Review of Best Practice 
in the use of ICT 
in Education

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eTQF – A Framework to Support Teachers CPD in the use of ICT (135297-LLP-1-2007-1-IE-KA3-KA3MP)

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1. EXECUTIVE SUMMARY

The purpose of this research document is to provide a review of best practice in the use of ICT in education. This document marks the beginning of an exciting research project which seeks to identify and develop a framework to support teachers’ continuous professional development in the use of ICT. The project will therefore identify and describe emerging technologies which are most likely to have a major impact on teaching, learning and expression within the classroom.

The review is to identify specific examples of best practice across the education forum. The study is based on four groupings of education: primary, secondary, further education and higher education. This secondary research shows how each specific sector sample has used ICT to the best of their ability to improve their learner environment and experience.

The report takes a look at the experiences of other European institutes and how they have been progressing to embed ICT into the educational environment.

Continuous Professional Development is also an important element of how successful ICT will become if nourished and developed. The continuous motivation and re-skilling of staff on all levels will provide interactive learning materials and achievement for both staff and student.

The review also summarises the ITQ initiative in the UK and looks at the CEF and how this conceptual framework is set out and developed.

Overall this review aims to elaborate on what has been achieved in education by the implementation and use of ICT. It is hoped that this review will assist in the development of the eTQF framework which is the next stage of the eTQF project.
2. REVIEW OF BEST PRACTICE IN THE USE OF ICT IN EDUCATION

Information and Communication Technology has proven to have the ability to transfer many of the processes and systems in present day society, the education system being no exception. Most schools, however, only introduced ICT in their schools after realising that their pupils and students needed new skills or because they were ‘focused’ to integrate ICT in their programmes by local governments.

In today’s society the learner: computer ratio continues to improve, particularly in secondary schools, assisted by the growing availability of laptops and wireless networks. The use of ICT resources in lessons by teachers has continued to grow, both in schools and Further Education (FE) colleges, driven to a large extent by the adoption of interactive whiteboards and related technologies. Schools are also beginning to provide access to their networks from remote locations for staff and pupils. In secondary schools and FE colleges, learning platforms give practitioners and learners access to growing repositories of digital resources, increasing the range and quality of materials available.

In the FE sector, the learner: computer ratio is largely unchanged. However, unlike the schools sector where adoption and use of learning platforms is slow, in FE the adoption and use of Virtual Learning Environments (VLEs) continues to grow, though the majority of colleges still fail to use this as their main platform. There is a noticeable increase in remote access to learning, which suggests a trend to allow learners access to their programmes at a time and place to suit them, but the primary function of learning platforms continues to be as repositories for course materials and resources. Educational leaders are planning further investments in technology infrastructure not only to sustain existing provision but also to keep pace with constantly changing priorities and educational needs.

To understand how ICT is shaping education at present it is relevant to select examples of best practice from across the spectrum such as: Primary, Secondary, Further and Higher Education.

Below are the four educational institutes which have shown best practice throughout their proceedings.

1. **Primary education**; Forthill Primary School, Dundee Scotland
2. **Secondary education**; Aquinas Grammar School Belfast
3. **Further Education (FE)**; South West College, Omagh Campus
4. **Higher Education (HE)**; South West College, Omagh Campus
Primary Education

Forthill Primary School is a large primary school in Broughty Ferry, a suburb of the city of Dundee, opened in 1964. The roll of the school is currently 484 pupils.

The staff team consists of the head teacher; two depute head teachers and 16 full-time class teachers. There is also a full-time support for learning teacher.

There is an integrated nursery class, the nursery accommodates forty pupils in the morning and another forty in the afternoons. There are three nursery nurses and a full-time nursery teacher.

There is a very warm and welcoming atmosphere in the school and a strong sense of identity and pride conveyed by pupils and staff alike. The good working relationships and the positive attitudes to work are reflected in very high standards of attainment achieved by the pupils across every measure. The use of ICT is embedded in the practice of learning and teaching across the school and, as will be seen from what follows in this portrait, it is the belief of all concerned that ICT has played its part in these successes.

When the current head teacher took up post ten years ago, the school had a reasonable number of BBC micro-computers and some Acorn machines. Some staff had been using these computers regularly and had developed some knowledge and skills in their use. The head teacher quickly took up offers of local authority and government funding for new equipment to move to PCs, and the older computers were soon all replaced with new equipment.

From this early start, she has taken the school forward in a few years to the position where there is a "tangible ethos of ICT" across the school. Teachers’ confidence and abilities in using computers varied enormously five years ago; a few had barely touched a computer, while one teacher had been seconded as a staff tutor in ICT for the education authority. Now all staff are confident users and some are highly skilled practitioners who can spread good practice and support their colleagues. This has been achieved by accessing all available sources of funding and taking up all opportunities for staff training and support very effectively.

School Aims

A sample of the school’s aims suggests areas within which this ethos of ICT has been nurtured and developed. For example, the school aims to:

- provide a stimulating, appropriate, progressive and balanced curriculum which promotes independence, achievement and attainment and meets the needs of each pupil;
- equip pupils with the foundation skills, attitudes and expectations required to prosper in a changing society and to encourage creativity and ambition;
- develop ways in which individuals and groups can contribute to the well-being of the school and the local and wider community; and
- Recognise and appreciate personal strengths and achievements.

The opening paragraph of the school’s policy for ICT stresses the importance of developing the appropriate attitudes to the use of technology in children’s education. “With the rapid growth of Information and Communications Technology (ICT) throughout the world, we recognise that in the primary school we have an important role to play in awakening and developing our pupils’ awareness of all forms of ICT, and in assisting them to develop the necessary skills to use them with confidence and to realise the potential of these powerful tools.” Headteacher Forthill Primary School

**Infrastructure, hardware and support**

The school is now very well equipped for ICT. Each of the sixteen classrooms at P1 to P7 has three modern PCs, each with a dedicated colour printer, and access to several scanners. There are two PCs in the nursery and a suite of 17 in the library resource centre. There are interactive whiteboards with ceiling-mounted projectors in six classrooms at the moment, and the headteacher has firm plans to increase that number as funds allow. In addition, classes have access to four digital cameras and one digital video camera. All classrooms and the library resource centre have Internet access through a leased line connection.

Even with this large number of computers, there are still some constraints on pupil access and use, especially since many of the classes have 30 or more pupils in them. The library resource centre is in regular use, mostly for pupils to undertake specific tasks and projects. The headteacher is also concerned about the need to replace ageing equipment in a relatively short time-frame. This is likely to become a more serious issue in the next few years as the large bulk of computers supplied under the 28 government’s national programme, the National Grid for Learning (NGFL), reach the end of their useful lives.

Each P1-P4 class has its own e-mail address and each pupil in P5-P7 has their own e-mail address.

The school has its own website which was designed by the pupils, using HTML coding, with some help from IT specialist staff from within the education authority. In each school year, new members of the senior classes are invited to join the web team to maintain and update the site. The team works collaboratively in these tasks, and consults regularly with pupils in all classes. Staff and pupils regard this as an ideal opportunity to develop and extend their ICT, language and social skills. A separate set of web pages has been designed by P7 pupils to provide support materials for a local study topic being carried out by pupils in P3. Both sites are hosted by the local education authority on their own servers.

The education authority, Dundee City Council, has been very supportive of these developments, both in terms of hardware provision and technical support and in the provision of appropriate training for staff. ICT co-ordinators and staff tutors from the authority have provided basic skills training, they have been involved in the delivery of the New Opportunities Fund (NOF) training in the use of ICT in teaching and learning, and are currently providing classes in the European Computer Driving Licence (ECDL) scheme.
General observations

Although the increasing use of ICT has undoubtedly brought about many changes in the experiences for pupils in the classroom, all but the oldest of them are probably unaware of the true extent of these changes. For most pupils in this school, using technology is as natural to them as using a textbook or any other learning resource.

What is a major change for them is the most recent application of technology, the use of interactive whiteboards in an increasing number of classrooms, mainly in the upper stages so far. Pupils at these stages are rapidly getting used not only to seeing lessons delivered using the whiteboard as the main source of information provision, but also to being involved in the lesson themselves, as they take turns to enter information and solve problems directly on the board.

Teachers in the school have used national guidelines to plan for the delivery of basic ICT skills and have produced grids and checklists to ensure appropriate progress at each stage. In doing so, they have not turned to any commercial or education authority package for materials, but have developed their own resources largely designed to deliver appropriate ICT skills within the existing curriculum. In other words, the use of ICT has not been seen as a separate subject lesson, but simply as an integral part of a language or maths lesson, or to support work in a topic in science or social studies.

The school is increasingly turning to digital photography to develop further pupils’ skills and knowledge base, and to involve them more directly in their learning. The use of the digital still camera is already well established across the school, and some classes are now beginning to use the digital video camera for specific projects. One group of pupils in P6 spoke with great confidence and good background knowledge about their collaborative work in planning, scripting, casting, filming and editing a short film about their enterprise activity.

The school had recently acquired three webcams and intended to explore further the potential of videoconferencing in the near future.

Specific classroom examples

In P2, pupils were developing their numeracy skills by completing exercises on a number square. While the main exercises were done on worksheets, the teacher used the interactive whiteboard to teach the skills and reinforce pupils’ learning, as each pupil took it in turn to move numbers around and enter them into the appropriate part of the square with the board’s stylus. The programme for this task was accessed online from the BBC’s education website. While this was happening, a small group of pupils were using appropriate software on the other two PCs to extend their number work, having already completed the main lesson successfully. In both cases, the interactive nature of these learning experiences meant that the pupils were more likely to be motivated to learn and would recall that learning more readily. They already had confidence in mouse, keyboard and desktop skills.

