sternberg and Horvath (1995) make for the need to understand the social and political context in which teaching occurs. They claim that expert teachers must know how to apply teaching knowledge in a particular social and organizational context. The teachers in this study do seem to recognise and value this need and they appear to take it into account in their teaching.

The Hay McBer Report, (2000) on teacher effectiveness, suggests that effective teachers in the future will need to deal with a climate of continual change in which new teaching media will become more prevalent. Therefore, the best practices need to become the standard for all and in order to achieve that climate that fosters continuous improvement needs to be created. One critical dimension is likely to be openness to the integration of good practice from other teachers, schools, regions or even countries. This will require a shift in culture so that real team working is valued, and mutual feedback – through lesson observation or other means – is embraced as an essential part of professional development. Experts recognise that all these practices are very important in their development and technology can improve and extend these practices.

The strongest general impact of technology across education relates to improvements in efficiency, notably the impact on the use of teachers’ and practitioners’ time. Studies have demonstrated that practitioners generally re-invest time they save into core tasks (PwC, 2004), thus giving rise to benefits in quality. Technology has delivered significant benefits to teachers in the use of their time.

Training and ongoing support is required for teachers to appropriately use new technologies and to support their selection of appropriate media and software. Training must be appropriate to the individual needs of teachers (Levy, 2002), linked to particular subjects and practical examples, and not a simple demonstration of the technology.

The experiences of these teachers echo the findings of other researchers (Becta, 2004) who have also commented on the importance of in-service support and training. Without this, it is unlikely that teachers will either be aware of, or be able, to exploit the potential affordances of new technologies. Finally, a high level of reliability and technical support should be available, to minimise problems when they occur. This is especially important as Digi-teachers are expert teachers, not technicians. Their focus is on the efficacy of learning, they need technical support to free them to focus on optimising the learning environment.

The role of teaching assistants is very highly rated by all expert participants in this study. They argue that technologically savvy TAs are an integral part of the teaching practice. They claim that ICT competent TAs help teachers to provide high quality teaching to all pupils without excluding anybody. However, they underline the difficulties to find ICT savvy teaching assistants, or even sometimes to train them and this is an issue, according to them, that needs to be addressed if we want to develop effective use of ICT in the classroom.

The Digi-teacher is an emergent phenomenon and much more research is needed to investigate them as a phenomenon. However, this developing group of teachers really do harness technology for learning for the benefit of all their students.

# Directions for further research

Future research might usefully attend to:

* Further work on identifying and characterising the Digi-teacher, are there, for example, sub categories?
* Whether subject identity strongly influences the Digi-teachers practice and therefore provides exemplary innovations for other subject specialists?
* Measuring the proportion of Digi-teachers in the workforce and evaluating whether other variables affect their development e.g. teacher training, school environment etc.
* Identifying which schools have high proportions of such teachers and what has led to this development.
* Investigating such schools to understand how this affects the successful learning of all the students and also whether there is a critical mass effect.
* Generating further case studies and ‘rich descr**i**ptions’ of Digi-teachers.
* Investigating how the effect of Digi-teachers can be either measured and/or evaluated.
* Investigating the skills and practice of Teaching Assistants in relation to their individual and professional use of ICT.
* Investigating the interactions of teachers and teaching assistants when ICT is deployed.
* Developing sophisticated indicators of the effect of Digi-teachers on student learning e.g. levels of engagement in students, degrees of student self-efficacy, better match between student *life world* and *school world.*

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# Appendices

## Appendix A



**Celebrating outstanding teachers**

**To all Primary and Secondary Head Teachers 30th May 2008**

Dear Colleague,

I am sure we are all in the business of celebrating good teaching and looking for exciting ways to share best practice. The Institute of Education is undertaking a project, funded by BECTa, to identify good teachers who are also effective in their use of ICT. The idea is to start with good teaching and not with technology. What we want to do is to understand how good teachers make best use of ICT in their teaching and how they learned this additional expertise. Over the next few months we hope to interview many teachers over the phone and then come and visit a sample of those teachers to see them at work. We are also very interested in teaching assistants who have developed ICT skills.