In P5, pupils were studying world religions, using a CDROM as the source for research into aspects of Islam. Some pupils were consolidating their acquired knowledge by completing a text-matching exercise developed by the teacher specifically for the purpose. By this stage, these pupils were
confident users of computers, and were able to discuss with some confidence and understanding the uses of ICT in their learning. Almost all had access to a computer at home, and used the Internet regularly.

In P6/7, pupils were working in the library resource centre, using a website to research aspects of the Christmas story and the nativity. They were downloading relevant information then summarising what they had learned in their own words. Their research, editing and keyboarding skills were all being challenged and developed. There were also a few P4 pupils using the computers in the centre to complete the printing of their Christmas cards. The atmosphere was relaxed but very focused and productive; it was a "hive of ICT activity".

During these activities, the pupils were supervised by two of the classroom assistants, who provided informed and well-judged support to pupils on their tasks. Both classroom assistants had very good ICT skills themselves and were highly valued by the teaching staff for the quality of these inputs.

In P7, both classes were learning through the medium of the interactive whiteboard. This was already an established part of classroom practice for the teachers and the lessons were very well organised. In one class, studying mathematics, pupils were able to solve problems set in the context of geometric shapes, by drawing solutions directly on to the board, and getting immediate feedback on their accuracy. At the same time, other pupils were using PCs to develop their skills in turtle graphics using the Superlogo software.

**Everyday classroom practice**

Teachers in this school were now using ICT just as they would any other teaching and learning resource as an integral part of their classroom practice. Although the degree to which this was embedded varied according to the expertise and confidence of the teacher, all pupils in all classes had frequent and well structured opportunities to learn with and through the medium of ICT.

Teachers’ plans included the use of ICT as a matter of course, not just to support learning in language and maths, but to enable and encourage pupils to conduct independent research for their work in topics and other subject areas.

ICT enabled teachers to plan appropriate support for those pupils who needed extra help and consolidation, particularly in language and maths work. This meant that they could provide appropriate support when required but could spend the rest of their time directing learning for the rest of the class.

All staff were convinced that the use of ICT motivated pupils in many lessons, and helped to retain their interest and concentration span for longer periods of time.

**Continuing professional development**

The teaching staff have all completed the New Opportunities Funded training with support from the education authority’s staff tutors. Further training is now being offered by the staff tutors who work alongside teachers to extend pupils abilities in ICT in classes or smaller groups. In-house
support and training is provided by the school’s own ICT co-ordinators. The local authority’s own IT section provides training for specific software applications such as Microsoft Office. There are also a number of twilight classes on offer for ICT within the education authority’s In-service Directory.

Organisational changes

The aims and policy statements of Forthill Primary School make it very clear that ICT has a very important part to play in the education of its pupils. The headteacher and her staff demonstrate a strong commitment to the use of ICT to enhance the learning experiences of pupils and to improve aspects of the management of the school. The commitment and enthusiasm of the headteacher has been a major factor in the success of the school in taking forward the use of ICT to its current high level. She has skilfully managed the school’s budget to provide a wide range of ICT resources and to train and support staff in its effective use. Continuing developments in and using ICT are a constant feature of the school’s planning for improvement. These plans take careful account of the school’s changing needs as well as the training needs of staff.

Staff training and support

As stated earlier, all staff have completed the NOF ICT training scheme organised by the education authority. A few of them have now opted into the advanced level of the ECDL to develop further their skills. Some also attend twilight classes run by the staff tutors in the authority. Many of these teachers have come a long way in their skills levels, confidence and attitude to the use of ICT in the last three or four years and most are keen to make increasing use of ICT in teaching and learning. The recent appointment of a former ICT staff tutor to a permanent teaching post in the school can only further enhance the school’s ability to support and mentor its teachers in this area.
Secondary Education

Aquinas Grammar (Aquinas) is a co-educational selective post-primary school situated in south Belfast; it caters for pupils aged 11 to 18. Currently there are 770 pupils enrolled, with 55 teachers. The school was established in 1993. It has benefited from a new build programme, which was completed in December 2002; the layout and facilities in the new building are excellent.

Aquinas is an ICT-rich school where the development of ICT is effectively and enthusiastically led and co-ordinated. There is a clear vision for the further embedding of ICT to support learning and teaching across the curriculum. The continuous professional development of all staff is strongly valued and central to the work of the school. A hard-working, dynamic and effective core team exists and the staff embrace ICT with commitment and enthusiasm; most are competent in the use of ICT as a learning and teaching tool. The school management team (SMT) places an appropriate emphasis on self-reflection and on the evaluation of the quality of the pupils’ learning experiences, including the influence of ICT.

"The big things that happened here were intuitive. There was an opportunity which fitted in with the vision and culture of the school." Principal

The potential of ICT to support learning is well understood and valued by the staff. As part of the new build programme the SMT decided to invest in Promethean Interactive Whiteboards, connected to ceiling-mounted data projectors. It is noteworthy that an inclusive approach was adopted by the SMT, and an interactive whiteboard was installed in all 44 teaching spaces. The interactive whiteboards, aligned to considerable staff development in both the operation of the new technology and its associated pedagogy, have had a very significant beneficial effect on the use of ICT as an aid to learning and teaching.

The accommodation and resources for ICT are excellent. The ratio of pupils to computers is 3:1. A comprehensive network, with broadband Internet connectivity, has been established. In addition to the centralised suites, the computers have been distributed to good effect throughout the school. Excellent use is made of the interactive whiteboards to enrich teaching and learning across the full range of subjects. The pupils have ready access to computers in subject.

Classrooms; they use them for research and presentation. In addition, they have good access to computers in the school library before, during and after school.

Aquinas is a pilot school for the roll-out of the Classroom 2000 (C2k) post-primary ICT managed service solution. This has been installed recently and the school reports generally high levels of satisfaction with the new system and associated service backup. Through C2k, the school received an additional 111 high-specification networked computers, a good range of peripheral devices and a comprehensive bundle of good quality curriculum content software. The teachers have access to the C2k computers.
for both curriculum and administrative use. As a result of the C2k initiative, staff and pupils have much improved access to ICT equipment and software.

"There is fantastic potential with C2k. The developments here happened the right way around, Aquinas had ICT in subject classrooms before C2k was installed." Principal

The relationships between the pupils and the teachers are excellent; a noticeable ethos of cooperation and teamwork is evident during lessons. The pupils value highly the support and encouragement of the teachers and almost all of the pupils interviewed reported that the teachers were the main strength of the school.

The SMT have made crucial decisions to introduce an effective computer infrastructure which has supported the creative integration of ICT across the curriculum, and resulted in the establishment of a more professional and expert teaching staff. The teachers have a growing competence and confidence in using ICT. The SMT enables and encourages peer classroom observation; a culture of shared experiences exists among staff and the core team for ICT is dynamic in promoting the continuous professional development of the staff in ICT. In 2002, Aquinas was an Education Technology Laureate Award winner in Northern Ireland (NI).

Changes for pupils

The pupils are motivated by the use of ICT and they talk with confidence about the influence ICT has on their work across a range of subjects. There is considerable evidence of the use of ICT by the pupils at all levels in the school, and they are competent in the use of a range of appropriate software applications.

The teachers noted that the attention span of the pupils increases when they have the opportunity to focus on the interactive whiteboard. The pupil’s interest is clearly stimulated by the use of visual imagery, short video clips, animation, colour, graphics and sound. The pupils also help each other with the technology; learn from one another and they are keen and confident enough to assist the teachers if a problem arises. The impact of the interactive whiteboards on learning and teaching has been sustained. The pupils report continuing high levels of support for this type of learning. There has been an increase in pupil autonomy and they take greater responsibility for their own learning than before. A more collaborative culture for learning and teaching has emerged and this is seen in the growing use of group and paired work. The pupils are now involved in lesson planning activities to a certain degree. There is a suitable emphasis on study skills and how pupils learn in different ways. The teachers have created online resources, including websites and multimedia presentations for the pupils to access outside class time.

The pupils in years 8 and 9 are taught ICT skills in discrete lessons. The co-ordinator works hard to assess the ICT skill levels of the pupils on their entry to the school. She uses this information well to ensure that all the pupils are challenged by the activities undertaken in the taught programme, and that they learn new skills. The formal ICT programme is characterised by: the high quality of the teaching and learning; the very good ICT skills displayed by the pupils; the excellent planning and preparation which sets appropriate teaching tasks in a range of subject contexts; and, the opportunities provided for the pupils to self-assess the quality and extent of their ICT skills. The
school is using the Council for Curriculum Examinations and Assessment (CCEA) Scheme of IT Accreditation at Key Stage 3, as an appropriate means of external assessment and accreditation of the pupils’ ICT achievements at the end of year 10. The formal ICT lessons are complemented effectively by this cross curricular approach to ICT. A good range of subject departments contribute to this assessment.

The learning of modern languages is enriched and broadened by the range of ICT applications used by the teachers. The teaching objectives for language learning are well served by the technology and the approaches adapted by the teachers. The teachers make extensive use of the target language and exploit the interactive whiteboards judiciously as an aid to whole class teaching. There are good opportunities for brisk oral question and answer sessions. Using the interactive technology, the Spanish teacher was able to highlight and hide important aspects of language and the pupils enjoyed guessing the correct answers. The pupils are motivated by the challenging and stimulating tasks set; they are involved in their learning, act as teachers and get the opportunity to use the technology for themselves. In Irish, there is an appropriate emphasis on grammar. The teacher presented model phrases on the screen and the pupils engaged in an oral gap-filling exercise designed to consolidate key grammar points. In a single lesson the pupils had opportunities to practise all four skills of language learning.

The science department has firmly embraced ICT as a learning and teaching tool, and the inspectors noted several instances of the excellent use of ICT to extend the pupils’ knowledge and understanding of complex concepts. Several teachers require the pupils to complete worksheets online and they have regular opportunities to enhance the content and presentation of their work through effective use of ICT. In year 10, they produce excellent multimedia presentations on a range of topics, for example genetics: the pupils discuss their understanding of genetics, they choose an area within the field of genetics to research; they undertake refined Internet and journal searches; plan the presentation; design and create the presentation using a range of suitable images, animations and video clips; post the work into the shared science area of the network for the teacher to comment; refine the presentation using the teachers’ feedback for guidance; and use the interactive whiteboard to present to peers.

The pupils make appropriate use of the digital still and video cameras to record the outcomes of science experiments. In one practical lesson, the teacher used a digital video camera connected to the interactive whiteboard to demonstrate quickly to the whole class the methodology of a normally difficult investigation of photosynthesis. This worked well; the pupils asked a range of questions and all of the groups managed to, and with minimum fuss, complete successfully the experiment. A group of sixth form pupils designed and built suitable apparatus to study parasite behaviour as part of an investigation into the effects of pollution on marine cercariae. They used digital video capture to record the parasites and using freeze-frame and slow motion software, the pupils analysed the digital recordings and assessed fitness. This is work of an extremely high standard, significantly extended in many aspects by the creative use of ICT, and has been entered for a national science competition.

**Changes for teachers**

The SMT and the ICT co-ordinator provide strong leadership and a clear direction for taking forward the development of ICT throughout the school. While the vision for ICT and the
empowerment of the staff come from the school leaders, the drive, energy and ideas come from the ICT core team. This small team is highly effective in monitoring and evaluating staff and pupils' ICT competences, providing development opportunities for staff, linking discrete ICT provision effectively to curriculum work and creating a positive climate for a debate on the potential of ICT to enhance learning. They are good role models. Through their hard work, ICT is continually on the agenda for improvement in the school. The core team maintains good communication with the SMT, heads of department and subject teachers.

"The Core Team are keen to help colleagues. There are good vibes from them and they are not seen as pushy or self-centred individuals." Teacher

The staff in Aquinas completed successfully New Opportunities Fund (NOF) ICT training some time ago. The NOF training was very much a starting point for them, and through a range of post-NOF ICT-related training opportunities, most of them have progressed significantly in gaining new ICT skills. Many of the staff is highly proficient in the use of new technologies in learning. Much of the staff support is planned and delivered internally, co-ordinated through the core team. Most of the training now taking place is related closely to the needs of individual teachers. The staff are open to suggestions and ideas from colleagues, and on occasion ideas from pupils. Eight members of staff were employed by one of the NOF ICT training providers to deliver courses to teachers in other schools. The staff have benefited from the ongoing training and support in the effective use of the interactive whiteboard technology and the pupils report that the use of the equipment by almost all the teachers is now routine in lessons. The NOF training was used well as a catalyst for the continuous professional development of the staff.

There is a high level of awareness and understanding among the staff of the potential of ICT to support learners. The introduction of interactive whiteboard technology and its associated change in learning and teaching styles has brought about interesting and innovative ways for the teachers to develop, share ideas and grow as reflective practitioners. The system of teachers acting as ‘technological advisers’ to one another has enabled peer classroom observation in a non-threatening climate of co-operation. There have been unanticipated, yet valuable spin-offs from this process, for example, science teachers visiting English lessons to learn about better oral approaches to teaching.

All members of staff have 128MB memory sticks; these are used to good effect. This equipment facilitates well the transfer of planning and learning materials, particularly those containing visual images or animations, between home and school systems. At the moment, the C2k network is running in parallel with the existing legacy network and the memory sticks enable easy transfer of teachers’ personal files between the networks, with minimal technical support. In addition, the teachers can use the interactive whiteboard technology in whatever classroom they happen to be in.

In the lessons observed, the teachers were confident and comfortable in the use of ICT to enhance learning. The pupils benefited from a good range of teaching approaches; the interactive whiteboards facilitated: clear lesson introductions using saved records from previous lessons; the use of web-based resources, which were often discussed and evaluated by the pupils; the showing of video clips and short animation clips to explain concepts; pupils presenting work to the rest of the class; complex scientific experiments shared effectively by the whole class through digital
video; and quick but effective consolidation and review of learning outcomes. All this enlivened the lessons, added to the pace and challenge of the work, motivated the pupils to interact and participate and provided good opportunities for collaborative work. With few exceptions, the pupils were highly motivated and engaged in the learning process. Almost all the lessons observed had clearly discernible progression, which maintained the interest and enthusiasm of the learners.

The development of ICT has become one of the major focus for improvement within many of the subject departments. In modern languages, for example, the emphasis on ICT has given the teachers the impetus to share their work, including their lesson plans and multimedia presentations with each other; this has resulted in the breaking down of traditional barriers along subject boundaries and has facilitated the teachers in learning more effectively from one another. An on-line learning resources area has been established which contains different sections for teachers’ and pupils’ language resource materials, the departmental schemes of work and detailed planning information on the topics to be taught.

Organisational changes

Aquinas is developing well as a self-reflective school. There is a clear focus throughout the school on the high quality of learning and teaching; this includes the use of ICT. The principal and SMT have developed sound procedures for monitoring and evaluating the quality of learning and teaching, through peer observations within subject departments and class pursuit activities carried out by the SMT; the staff are provided with evaluative feedback from the outcomes of the class pursuits and have the opportunity to debate and discuss strategies for further improvement. The SMT values strongly the potential of ICT to motivate pupils and to enliven lessons. ICT is well resourced, led and managed, and the use of ICT in subjects is carefully monitored and assessed regularly.

In Aquinas, the main enabling factor in the effective use of ICT in learning and teaching has been the clear focus on making the integration of ICT into subject work easier for the teachers, through:

- The provision of laptops for all staff;
- The provision of memory sticks to facilitate easy transfer of files between different computer systems;
- The clear identification of the training needs of the staff and responding with good staff development in the pedagogy of whole-class teaching with an interactive whiteboard, resulting in many staff using effectively the advanced features of the technology with ease;
- The good technical and pedagogic support;
- The encouragement of staff to collaborate and share learning resources, expertise and good practice;
- The excellent development of the pupils’ ICT skills in discrete lessons, building on their prior capabilities developed in the primary school and at home, and incorporating the pupils’ views on what they would like to learn during ICT lessons;
• The fostering by the school leaders of a culture of exploration of ideas and experimentation in ICT matters.

The principal and staff are forward looking in their approach to ICT. The SMT make considerable use of the management information system to support administration and management, and for the analysis and benchmarking of the performance of pupils in public examinations.
Further Education

The South West College

The Vision for Information Learning Technology (ILT) in South West College (know as SWC here after) is to successfully blend technology with traditional teaching methods to greatly enhance the experience of students from all sections of our community.

• To nurture a culture which encourages innovation in ILT.
• To incorporate “Blended Learning” across all areas of the curriculum.
• To constantly improve Teaching and Learning Materials.
• To encourage staff to use new teaching methods to engage students at all levels.
• To improve effectiveness of programme delivery, management and administration through the inclusive use of ILT and blended learning.
• To encourage staff and students to develop their e-learning skills and in turn to use these skills to augment the learning process.
• To foster “hard to reach” learners through a more innovative way of learning, and more choice about how and where to learn.
• To recognise and build upon existing good practice and provide opportunities for sharing this throughout all sites.
• To move towards one Managed Learning Environment (MLE).

SWC considered the key points that have been raised within the Department for Education and Learning’s E learning Strategy, Northern Ireland Skills Strategy, ‘FE Means Business’, Training for Success and the Burns Report in the development of the College’s ILT Strategy. The college recognises the advantages that flow from sharing common learning platforms and the Department for Education and Learning’s desire to see e-learning leading to greater openness and co-operation in supporting learning.

SWC has a rural base which can benefit greatly from broadband access. Working from home, rural industry, healthcare, financial services and construction can all benefit from the development of IT and ILT skills. SWC assists this by harnessing knowledge and information, making it available to meet the needs of the business user, networks and clusters using the latest technology.
The College will also continue to work with the small and micro business market to develop ILT in the workplace i.e. allowing employees to re-skill and up-skill at work and home.

**Curriculum Design and Delivery**

SWC uses ILT to improve the learning processes by embedding a minimum of one hour per week of blended learning into all full-time curriculum courses. The college also ensures that where possible, the Virtual Learning Environment (VLE), online testing and e-portfolios are used. A pilot scheme for foundation degree courses using blended learning has also been incorporated using Adobe Connect.

South West college has introduced a recent initiative called “Steps to Success” aimed at increasing the level and proficiency of ILT use by all staff within the college. Each member of staff has a log book where they record certain ILT activities they carry out such as participating in a web conference, creating a podcast and a vodcast, using various MIS systems etc. This has proved a very successful scheme in that it encourages staff to carry out activities such as podcasting which they may not otherwise have thought about using.

South West College - Omagh Campus is involved in an innovative project with the schools sector. The aim of the project is to facilitate the delivery of City & Guilds Level 2 Parametric Modeling over the internet to Schools in the surrounding area via online collaborative teaching software. Essential requirements of this are as follows:

1. Students can enter the online classroom using the internet.
2. The Student can interact with the lecturer using live messaging technology integrated within the online tool.
3. The Lecturer can share the student’s computer to help with any software problems the individual student may have.
4. The lecture will be recorded and made available over the internet for revision purposes. This will be accessible at any time from anywhere with an internet connection.

**Background**

The initial idea was developed using a hosted solution within SWC network called “Adobe Connect Professional” this solution was realized after research on other collaboration tools discovered this to be the best fitted model for their requirements.

The initial feedback from the schools has been very positive however there have been some difficulties with the bandwidth capability on the school side, we are currently working with C2K to resolve these issues. With collaboration being one of the main focuses of the government’s agenda in education the college see using the internet and collaborative tools as a way to deliver curriculum to a wider audience and share resources.
E-assessment
SWC uses e-assessment in the testing of students in different vocational courses which has proved very effective and has received very positive feedback. On a weekly basis approx 100-200 students are tested on-line which provides immediate test results to the lecturer and student.