We hope you, or a suitable colleague, will be prepared to nominate one or more of your teachers who fit this category so that we can contact them and learn about their development. Eventually we will be able to describe how these good teachers [and teaching assistants] also learnt their ICT skills and so help others learn from them.

We would be very grateful if you could [with their permission] nominate one or more of your teachers or teaching assistants and simply email their name and a contact number or email address to:-

Andy Goodwyn at [a.c.goodwyn@reading.ac.uk](mailto:a.c.goodwyn@reading.ac.uk) or voicemail 0118 3788811 – if you would rather send a letter then send to The Institute of Education, University of Reading, RG6 1HY.

This nomination will only take a few seconds and will lead to your colleague being recognised for their teaching skills and will help other teachers to learn from them. All we want to do initially is to talk to them for a few minutes, at a time that suits them. All participating teachers and their schools will be acknowledged. It would be very helpful to have your nomination by **June 20th.**

Please do not hesitate to contact me if you would like to discuss the nomination process, there are more details on our web site at <http://www.reading.ac.uk/education/research>

Thanks for your help

Andy Goodwyn

## Appendix B



**Name.…………………………………….School Type…………………………**

**Interview Time and Date……………………………………………………………**

**Interview Carried Out By**………………………………………………………….

**Section 1 – Basic Biographical Info**

Q1. Which age range are you in?

**1** 25 – 34 ……

**2** 35 – 44 ……

**3**  45 – 54 ……

**4**  55+ ……

Q2. What is your original degree/training?

|  |  |
| --- | --- |
| **Degree** | Tick |
| English | **1** |
| Maths | **2** |
| Science | **3** |
| ICT | **4** |
| Geography | **5** |
| History | **6** |
| Art | **7** |
| Music | **8** |
| Other (please specify) | **9** |

Q3. What subject/s do you teach?

|  |  |
| --- | --- |
| **Degree** | Tick |
| English | **1** |
| Maths | **2** |
| Science | **3** |
| ICT | **4** |
| Geography | **5** |
| History | **6** |
| Art | **7** |
| Technology | **8** |
| Language | **9** |
| Music | **10** |
| Other (please specify) | **11** |

Q4. Do you have a particular specialism?

Yes………… **1**(If yes, please go to Q4i)

No…………. **2**

Not sure…………. **3**

Q4i. What is you specialism?

|  |  |
| --- | --- |
| **Specialism** | Tick |
| ICT | **1** |
|  | **2** |
|  | **3** |
|  | **4** |
| Other (please specify) | **5** |

Q5. How many years have you been teaching for?

Less than 3…………**1**

3 – 10…………**2**

10 – 15…………**3**

15+………...**4**

Q6. How many schools have you worked in?

1-3………..**1**

3-5………..**2**

Q7. Do you have any particular responsibilities in you current school?

Yes…………**1** (If yes, please go to Q7i)

No………….**2**

Not sure………….**3**

Q7i. What responsibilities do you have?

|  |  |
| --- | --- |
| **Responsible for:** | Tick |
| ICT | **1** |
| Senco | **2** |
| Head of year | **3** |
| Head of subject | **4** |
| Other (please specify) | **5** |

## Appendix C

Becta project: Telephone Interview Question bank

Aims:

-capture the teachers´ view of “good” teaching

-capture the teachers´ view of the role of technology

Preamble

This project is completely focused on helping teachers to improve their teaching. Since, you have been nominated by your headmaster/deputy/school as a good teacher,

all our questions are designed to learn from you. To learn about your views of good teaching and also how technology can be used effectively to help children learn.

Inform/remind the teachers that the interview is being recorded.

Section 1: is about their views of a good teacher

1. What are you enjoying about teaching?
2. What aspects of teaching you find less enjoyable at present?

As you have been identified as a good teacher by your school

1. What do you think makes a “good” teacher (TA)?
2. What do you feel are the reasons that have identified you as a good teacher (TA)?
3. Can you comment on what has helped you to develop and become a good teacher?

Prompt them if you see that they have not mentioned any of the following:

e.g. - Personal commitment

- Original training/ongoing training/outside connections and networks

- Support from colleagues

- Enabling environment

- Anything else

You have not mentioned anything about ……………….. do you think that is an important factor?