Resources
SWC tries to ensure that students have access to sufficient and suitable resources by auditing existing materials and purchasing new materials as Curriculum needs change. The college’s intranet and VLE will inform staff and students when and where these resources are available.

Regular staff development is carried out to ensure staff are aware of these resources and where they can be used and also how to create their own resources.

The college is keen in promoting the use of open source software among its students. Lecturers within various departments actively encourage students to use applications such as Google docs and the software available on sites such as portableapp.com as an alternative to the commercial packages available.

Inclusion
SWC addresses the needs of all students, bearing in mind issues such as SENDO legislation and web-accessibility, also incorporating the use of assistive technologies. Assistive software and hardware is available.

Networked PC Ratios for Students
At present the college’s ratio of internet computers to Full-Time students is 1:4. This will increase to 1:3.

Additional PCs are available in the learning resource centre and general classrooms.

Networked PCs for Staff
The college has a staff to computers ratio of 1:1.

Services
• Access to Internet
  Available on all PC’s within the college. Internet filtering is in place to monitor and prevent access to inappropriate material.

• Library Services
  The library system enables all students to search the database and to request/renew books using any of the workstations within all Learning Resource Centres. They aim to provide a centralised booking system throughout South West College.

• E-books
Another facility offered by the library is the e-books system. Every student and staff member within the college can gain access to the e-books system accessed from the college Intranet. Staff and students can access the system in order to obtain an electronic book on the subjects they teach. This is a very popular facility among staff and students and usage among South West College has been recorded as being the highest among the 369 colleges in the UK that have access to the system.

- VLE – (Blackboard)
  
  All students receive a logon for Blackboard which gives access to course materials and student support information. Staff receive a logon to administer their own course area.

- E-portfolios
  
  Research is currently underway for the groundbreaking area of the ‘e-portfolio’. The aim would be to replace the traditional method of having physical portfolios for assessment.

- E-ILP
  
  The progress of all students within the college are documented on an E-ILP which is an online Individual Learning Plan. This electronic document contains information on the students progress throughout the term. E-ILPs help encourage learners to take a personal interest in and responsibility for their own learning. The students gather a rich, consistent pool of information that follows them through their learning journey. The system also allows South West College to collate and obtain reports from the information based within the system.

- E-registers
  
  Each Student has their attendance marked on the colleges e-register system. The college no longer holds paper version of registers. The e-register system provides vital information for both staff and management within the college.

- Email
  
  All Students have access to their own email address. This can be used both in the college and outside via webmail.

- Videoconferencing/Adobe Connect
  
  Staff and students can avail of videoconferencing facilities for communications across all sites and to external bodies via new Videoconferencing systems and Adobe Connect. Students frequently converse with students in other Colleges both at home and abroad using Skype and a professor in Austria delivered specialist training online to IT staff using adobe connect.

  Other examples of good practice in the area of videoconferencing can be found in the delivery of Higher Education curriculum. On a weekly basis students, studying the BA Early Childhood Studies course video link to Stranmillis University in Belfast for the delivery of this programme.
This has proved very successful and has been commented upon during inspection as a very effective mode of delivering education without the need to travel.

- **Assistive Technologies**
  A range of hardware and software is available on all four campuses to address any specific learning requirements that individual students may have.

- **Apple**
  All four campuses of the college have a suite of Apple computers, in addition to the more common Windows based PC’s. These are more frequently used by students studying creative media courses.

- **PSP**
  The learning resource centre within each college has a collection of Sony Play Station Portable consoles for students to borrow when and as they need to. The PSP’s have been successfully integrated into the teaching of many courses.

- **Nintendo DS**
  The learning resource centre within each college has a collection of Nintendo DS consoles which are loaned out to students studying Essential skills. Games such as Brain Training have been useful in helping students with skills such as Essential skills numeracy.

- **Remote Access**
  Course notes can be accessed via the college’s VLE at any time. Adobe connect is being piloted in the Omagh Campus to allow students studying foundation degrees (to attend class while at home or work). If successful, it is anticipated that this mode of delivery will be rolled out to the wider student population. SWC has a profile in European and transnational work, this software will assist in facilitating transnational communication and partnership building with a range of strategic partners and will help the college deliver its lifelong learning programmes under European Directive 2006-2013.

To date some of the technology benefits are as follows for students;

- improved concentration
- increased receptiveness to learning
- increased confidence
- better understanding of concepts
- By participating more learners can **achieve** more
- **Staff report** that effective technology use improves **retention** rates
• Ability to learn on-line when it suits the learner

SWC will introduce a new student tracking system through mobile technology where students can be text with up-to-date information on college activities.

**ILT staff development (teaching and support staff)**

The College staff development programme has been developing at an increasing rate to meet the needs required to keep up to date with the steady rise of ILT inclusion in the curriculum.

Training courses for all staff are continually being developed to keep them up to date with current versions of the software in use. The ILT Support staff offer courses based upon demand, such as; PowerPoint, Effective use of the Internet and the creation of learning resources. These courses are available to both academic and support staff accordingly. The courses are run in a timetabled format but are also available to all staff via the intranet. The current method of delivery will be converted into a more interactive approach using specialist software.

**Materials and resource development**

All computers with staff access have the relevant software installed to allow materials to be created for use within the classroom and on the VLE. The ILT team are on hand to deal with any material creation issues or if more complex materials are required. Staff are continually informed and encouraged to spend time researching on the web for useful resources to recommend to students and also to avail of the ILT Team to create additional materials thereby promoting ILT in the classroom.

All staff are made aware of copyright issues when creating ILT materials for use in the classroom, details of the “do’s” and “don'ts” will also be posted on the intranet.

**Sector collaboration and Co-operation**

South West College use specific websites which exist to facilitate the sharing of materials and good practice including materials developed within the sector. For example:

The Teaching and Learning Communities (TLC) site is the primary repository for materials in the sector. TLC is a free site where practitioners can share content and curriculum development and discuss developments in the sector in a secure environment only available in Northern Ireland. The TLC Portal allows practitioners to communicate directly with each other, no matter what their subject area, department or college.

Jorum is a free online repository service for teaching and support staff in UK Further and Higher Education Institutions, helping to build a community for the sharing, reuse and repurposing of learning and teaching materials.

**Curriculum**

The college VLE is used as a tool for curriculum groups to share good practice including resources created. SWC will make use of Teaching and Learning Communities portal, Jorum and Fenc to share,
reuse and repurpose learning materials.

**Committees**

The college has an ILT committee who meet on a monthly basis. The committee members are made up of a number of staff including the network manager, ILT officers, the Head of Quality, Curriculum managers, and staff from the Innotech Centre (which is the college’s business development unit). One of the roles of the committee is to actively promote the use of and encourage lecturers to use ILT technology in the classroom. Other roles of the committee include discussing issues around sourcing new hardware/software, the identifying the need for staff training, the effectiveness of current IT systems within the college, identifying the pros and cons of implementing new IT systems with the college among numerous other issues.

A sector committee for ILT has been formed through ANIC called Managed Information and Learning Technology Committee. The objective of the committee is to consider the Management Information and Learning Technology needs of the sector in the context of all ILT systems.

The Success of ILT in South West College – Omagh Campus, was highlighted in a recent inspection report (which awarded a grade 1 to Omagh Campus) and one of the main strengths of the inspection was “the development and embedding of information and learning technologies across all curriculum areas”.
Higher Education

While researching for information on best practice for higher education it was evident that there was an abundance of case studies but few of them elaborated on how effective ICT has become in the classroom/lecture environment. To use a sample of best practice for this sector the SWC has been chosen again, and although the sample will be small, the information and example provided show just how successful blended and distant learning has become.

The SWC offers numerous foundation and degree courses based on their campus. These courses are in conjunction with Queens University and The University of Ulster Belfast. While most students who study full time at university are between the ages of 18-27 it leaves the older grouping at a disadvantage. This is where SWC fills the gap, although all degree courses are open to learners from 18 + it allows those learners who are unable to travel or stay in Belfast to access the courses. SWC has found that learners from more rural or remote areas have enrolled for such courses.

The benefits that come from offering such technology are as follows;

- With the ISDN lines the class connection time is fast and effective
- VCN conferencing allows real time class situation so that both the students and staff in the remote area feel as if they are an active part of the degree course - where they can ask questions of the lecturer and other students.
- Classes tend to have smaller work groups hence it’s a more learner friendly environment
- Connect has also been installed in the SWC, which enables students to access webcams to interact with tutors for assessments and other assistance out of the classroom.
- Blogs and e-learning platforms have been set up to ensure every student need is catered for.

SWC have found that enrolment numbers have increased dramatically on their degree courses due to this advancement in technology.

Management in SWC also see the advantage of this and are working with the Department of Education and Learning to ensure all tutors and staff are fully trained in the online teaching environment.

It must be remembered that although the process of setting this network up was lengthy, that perhaps if all newly qualified teachers had experience in distance learning all FE colleges would embrace this technology.

The SWC have enrolled on The Innovative Teachers Programme which provides teachers with a wide range of high-quality learning activities via hands-on Virtual Classroom Tours. Teachers can share best practices not only within their own learning environment, but nationally and internationally as the number of facilities that adopt the programme grows.

By helping teachers hone their skills and gain more from their role, the programme motivates existing staff, and encourages people to join the profession by reaching teachers early on in their
careers. Learning from other teachers through the technology promotes confidence and new opportunities to enhance and broaden skills.

Teachers can connect to the online environment at any time, from any location with Internet access. Discussions are available 24 hours a day, and can be downloaded when convenient.

The Innovative Teachers programme helps teachers to better use and apply the standard education technologies already present at their school.

SWC will continue to build on our ability to unite schools, teachers and the University, thus making better use of the learning environment.
Review of ICT across the four educational groupings

Reviewing all the information on the four groupings, the underlying philosophy is that all students should have sufficient access to ICT throughout their schooling period to ensure that they enter employment or further education with the skills needed to function in a world increasingly dependent on technology.

Teachers seek to embed the use of ICT within the curriculum, using opportunities to progressively develop students’ skills in a range of subject areas as appropriate. It seems across the four groupings there is a consensual decision against using a stand-alone basic skills programme since they believe that ICT should not be seen as a separate subject but as something which permeates and underpins their learning. In addition to the range of classroom experiences, some of which have been described above, ICT is used very effectively to offer pupils the opportunity to pursue independent research or work collaboratively in, for example, producing a digital video, developing the website or undertaking an e-assessment.

It is clear that there are ways in which the above groupings could be developed further;

- More advanced staff training in specific applications as described earlier; - Continue to expand the hardware resource base, specifically to provide interactive whiteboards for more staff;
- Extend the use of wireless laptops to allow for more flexible uses of computers in a larger number of classes;
- Encourage more use of digital cameras, specifically the use of digital video mainly in primary and secondary education;
- Extend the use of ICT for administration, monitoring and reporting;

Teachers in Forthill now use a range of ICT to plan, deliver and monitor learning. Pupils use ICT as a matter of course, and are increasingly confident users of a range of technology. Through the use of ICT, pupils now have many more opportunities to take responsibility for aspects of their own learning, and to work co-operatively with others in creative and innovative projects. In many of these activities, they are encouraged to present their results in a variety of different formats, including talk, print, slides and video.

Although much progress has been achieved in the embedding of ICT to support learning, the development of ICT across the Aquinas Grammer school curriculum is still a key priority area for improvement and the SMT continue to promote strongly the effective integration of ICT into classroom practice. The main thrust of its vision has been the establishment of an ICT infrastructure designed to bring about improvements and enrichment in the pupils’ learning experiences as well as better self-esteem and confidence for the pupils to deal with the challenges of a knowledge-driven society. There are many qualitative, intangible and immeasurable benefits deriving from this vision, enhancing the work of the pupils and teachers alike.

Several departments in Aquinas Grammer, for example, modern languages, science and geography have made a good start to organising and cataloguing teaching and learning materials; these are available to teachers on the school network and on CD-ROM. Because of the good technical skills
of many of the staff, along with their commitment and enthusiasm to develop further the use of ICT in supporting learning, the school is well placed to benefit from the online learning environment established as part of the wide area services package by C2k. This will make possible: improved collaborative development and sharing of resources by staff; ‘anytime, anyplace’ access to learning materials for the pupils; and, better co-operation and partnerships with other schools involving discussion forums.
3. OVERVIEW OF ICT PROGRESSION IN EUROPEAN COUNTRIES

The use of ICT in education and training has been a priority in most European countries during the last decade, but progress has been uneven. There are considerable differences of ‘e-maturity’ within and between countries, and between schools within countries. A small percentage of schools in some countries have embedded ICT into the curriculum, and demonstrate high levels of effective and appropriate ICT use to support and transform teaching and learning across a wide range of subject areas. Most schools in most countries, however, are in the early phase of ICT adoption, characterised by patchy uncoordinated provision and use, some enhancement of the learning process, some development of e-learning, but little transformed learning and teaching.

In the past year the picture of ICT in schools in Europe has been improved significantly thanks to a number of key studies. However, with 282 512 schools in the 27 EU countries, it is not easy to give an accurate view of ICT in the ‘average’ school (if such a school exists).

ICT in Europe’s schools can be said to be progressing, albeit slowly. Use in classrooms of readily integrated equipment, content and services is increasing but there is little use of social networking tools.

Issues related to ICT use in teaching and learning are coming to the forefront. They are more complex than providing hardware and connectivity and there is evidence that ICT is becoming less of a political priority in many countries, and so funding for replacement and upgrading of hardware, professional development of teachers and development of content is likely to be in short supply, just when schools may need it most in order to reap the benefits of technology. Teachers are in general open to use and share digital resources, but more work has to be done to show, for example, the impact of exchanging digital learning resources on current school practices or how they can make best use of emerging technologies.

There is also no clear picture of how far innovations pointed out can be useful for wider take up at national level, let alone for other countries in different contexts. The focus in the future might not be to work towards transferability, but rather on identifying favorable factors that make efficient classroom, teacher and organizational practices in schools happen.

How far national policies have decisively and effectively shaped existing classroom practice remains likewise to be proven. Evaluations of national policies and projects, if they exist, are certainly one approach to enlighten the picture of how policy relates to practice. However, there
are many other factors that determine ICT practices in schools. The challenge for the future is the exchange, description and analysis of educational practices across Europe and the interrelationship between various factors that shape them as a means to make students, teachers, head teachers and policy makers more aware of existing possibilities with ICT in their own but also in other European countries, the role ICT can play in solving educational challenges and how to make appropriate choices about ICT use. Mechanisms to foster peer learning between schools (both e-mature and those in the early stages of ICT adoption) to stimulate the exchange of practices need to be developed. European Schoolnet’s developing work with schools and education ministries to study the connection between policy and practice, how practices connect to policies and vice versa, is expected to throw more light on this subject.
4. OTHER PARTNERS’ EXPERIENCES

**Italian examples**

Many promises have been made concerning the various ways in which technology is going to change Education. Data published recently has justified the investment in the use of technology through showing, for example, teachers managing databases or pictures of students exploring new worlds.

Despite this scenario, every year a new survey reveals that technology has not been meaningfully integrated in compulsory education.

Such an ongoing process indicates 2 different challenges:

- making the technology available for all schools and to make sure that all exploitation requirements are satisfied, in particular, the technical support and professional growth of teachers;
- making the previous challenge available for all classes in order to enhance the learning and teaching level.

Even if the challenges are strictly connected, each one has its own rationale and objectives; it would be possible to overcome the first but not the second, whereas it is evident that by overcoming both the system could be changed.

The rationale of didactic technology’s integration in the Education process is to improve the students’ performance. In order to realise this aim, it is essential that teachers look at technology in a positive way by both exploiting it and being comfortable with it.

**Teacher training is therefore a key issue.** As soon as the use of technology grows in schools, the integration of technology in didactics grows as well.

Unfortunately, at the moment, in Italy, the use of technology means a simple acquisition of competences, not a changing process which influences the individuals’ behaviours in depth.

In fact, teachers use technologies to support the content of lessons and not to transform educational methods on the whole.

**ICT is not yet used to its full potential and as a result, the benefits which can be gained from it are not being reached.** The use of ICT as a tool for pedagogical development is not a focal point and the impact of ICT on knowledge-sharing, communication and home – school co-operation is only moderate. Students learn ICT out of classes and without a specific learning path, they just try making mistakes and comparing acquired knowledge with friends. They are more consumers than producers.
The most important issue is the **teachers’ attitude**. ICTs do not change teaching methods even when they are used; technological tools are adapted to didactic aims or become a subject of their own.

In such a scenario of structural transformation a paradox emerges: while the new technologies provide innovative learning and teaching modalities, **the traditional competences and curricula content should also be greatly revised**.

ICT matter is strictly connected to up-to-date students’ competences; we move from the traditional 3 Rs (Reading, wRiting and aRithmetic) to the actual 3 X (eXploration, eXpression, eXchange).

The importance and role of ICT competences is progressively growing and the Knowledge Society represents the future. The transformation process involves the entire society, not only the schools and the Education system.

In all countries, school and teachers represent the most important resource, the most precious capital and the most change-resistant element.

Teaching is the main task for teachers. Very little time is dedicated to learning, in fact, ongoing pressures, deadlines and emergencies represent the barrier to changes which cause the most important constraints on the integration of ICT in education.

Teachers are quite **scared of innovation; they are worried about their identity, their tasks and the impact of changes**.

Three phases of concerns are identified when teachers face the implementation phase of innovations. Studies have highlighted that individuals demonstrate a set of typical worries which emerge during the innovation process. In particular, individuals show 7 levels of concerns facing “something new” the levels include: awareness, information, personal concern, management, consequence assessment, collaboration and repositioning. These studies demonstrate that teachers have several concerns in the same moment.

According to the physiological approach, the worst critical state is just after the e-course attendance, when the training path is finished and the teacher tries to apply what he/she has learnt using only his/her resources and abilities. In fact, even if the teacher acquired the necessary competences, he suffers from critical difficulties in practicing.

In Italy, unfortunately, the **teacher is not considered a professional** who joins an ongoing professional development, who by means of training and cooperation with colleagues is able to build up tools for personal improvement. The concept of teacher as a **reflective professional** is an essential acquisition of knowledge since it means he/she is a critic of his/her own actions and
aware of processes. Training is, therefore, an ongoing process fostered by research and knowledge which comes from teaching practice. At the moment, the traditional refresher course is inadequate to respond to teachers’ learning needs since it does not foresee assistance in the experimentation phase nor content, which comes from Best Practices of real life.

Coherently with this introductive survey, the criteria through which we have assessed a “practice” as “best” are the following:

1. “practice” is considered a set of actions and procedures repeated in years which have already proved and consolidated their relevant results;
2. “best” is considered a practice that supports teachers in acquiring competencies in ICT through ICT technologies;
3. “best” is considered a practice that stimulates teachers in improving the teaching process through ICT;
4. “best” is considered a practice that supports the manager of the education system in establishing tools for the certification of teachers’ ICT competencies.

**The institutional offer: Puntoedu, For and ForTIC**

The integrated e-learning courses developed in PuntoEdu, the e-learning environment established by INDIRE in 2001 (Ministry of University, Technological and Scientific Research), represented one of the innovation factors in teachers’ learning models.