Section 2: use of technology

1. What has interested you about using technology in your teaching?
2. What technologies do you use?

or

-What technologies do you like the most?

1. What is the most effective/useful technology/medium that you have used and why?
2. How did you learn to use these technologies?

Prompt them if there is a need:

-alone?

-had training?

Online courses?

-etc

or

-Did you receive any training?

1. Has the use of technologies helped you to resolve certain challenges or problems in the class?

Can you give me an example?

1. How much of the time do you use technology into your teaching?
2. What are the benefits of using technologies in teaching?

Are there any benefits for the

* 1. For the teachers
  2. For the pupils

1. Are the children involved in the use of these/any technologies during the lessons?

(distinguishes between expert and experienced teachers)

1. Do you explain the use of the technology (at the beginning of the lesson) to the pupils?

(distinguishes between expert and experienced teachers)

1. What do you think that would help more teachers to become effective with technologies?

E.g. more resources

more training

etc.

1. Looking back, what have been the most helpful things in enabling you to incorporate technology into your teaching?
2. What do you think is the role of TAs in using technology effectively in the class?

Can/Do they help? How?

1. Have you heard about Becta before?
2. What is your view on the role of Becta in helping teachers with new technologies?

Prompt: Has it helped you?

Closing section:

1. Would you be interested in having a more detailed interview at your school?
2. Would we be able to observe a lesson of your choice, at a time that is convenient for you?
3. Do you still feel as enthusiastic about teaching as when you started teaching?
4. Would you like a transcription of the interview?

## Appendix D



**Case study Episodes**

**Name:……………………………………………..….** **School: ………………………………….………**

**Case Study Time and Date:…………………………………………………………………..……………**

**Interview Carried Out By:** ……...........................................................…………………….

**Pre-lesson Interview**

* Lesson plan
* Scheme (the lesson is part of a bigger plan, e.g. Weekly plan, term plan). Is the lesson part of a bigger plan? / Where does it fit in relation to the term plan?
* What lesson are you going to teach?
* What are the objectives of the lesson?
* What is the relation of today’s lesson in regard to the national curriculum?

Is there a specific document? Can we have a copy? /Where can I find it?

* What would you like to achieve with the lesson?
* What are you trying to do with that class?
* How do you see them progressing?
* Are you focusing on particular pupils?

**Post-lesson Interview (Transcript)**

Q. How do you think did it go?

A.

Q. Have you achieved your aim/aims?

A.

Q. How successful was the technology?

A.

Q. Why do you use ICT?

A.

Q. What did you find worked well?

A.

Q. What was the benefit of using technology in the lesson?

A.

Q. What the technology has added that it was not possible without it?

A.

Q. What you would like to do if you had the resources?

A.

## Appendix E



**Name:.… Graham Pricket ….** **School: …Secondary…………**

**Interview Time and Date: …19:00 Wednesday 08/10/08……………………**

**Interview Carried Out By:** ……Aristidis Protopsaltis…………………….

**Interview Duration: 23:35 min**

**Section 1 – Basic Biographical Info**

Q1. Which age range are you in?

25 – 34 … ..

35 – 44 ……

45 – 54 …✓ (50)…

55+ ……

Q2. What is your original degree/training?

|  |  |
| --- | --- |
| **Degree** | Tick |
| English | **1** |
| Maths | **2** |
| Science | **3** |
| ICT | **4** |
| Geography | **5** |
| History | **6** |
| Art | **7** |
| Music | **8** |
| Media | **9** |
| No Degree | **10** |
| Other (please specify)  BS in Education | **11**  ✓ |

Q3. What subject/s do you teach?

|  |  |
| --- | --- |
| **Subject** | Tick |
| English | **1** |
| Maths | **2** |
| Science | **3** |
| ICT | **4**✓ |
| Geography | **5** |
| History | **6** |
| Art | **7** |
| Technology | **8**✓ |
| Language | **9** |
| Music | **10** |
| Media | **11** |
| Other (please specify) | **12** |

Q4. Do you have a particular specialism?

Yes………… (If yes, please go to Q4i)

No…✓…….