Puntoedu is a training initiative addressed to the people who work in the schools and adult education centres. The environment Puntoedu exploits a blended e-learning methodology: the online training and face to face meetings are part of a unique training path. The technological environment provides personalised learning paths by means of the choice of different training activities and lecture notes.
FOR

Within the platform Puntoedu, FOR is a lifelong learning environment for all Italian teachers, it represents a laboratory for flexible professional growth.

It is an institutional open space which promotes work groups’ free association and discussion; it develops and shares tools, proposals and ideas.

FOR was created to cope with emerging professional learning needs revealed by a transversal survey of monitoring reports. The main platform’s objectives are:

- supporting a lifelong learning system for school staff;
- maintaining continuity of learning actions in a transversal point of view and not time restricted;
- deepening didactic topics moving from an occasional to lifelong learning action;
- establishing a professional community based on knowledge sharing.

For is:

- a laboratory of professional development for all Italian teachers;
- a flexible and personalised environment close to learning needs of autonomous schools and territory;
- a community in which each single teacher can find and create their own space, have dialogue, be listened to, experiment his/her job results;
• a map which orients the path from process to products, supports learning in the learning process, gathers knowledge, lightens the cognitive path stimulating aggregations and mental associations;
• a space in which all the training initiatives are gathered.

For provides self-training and collaborative training initiatives, where it is possible to confront each other in other contexts, other professional experiences, and gain access to several in depth studies, lecture notes and digital didactic databases.

In fact, through the space it provides it is possible:

• to consult digital databases and online repository (learning objects, multimedia objects, case studies, representative best practices, bibliography with comments, reference websites);
• to benefit from relevant didactic experiences, feedback and instructions of the National Agency for the development and the Autonomy of School (ex-INDIRE) in cooperation with universities and disciplinary associations;
• to attend self-learning courses (Tutorial and courseware) on technical and professional aspects such as technological aids for the inclusion of disabled people, instruments for welcoming foreign students and European project planning;
• to research structured information of new generation technologies and basic ICT information.

The collaborative activities locate teachers at the centre of the learning process and the new learning models are finalised for the promotion of a meaningful professional development.

The interaction will create a community of colleagues in order to foster exchange activities, European and Italian joint initiatives.

The collaborative activities include:

• discussion groups in a FORUM to share and exchange ideas on breaking didactic issues and pedagogy;
• working groups to share knowledge and produce material in a collaborative way; for this purpose, a web conference platform, a chat room and Wiki areas are available;
• two-monthly editorials show interesting issues (methodology and didactics) and content structure; the content has a formative and informative function;
• Focus is a space which includes articles, interviews, learning strategies;
• my FOR is a private space in which the e-courses, FORUM and working group are available.

Puntoedu ForTIC

An environment for technological learning addressed to all teachers coming from all kinds of schools.
ForTIC consists of a didactic-pedagogical and an advanced technological learning path.

In particular, with regard to the ICT learning path, 2 different modules are available:

- **ICT literacy with opensource OpenOffice**;
- **laboratory** activities to stimulate ICT training in a didactic context.

Moreover, beside the specific ICT didactic offer, a didactic – pedagogical learning path is available as well.

It deepens topics related to the introduction of TIC in didactic, in particular:

1. the rationale and the coherence in the use of TIC in didactics;
2. the didactic contexts to use TIC;
3. the potential of TIC;
4. limits of TIC.

The training is realised in **laboratory** activities finalised to the construction of didactic objects, didactic planning, assessment, experimentation with the class, research and reporting of didactic activity.
FOR.COM Specialisation online courses for Teachers

FOR.COM is a public non profit body promoted by the Ministry of University, Technological and Scientific Research (D.M 9.10.97 G.U. 29.10.97); it is a multimedia Interuniversity Consortium which develops and delivers distance university courses (ODL - Open Distance Learning) exploiting computer networking solutions and tools as sharing channels and collective production facilities in the framework of collaborative learning and teaching processes.
FOR.COM delivers Technology Based Training (TBT) education specialisation courses for teachers, exploiting technological tools tailored to different needs. Autonomous learning paths are ensured by individual training processes.

FOR.COM. specialization training paths develop interactivity through all the opportunities offered by distance and learning and teaching technologies: telematics interaction, e-mail, Internet, satellite TV, mobile connections, ISDN videoconference, computer conferencing, etc.

Validity of qualifications

According to public laws, specialisation online courses are recognised and assessed in order to increase teacher expertise level. In fact, as soon as the e-course is finished, the director provides an attendance certification, valid for the acknowledgment of qualifications and increase of personal teaching score. In fact, FOR.COM online courses are included in the didactic experimentation and innovation activities.
All courses are designed and produced to simulate self-learning processes harmonizing contents, methodologies and learning space in accordance to individual learning styles. For this purpose professionals and tutor support teacher students, produce advanced didactic tools and constantly follow and monitor their results (education training, organization and monitoring phase, didactic support production, didactic activity delivery, learning assessment).

Thanks to the availability of different education technologies, the Consortium developed a training model inspired by collaborative learning principles, where the interaction among the users appears as a guided didactic conversation allowing the development of self-motivation and completes sharing of results and of training objectives. Curricula programming is developed in order to face qualification and re-qualification of the users who work in public and private structures.

The most relevant Specialisation Courses provided by FOR.COM are:

**Literature, Arts and Languages**
- Modern Language Didactics
- Literature Didactics
- Music History and Philology

**School and Training**
- Organization and management of the school autonomy
- Intercultural Pedagogy
- Didactic communication Sociology and Psychology
- Education Technology
- Theory and Methodology of Back-Up Teaching (for disabled children)
- School Evaluation Theory and Methodology

The different technological learning modalities, through which the interaction between professors and teacher students takes place, are constantly tailored to the users’ skills and competence so that they can choose their own learning path following one of the following models:

**Model A**
Users with computer science competence are able to utilize basic electronic tools (PC, modem, Internet).

Interaction Modality: on the web, synchronic and diachronic modalities, individual and collaborative learning in virtual classrooms.

Didactic supports: electronic packages, multimedia supporting tools.

Tutoring Services: personalized tutoring, intermediate and final learning evaluation.
Model B

Users \textit{without computer science competence}

Interaction Modality: videoconference, satellite TV, telephone, fax, synchronic and diachronic modalities, self individual and group learning.

Tutoring Services: personalized tutoring, intermediate and final learning evaluation.

At the end of the study programme, a final individual evaluation is carried out to test the users' learning. After the final testing it is possible to get the certificate of attendance or the final degree.

In accordance with the teacher choice between the two Models (A or B), conferences and seminars with the participation of experts are held to support learning practice activities. The didactic schedule of training programmes allows the identification of study paths according to collaborative modalities (teaching by projects, in-depth study, etc.) in order to guarantee the achievement of remarkable results by the students, also from the professional viewpoint.

A strategy fostering the different didactic modalities is constantly privileged. This strategy enables individual learning processes thanks to the flexibility of programme management methodologies.

All specialisation courses are organized in order to foster the most appropriate didactic strategy to reach high levels of learning, according to different contexts, pre-qualifications, competence and objectives which characterize each user.

All courses are produced in a thematic modular way. Didactic activities include:

\textbf{A. Interaction with the teacher}

It is provided mostly on line.

\textbf{B. Assisted self learning phases}

Students receive learning texts through the web. All the on line courses are supported by practice activities, simulations and real/virtual examples in order to facilitate the knowledge acquisition and foster the self learning process. The tutor can be contacted by students at any moment for mentoring activities.

\textbf{C. Consolidation activities}

They are collaborative learning sections, carried out with the assistance of tutors and professors, in order to foster the in depth study of the learning materials, group reaction and critical approach.

Students are urged to organize virtual classes for the setting up of collaborative learning activities.

\textbf{D. Tutoring}

The interaction between the university involved in the course management and the users is mostly carried out on line.
A tutor is assigned to each student and is in charge of their motivation and guides them in different learning phases. The interaction with the tutor is carried out mostly online according to a round-the-clock learning modality.

The student can also rely on the telephone, bi-directional and synchronic interactivity, and fax bi-directional diachronic activity.

E. Intermediate and final evaluation testing

Evaluation tests are carried out in order to assess and control the learning levels and intermediate and final goals achieved.

Self-evaluation testing allows to improve the individualization of study path and a constant control of the individual learning. The high level of interaction by means of new communication technologies permits a better utilization of learning evaluation and self-evaluation instruments.

At the end of each course an online pre-exam is carried out. Final exams, always on site and not online, are possible after getting through the pre-exam phase.
ATENA Project (2006)

ATENA is a project financed by the Ministry of Education, University and Scientific Research in 2006. It aims at providing a specialisation online course consisting of 1500 hours addressed to teachers of primary and high school namely “Didactics of Italian as second language Towards a Multicultural School”.

The didactic model throughout e-learning modalities joins the lifelong learning strategy aimed at improving teachers’ specific competencies and cognitive and cross skills.

The main objectives of ATENA are:

- promoting the introduction of new technologies in the communication process;
- supporting the lifelong learning practice for the development of specific and sectorial competencies and cognitive and cross skills;
- acquiring specific competencies for a multicultural approach;
- acquiring didactic tools for Italian as second language.

The content is personalised to teachers’ needs, the learning path is tailored to individual weaknesses and strengths.

The learning action is structured into three different paths; each path is related to the different contexts of teaching and to the specific emerged methodological and didactic needs.

The three learning paths are:

1. specialisation in teaching at nursery and primary school;
2. specialisation in teaching at secondary school;
3. specialisation in teaching for disabled people.

Each training path is provided online including an ongoing learning assessment and a final exam. Throughout the courses, teachers acquire didactic and curricula competencies, Information and Communication Technologies skills and methodologies for scientific research to disseminate scientific culture by means of studies on scientific and technological subjects.