Not sure………….

Q4i. What is you specialism?

|  |  |
| --- | --- |
| **Specialism** | Tick |
| ICT | **1** |
| Media | **2** |
|  | **3** |
|  | **4** |
| Other (please specify)  Used to be graphics specialist | **5** |

Q5. How many years have you been teaching for?

**1** Less than 3….…

**2** 3 – 9………

**3** 10 – 15…………

**4** 16+…✓ (27)……...

Q6. How many schools have you worked in?

**1**  1-3…✓ (3)..

**2** 3-5………..

Q7. Do you have any particular responsibilities in your current school?

**1** Yes…✓… (If yes, please go to Q7i)

**2** No………….

**3** Not sure………….

Q7i. What responsibilities do you have?

|  |  |
| --- | --- |
| **Responsible for:** | Tick |
| ICT | **1** |
| Senco | **2** |
| Head of year | **3** |
| Assistant Head of year | **4** |
| Head of subject | **5** |
| Assistant Head of subject | **6** |
| Other (please specify)  Head of design and technology  Duke of Edinburgh awards coordinator | **7**  ✓  ✓ |

**Transcription**

Greetings

I introduce myself and explain the reasons I am calling

Description of the project by the interviewer

It is a Becta funded project and the aim is to:

-capture the teachers´ view of “good” teaching

-capture the teachers´ view of the role of technology

This project is completely focused on helping teachers to improve their teaching. Since, you have been nominated by your headmaster/deputy/school as a good teacher,

All our questions are designed to learn from you. To learn about your views of good teaching and also how technology can be used effectively to help children learn.

Q. What do you enjoy most about teaching?

A. I have been teaching now for 27 years, I just enjoying being in the classroom. I don’t enjoy paperwork for the sake of paperwork and I don’t enjoy all the other bits and pieces. I can’t stand enjoying marking, but I actually enjoying being with the kids and actually seeing them thrive and see sparks in their eyes when you tell them something that they find interesting.

Q. Anything else that you don’t enjoy?

A. I don’t enjoy paperwork for the sake of paperwork. I don’t enjoy things being forced on me, like for example, I was told to do a continuing professional development short of scheme on a particular day. I think teachers are fairly autonomous people and I don’t necessarily need to be told that.

Q. Since you have been identified as a good teacher, what do you think makes a “good” teacher?

A. Well, I would say that I am a good teacher. That is for others to say really.

Q. They told us already. You have been suggested by someone else.

A. Yes, I know that. My idea of a good teacher is somebody that does the job really thoroughly. Somebody that actually makes sure that it is not just their job. I mean I spend many many hours every evening and many many hours every weekend and certainly many many days during the holidays, just trying to make things better. And to be honest with you I succeed partiality, but there are so many other things I need to do and I want to do in order to make things better, but I just don’t have the time.

Q. Can you give me some examples?

A. Well, for example, tonight I should be writing like a guide for the new A-levels syllabuses, so that the students can actually access it online. Just when I thought that I had that actually shorted they changed the syllabus. I’ve already done it once last year and the year before and now they changed the syllabus and I have to do it all over again.

Q. What do you feel are the reasons that have identified you as a good teacher?

A. I think possibly because I am open to changes. I think the management in the school probably feel that I want to be part of the school in a wider sense really. Take part in as many different things as possibly can, because I think, you know, good teachers are not necessarily just confined to the classrooms. I think they have to have wider input into the school environment.

Q. Can you comment on what has helped you to develop and become a good teacher?

A. I think is mostly cos I like kids. You know I see other teachers I wonder whether they actually like kids. I mean, I have been teaching for 27 years, I still like teaching them, and I still like their “unfiled” approach when you actually teaching them something and you can see that they not...I suppose in some cases, persuaded from what they hear in the news and things like that, it’s nice to be able to give impartial view of life and let them make their own decisions really.

Q. What do you think is the role of the school or of the colleagues in helping you to develop?

A. Well, I like the school I am at, and I like the school purely because the management wants to be part of the education of the children. I came from a school where I think the management show themselves more as management and nothing else. And you know, I like to see for example, you know my Head teacher going around and picking up litter. This is very basic thing, but she sets the example by the way she leads, while the previous Head teacher would not being see outside her office. And I don’t think that sets the right tone for her.