All the online courses are uploaded and published in the e-c@mpus platform.

The project lasts 1 year, with 6 months of online experimentation including 1500 hours of attendance.
The expected results comprise the acquisition of didactic and curricula knowledge based on structural and learning features, the relationships between central and related marginal subjects.

Regarding the specialisation in *Didactics of Italian as a second language Towards a Multicultural School*, the online course is split into 2 different areas:

- Multicultural area;
- Linguistic Area.

The didactic material in **Multicultural Area** aims at deepening features of Multicultural Society and supporting the necessary approach to different ethnic groups.

Integration and inclusion of foreign students are key issues for the e-course.

The **Linguistic Area** deepens the problems connected to teaching Italian as a second language and students in the first school years proposing effective and efficient didactic models and *problem – solving* techniques.

At the end of the e-course, teachers do a project, with a choice between a lesson simulation and a case study.

The project is discussed during the final exam.

The most important result is the acquisition of new competencies, essential to cope with foreign students’ problems.

**ATENA** learning path includes activities based on “learning by doing”, in fact, several laboratory activities have been realised online, supported by the coordination of tutors and professionals who support, assess and monitor such activities.

The e-learning platform of both learning paths provides:

- the easy management and distribution of learning resources which are highly interactive and always online;
- the production, management and distribution of interactive self-assessment systems able to provide immediate feedback on learning level;
- e-mail, newsgroup, newsletter, FAQ, conference room and virtual library and board;
- collaborative areas, synchronous and asynchronous, such as Forum or Wiki areas.

During all the training paths, students are assisted by a **TUTOR** in cooperation with governmental Didactic Commission and teaching body.

The role of the tutor is to support teachers’ learning by means of a scaffolding activity and support communication, stimulate debates and discussions in the virtual classroom.
One of the most important tools for the success of the project is the **discussion FORUM**.

In particular, eight Forums are realised to stimulate debates between teachers: linguistic area, multicultural area, theory and didactics, cultures in comparison, intercultural relations, the conclusion of the course and the final exam.

Two **multimedia laboratories** are available for teachers: the first one for the multicultural area, the second for the linguistic one.

The main objectives for the **Multicultural laboratory** are the:

- acquisition of competencies on collaborative learning;
- acquisition of competencies on FORUM and mailing list;
- sharing amongst groups of problems related to foreign students;
- definition of shared solutions to realise in the classroom;
- assessment of previous solutions’ effectiveness, sharing subsequent successes and limits.

On the basis of emerged problematic, five groups are defined:

1- Language;
2- Interpersonal Relation;
3- Relation school – family;
4- School inclusion;
5- Other.

The **linguistic laboratory** focuses on the realisation of efficient tools for language learning.

As a consequence, an e-course for Italian Language (basic level) is published on the platform.

The main objective is to design and realise learning tools to be immediately adopted in the teachers’ classrooms in the same year.

In particular, the main aims are:

- acquisition of competencies in collaborative learning;
- acquisition of competencies in forum and mailing list;
- sharing with working groups useful and innovative tools for Italian language (as second language) teaching;
- elaboration of exercises for teaching Italian Language to primary school children;
- production of exercises comprehensive of Italian and other cultures references.

**Irish Examples**

**Ballyfermot College of Further Education**

**Mission Statement**

BCFE is a college of further and higher education providing vocational education through the provision of excellent teaching and guidance in a caring and supportive learning environment.

Recognising their position within the City of Dublin VEC, it has a responsibility to provide educational opportunity and support to all, and in particular to the local community.

Conscious of its educational tradition the college continues to be innovative and creative in the provision of courses to meet the needs of present and prospective learners.

The courses provide learners with relevant qualifications and competencies enabling them to enter and advance in the work force or continue to further studies.

**Core Values**

- Equal opportunities and access.
- Respect for each individual.
- An open and flexible approach to learning.
- Learner-centred.
- Commitment to innovation and improvement.

**Aims**

- To continue to be a leading provider of further education.
- To be innovative in developing new courses at different levels in a planned and integrated way through consultative processes.
- To further improve the quality of our courses and their delivery.
- To provide a range of courses recognised within the Qualifications Framework.
- To contribute to educational access and opportunity for the local community.
- To develop internal structures appropriate to a college of further and higher education.
- To continue to enhance the physical resources of the college.
- To enable staff to develop their full potential within the college.
- To further develop partnerships with potential and current employers.
- To further develop collaborative relationships with educational institutions.
Management

Ballyfermot College of Further Education is managed by the City of Dublin Vocational Education Committee (CDVEC) with a local Board of Management representative of the community/special interest, industry/services and commerce, students and staff.

CDVEC is the statutory agency for vocational and technological education for the City of Dublin. It manages 21 schools and colleges, which cater for 11,000 students.

Maureen Conway is the Principal of the College and the Deputy Principals are Diarmuid O’Brien and Kevin Devine.

History

Ballyfermot College of Further Education is a leader in further education and training in the Republic of Ireland since it opened in 1979. Following the radical social, economic and demographic changes of the last few decades in Ireland and the corresponding evolution in education, Ballyfermot College has not only contributed immensely to the development of Post-Leaving Certificate courses (PLC) for Irish school leavers, but has also offered further education, specific skills and training in areas previously untouched by most educational institutions.

The college opened in 1979 as the Senior College Ballyfermot. Since then the college has worked with a range of educational and industrial partners to develop and offer a wide range of successful courses in further and higher education. The college caters for students from the age of 17 and upwards.

The college offers a choice of 39 courses of Further and Higher Education in 9 departments.

Senior College Ballyfermot (SCB)

The Senior College opened in September 1979 to provide the Leaving Certificate to students from Ballyfermot. After consultation with local secondary schools it was decided that students from 3 of the local schools, Ballyfermot Vocational School, Caritas and St Dominic’s would complete their leaving certificate in the Senior College. The new school offered a wide range of subjects to the boys and girls of the area. The College is part of City of Dublin Vocational Education Committee.

The new College also offered secretarial courses to post Leaving and post Intermediate students, as well as pre-employment courses for post intermediate students.

During the 1980’s a range of post Leaving cert. courses were introduced into the College, including Preliminary Engineering which had links with DIT Bolton Street, Hotel Catering and Tourism courses which had links with CERT, Business courses and Social Care courses. Most of these courses continue today.
In the 1990’s the Senior College gave up its Leaving Certificate classes, which returned to the local schools, and continued to develop Post-Leaving Certificate courses making it a leader in developing this area of education.

In 2000 the Senior College changed its name to Ballyfermot College of Further Education.

Departments

Within BCFE there are several Departments:

- Art, Design and Graphics
- Moving Images
- Business
- Engineering
- Lifelong Learning
- Media
- Music, Performance, Management and Sound
- Social Care
- Television and Film
- Travel, Tourism and Reception

ICT in BCFE

The college would regard itself as fairly well resourced with ICT. There are a total of fourteen computer rooms located in the three buildings on campus. One of these rooms is set aside for use as a student resource room, the others are used as timetabled classroom spaces. Each computer room is fitted with a data projector and an additional eight general classroom spaces have data projectors therein to facilitate teaching while embracing ICT.

The college has embraced Moodle as a distributive platform disseminating information from staff to learners. All staff have received demonstrations on the use of Moodle but it is used by less than 20% of the teaching teams at present. Training on Moodle continues on an ongoing workshop basis as required to support and encourage staff to adopt the platform as a standard practice within the institution.

Issues

- Sections of the staff in BCFE are using Moodle both for themselves and as a tool for the learners. Assignments and reading material are distributed using this application. All members of staff have access to email and the internet via staff resource facilities and office computers.

- The introduction of Windows Vista will present a significant challenge to the college in the future. It is estimated that from a technical perspective this operating system will create interesting challenges in terms of integrating it into a Window’s XP environment.
• There is currently no provision from the Dept of Education and Science for the continuing of CPD of staff with up-skilling in ICT. Any delivery to-date within the college has been done in-house with a very limited budget. The college is committed to the continual up-skilling of staff as best it can under the circumstances.

• Software is a continuous issue as upgrading is required for some applications on an annual basis. This is a great drain on funding and has the added knock on effect of requiring upgrades on existing hardware.

• The college has developed its own network. However this has been put together by the ingenuity and pragmatism of staff who understood that it was essential to network in order to manage the system efficiently. However, a dedicated backbone is essential for the future efficient management and expansion of the network.

Future issues

• This might include the demand from staff for the migration from PC to a Mac based platform for the more creative programmes within the college.
• Funding
5. EXAMPLES OF INITIATIVES TAKEN BY EDUCATION AUTHORITIES TO DEVELOP APPROACHES ON CPD IN ICT

Strategy for Education Technology in Northern Ireland

In 1997, a comprehensive “Strategy for Education Technology in Northern Ireland” was launched to equip young people with the ICT competence they need for the emerging knowledge based society, and to ensure teachers undertake professional development in the use of ICT to support and enhance learning and teaching. There has been and continues to be substantial investment in ICT provision through the Classroom 2000 Project (C2K), to provide an integrated broadband ICT managed service for all schools. In addition, there has been substantial investment in ICT training for teachers (through the New Opportunities Fund) to improve their competence in the use of ICT. Since 1999, over 12,000 laptops have been provided to teachers to support their professional development in ICT.

Much has been achieved, and there has been real progress in the development of ICT in schools. Nevertheless, much remains to be done to embed further the use of ICT in classroom practice in primary and post primary schools, and to raise the standards of the pupils work.

The strategy for education technology has been extensively reviewed. In light of this the Department of Education has launched a way forward call ‘emPowering Schools in Northern Ireland’ this builds on the achievements over the past five years, and plots a route-map with important milestones for the next five years.