Q. What has interested you about using technology in your teaching?

A. I started my career when technology was really a bundle sheet for handouts and things, and I am now able to produce quality of handouts, quality of presentations, and lessons which professional companies wouldn’t be able to produce 15 and 20 years ago. I am able to use all short of different resources to try and you know make them learn for different angles.

Q. And why did you start using them? Is it just for the quality of the results?

A. I think to start with this course, when ICT for example came in, it was expected and everybody had to go through the training and the opportunities offered. I think they were people who were quite resistant again and some people who show the opportunities involved and I think I was probably one of those people.

Now I use it in all short of things, I think email is a really important thing for me, and I spend a lot of time emailing students about their work and they spend a lot of time emailing me. Because I don’t think, well my job does not seem to stop now when I get home

Q. Any other technologies that you use?

A. Well, I use email, I use, I am technology teacher and I use computers in a wider sense, I mean we do a lot of work with computer aided design. I use lots of have machines for computer aid manufacturing, things like laser cutting, cameras, I use simulation software for electronics. I use the Website for lots of research and for finding out peoples’ opinions, Wikipedia and all these things. I mean it just opened up the world really, where by...you have access to all short of data. But unfortunately I think it can make students quite (blasé?) and quite lazy, because they don’t, they don’t have to actually do very much a part of a few mouse clicks, to access information.

Q. What is the most effective technology that you have used?

A. I think I would probably have to say is a cross up between PowerPoint and the use of email to contact children. I am actually in charge of the Duke of Edinburg awards scheme of the school as well, so I have about 150 children and I contact them about exhibitions, I used to set learning platforms, huge amounts, in order to try to give them access to various things that we’ve done in the lessons.

Q. How did you learn to use these technologies?

A. I was managed to... (he he) picking it up. I mean to start with, I was always very keen on computers, being a technology teacher. I can remember buying... I think it was an old Atari to start with. You know I remember, word processing where it was all black screen and every time a new development comes out, I am a bit of a gigy type and I just always want to find out what it can do for me. So, I kept up with it as a personal interest I think.... I don’t necessarily find the courses that run at school particularly useful because probably I am quite long way ahead further than other members of staff in that respect.

Q. Has the use of technologies helped you to resolve certain challenges or problems in the class?

A. That’s a difficult question…Maybe I have to come back to that. I have to give it some thought.

Q. Ok.

Q. What do you think are the benefits of using technologies in teaching, for the teachers and for the pupils?

A. One of the things that the children find very difficult, I mean technology is now in schools, is all about industrial techniques and industrial processes and I can’t take the children out of the classroom to show them that, but I can bring things into the classroom. So you know I’ve got the simulating software, will show them for example how screen printing is done, I have got simulation software to show them how things are made in practice, you know from that point of you I think is really important, so they can see how things is done. I think because technology is constantly moving, I mean 10 years ago I would have had a video and I will used it each year probably for 10 years, I would have probably shelved it when it want out of date, but nowadays things move on and you constantly update things, and there is a lots of free stuff on the web as well. Thinks like…you know YouTube and things like that that support your teaching, and it’s all fairly current and it’s more like the cutting edge than it used to be, so from the kids points of view its things like that.

One disadvantage from my point of view it takes an awful lot longer to put together lessons because… I try to pack so mach I guess… to use IT in lots of different ways.

Q. Are the children involved in the use of these/any technologies during the lessons?

A. Well, I mean our students use it all the time. So much so we have a school system at the moment, we are buying computer, paper, for using computers and printers and photocopies and things like that, centrally for us and if we wanted to have paper to drawn on and thinks like that we have to buy that departmentally, and we very rarely buy very much paper, because all the work we do tend to be printed out, the girls actually word process everything they do.

To come back to your previous question, has it helped? Some of the challenges in terms of children with learning difficulties, it is actually, it has been quite an advantage, they can produce some really good looking stuff despite limited ability, and then it can actually been put alongside somebody else’s, its good quality stuff. And its build their self esteem from the point of view, they can see they can produce almost as good as somebody else. That’s quite a good thing.

Q. How much of the time the use of technology takes up from the lesson?

A. Well, it is a little bit difficult to quantify because it depends on what I’m doing…I have my computer, my laptop connected to a projector, every lesson for the entire hour, because quite often I put my laptop…cos my laptop is like short of a mobile office, I have all short of resources on there, and if I am talking about something to somebody, then it’s quite easy for me to just click of a few buttons and refer to it and say here is a picture of that, have a look at it. All of my schemes of work are on there, every handout that I have produced is on there, as well as every learning platform. So I don’t think you can really separate out. I think is a critical part of the lesson all the time.

Q. Do you explain the use of the technology to the students? Do you think that there is a need for that?

A. I don’t think I need to explain much these days, the basic processes, using say the Microsoft Office because they go through whole courses all the way through, and sometimes they know certain tricks I don’t know and I learn from them. Sometimes they need to have their understanding of technology broaden out so they can see the wider uses, and I see that as part of my job really.

Q. What do you think that would help more teachers to become effective with technologies?

A. I think the old allegory that you can take a horse to water but you cannot necessarily make it drink apply to many teachers. I mean I am coming up to 50 and they are people who I suppose are not naturally comfortable with technology and sometimes you know it tends to be subject related. Say that they are teachers that they have gone through an art and design type route or drama type of route, subjects, they are doing the subject because they like those skills involved and they are not actually very comfortable using ICT or technical skills. Although is necessary for everybody to be computer literature, I think there is a short of bottom line. I think most teachers are, they have a bottom line, but whether they decide to take a stage further and use some type of software in their teaching, depends upon their subject, depends upon their personality and in they... general willing to do it, but it’s nothing in our job descriptions which says that we have to use it everywhere...

Q. What have been the most helpful things in enabling you to incorporate technology into your teaching?

A. IT support is really important. We’ve got a team of three guys who will come out and short out anything that went wrong. Having good quality equipment, for the 3500 pound laser printer and you know for the 10500 pound laser cutter, those things...really boost... the girls...self esteem and their understanding, you know they are there to produce quality, and I think without those, if were still using small insignificant inject printers probably they wouldn’t treat it the same.

Q. What do you think is the role of TAs in using technology effectively in the class?

A. Well again, TA’s are not necessarily...specialists in everything and you know who we get as teaching assistant doesn’t necessarily reflect their ability in use of IT and technology. When they place a teaching assistant they tend to short of place them within their specialism they like and sometimes we find that TA’s become another member of the class in some respect, and you know it’s a learning curve for them, and especially if you are using a piece of computer aided design software, fairly specialist piece of software, and they have to learn to use it in the same way that the children use it, and they are only a few steps ahead.

Q. Do you think that some extra training will help?

A. I am sure that that would be the case, except that, because we don’t necessarily get the same learning support, the same person for the same job, you will have to train everybody across the board and that’s not necessarily physically possible.

Q. Have you heard about Becta before?

A. In the back of my mind, but if you ask to describe what you do... I wouldn’t be able to do it.

Q. Just if you knew I would like to know your view on the role of Becta in helping teachers with new technologies?

A. No, I don’t know

Q. I briefly describe what Becta does.

Q. Would you be interested in having a more detailed interview at your school, at a convenient time?

A. Err well, Yes (a bit hesitant at the beginning)

Q. Would we be able to observe a lesson of your choice, at a time that is convenient for you?

A. Yes, that wouldn’t be a problem. I get people coming all the time.

Q. Do you still feel as enthusiastic about teaching as when you started teaching?

A. Do I still feel as enthusiastic? I still feel as enthusiastic but if I won the lottery today I would probably hand my notice in. I would really miss the teaching but, for example my week is...so hectic, I mean I come home in the evening and all I can do is sleep. And then I might do another hour or two and it’s every evening.

...The management promotes this work - life imbalance by scheduling meetings and not give us the trust and the autonomy to do what we want. ...

Do I still enjoy it? Yes I do enjoy otherwise I wouldn’t be in it.

Q. Would you like a transcription of the interview?

A. Not really.