The Northern Ireland education system has a well-established ICT infrastructure based on the ICT Strategy emPowering Schools (DE, 2004) and its predecessor the Education Technology (ET) Strategy (DENI, 1997).

Together, these have set the policy agenda for training Northern Ireland’s 20,700 full-time teachers and ensuring that its 1,245 schools and 300,000 potential school users have a robust managed service that offers a suite of software titles, high-speed connectivity, contracted maintenance and hardware renewal.

Classroom 2000 (C2K) is the body responsible for procuring, maintaining and developing the ICT infrastructure and Learning Northern Ireland (LNI), the regional Virtual Learning Environment (VLE). Whereas the ET Strategy established and embedded the infrastructure (Clarke, 2002; Anderson & Stewart, 2004), emPowering Schools now focuses more on individualised learning, greater coherence across schools in the use of ICT, better use made of multimedia-rich resources and higher expectations for e-learning, online collaboration and e-assessment.
**Classroom 2000(C2K)**

C2K is funded by the Department of Education, as part of the Education Technology Strategy, to deliver to schools high quality, sustainable infrastructure, connectivity and resources which meet the strategic targets.

The Mission of C2k is to provide, for Northern Ireland’s schools, a world class Learning Technology service and optimise its use throughout the Community.

C2k is a regional Project operating under the auspices of the Education Technology Strategy Management Group of the Department of Education. It is funded by the Department, through the Western Education and Library Board, as part of its Education Technology Strategy, to deliver to schools high quality, sustainable infrastructure, connectivity and resources which meet strategic targets.

Grant-aided schools receive, at no cost to themselves, a core entitlement, based on pupil numbers, including:

- an infrastructure of 40,000+ networked computers connected to the Internet and linked to legacy systems;
- access to a wide range of content and services to support the Northern Ireland Curriculum and the professional development of teachers;
- an integrated suite of services for school administration and management;
- connection of schools' networks into a single education network across Northern Ireland, with tools to facilitate the development of on-line teaching and learning; and
- full service support through a central help desk.

C2k works with a wide range of partners from both private and public sectors to deliver an integrated and supported service, installed, maintained and upgraded by specialist providers. A unique and successful feature of C2K is the excellent partnerships with a range of organisations, including Microsoft, Granada, RM, Cisco, Hewlett Packard and Hyperwave.

**Learning NI Initiative**

Learning NI is the online learning environment developed by C2k, in partnership with HP, for all learners, teachers and educational support staff across Northern Ireland, some 370,000 in all.

It has been built by teachers in NI for teachers in NI. This environment will support teachers as they respond to systemic changes in educational provision in Northern Ireland such as the implementation of the Revised Curriculum, the emPowering Schools Strategy and Performance Review and Staff Development.

The roll-out of LearningNI began in 2005 and all teachers and educational support staff now have access to it. Pupils involved in pilots also have access to the environment and all pupils will have their LearningNI accounts activated in the coming months.
LearningNI provides access to content licensed from educational publishers and customised for the Northern Ireland Curriculum, where required, in partnership with the publishers. Teachers, advisers, librarians, professional officers can submit content for publication in the LNI library which will provide locally derived content accessible to users as appropriate.

A range of online features are also available within LearningNI. These include web page creation facilities including the creation of group or whole class sites, streaming video, calendar and timetable functions, access to C2k email and online storage for all users.

The core of LearningNI is the class room, a virtual learning space, which provides an environment for learning and teaching as well as for professional development. Courses can be created within and across schools and organisations allowing collaboration between all the users. Here learners can communicate with their tutors and with each other and engage in focused discussions related to their learning.

Many pilots using this learning space have been run in LearningNI over the last year (view the LearningNI case studies page for details). These include pilots in Primary and Post-Primary Schools, in Teacher Training Institutions and for Professional Development. Follow-up research with teachers and learners indicates that those pilots which have utilised these collaborative functions in LearningNI have been particularly successful in supporting learning.

LearningNI is a flexible, feature-rich environment that can support current classroom provision, also supporting other pedagogical models, thus allowing teachers and learners to blend diverse learning models appropriate to a range of learning styles.

**The Becta Review 2005**

'The Becta Review 2005: Evidence on the progress of ICT in education' provides an assessment of the growth of ICT in education and offers an analysis of challenges to future development. This report uses evidence from recent surveys and research studies and draws together conclusions to create a national picture.

In terms of ICT provision, over the last few years there has been significant improvement in learner access, and institutional provision of ICT. This has been demonstrated by improved learner to computer ratios; now 4.9:1 in secondary and 7.5:1 in primary schools. Over 95% of secondary and 44% of primary schools now have a broadband connection of 2Mbps or higher; and 62% of primary and 69% of secondary schools have networking in teaching and learning areas.

Overall use of ICT has risen sharply since 2002, but there are variations within subjects and between institutions. Reported use is generally highest in core subjects. Ofsted reports growth in the number of institutions judged to be making effective use of ICT.

Where used effectively ICT contributes to pupil and student learning and leads to attainment gains and other positive outcomes. Factors associated with ICT having a positive impact on standards include: teachers’ understanding of their subject and their knowledge of the ways ICT can support subject teaching; traditions of ICT use within subjects; and institutional level implementation of ICT (such as general ICT resourcing and ICT leadership).
However, there are still barriers to progress in embedding the effective use of ICT, and variation between institutions in the provision and use of ICT. Limits to progress are most starkly represented in measures of institutional ICT 'maturity' in schools and FE colleges. Despite progress, many institutions, especially smaller ones, are currently struggling to embed the use of ICT fully to serve their educational goals and are failing to deploy ICT sustainably.

Owen Lynch, Chief Executive, Becta comments: "This review draws on a range of recent evidence to set out the progress that has been made in schools and the learning and skills sectors and to understand current challenges in realising the full potential of ICT in education in a new policy era.

"The e-strategy currently being developed by the DfES will take forward many of the issues covered in this review and will define a new ICT and e-learning vision. Becta, with its new responsibilities, is keen to support both the development and the delivery of this new strategy."

The Becta Review covers the schools and learning and skills (post-16) sectors, but excludes higher education. Given the limitations of available evidence, work-based learning is not covered. Becta is currently working with the Learning and Skills Council (LSC), e-Skills UK and the DfES to further develop the evidence base in this area. Due to issues of availability of a range of evidence, this report relates primarily to England. Given these factors and the restrictions on the length of the document, it should not be seen as an exhaustive knowledge audit.

**The Becta Review 2006**

'The Becta Review 2006: Evidence on the progress of ICT in education' the paper considers the strength of existing evidence of the impact of ICT in education and current evidence gaps.

**Background**

Becta publishes an annual evidence-based review of ICT in education, the Becta Review. This brings together a broad set of research findings and other evidence from the schools and post-16 sectors, offering an analysis of progress and issues, organised broadly around the four themes of the Harnessing Technology strategy: technology infrastructure, personalised content, learner information and e-maturity. This paper summarises key findings from the 2006 Becta Review and also presents further recent analysis of the impact of ICT from the Test Bed evaluation and secondary analysis of Curriculum Online evaluation data.

**Technology infrastructure**

Overall the trend towards greater spending and provision of institutional ICT infrastructure continues.

But schools and FE providers are facing a challenge in maintaining the currency of the technology infrastructure. There has been a worsening of student-computer ratios in FE and an increase in ageing computers in schools.
At the moment, however, most teachers are happy with the quantity of ICT resources available to them, though teachers’ perceptions of fitness for purpose of the technology available have worsened slightly since 2003.

Although there has been significant improvement to internet bandwidth in schools, many schools are unclear of the benefits to learning that broadband can bring and have not yet made significant use of it.

Few schools offer access to their networks from remote locations, and most schools’ visions for ICT in learning focus on learning within rather than beyond the institution.

The interoperability of management information systems remains a problem in both the school and post-16 sectors.

**Personalised content**

While the market is providing increasing numbers of high-quality products in the schools sector, quality of provision is mixed. It is unlikely at the moment that demand will drive significant improvements to quality.

Though there is evidence of positive impact from e-learning credits on investment in development, impact on innovation appears to be limited.

There are signs, however, of improvements in practitioners’ understanding of pedagogy and practice associated with the use of ICT in the classroom, in particular how use of resources is integrated with other activities.

Purchases by schools continue to be concentrated on a relatively small number of suppliers, partly because schools and practitioners are finding it difficult to develop effective strategies for identifying appropriate software.

Digital content continues to be overwhelmingly delivered and used offline in schools.

In colleges the use of e-learning materials has remained fairly static over the last three years. In-house resources continue to be most important to college content provision.

**Learner support and information**

There is a low level of familiarity among heads with the concept of a personalised online space, but a favourable view amongst those who are informed.

The use of learning platforms in schools remains relatively low, especially in the primary sector. This may in part be related to perceived cost barriers, but also to the possible lack of fit with existing practices.

There are still low levels of direct access for staff in schools to management information. Most standard workstations do not offer this.

There is little evidence from current practice that learner information which is currently transferred between institutions (e.g. records of achievement) is used to provide continuity of guidance or to personalise learning.
e-Maturity

Impact on learning arises from: strong vision and leadership for ICT from senior management, needs-related centralised resources allocation and whole-school strategies focused on learning and teaching.

The NCSL ‘SLICT’ (Strategic Leadership of ICT) programme has had a positive impact on the way heads are integrating ICT in their schools.

The use of MIS is central in developing institutional effectiveness and reducing administrative burdens, yet widespread effective use and related productivity gains currently achieved by a small number of institutions.

Teachers want CPD in ICT, but headteachers consider that the ICT skills of their staff meet or exceed current job needs.

ICT and e-learning training for staff in colleges is not as extensive as in schools, although the role and effectiveness of informal training peer support networks are similar in both sectors.

In FE, classroom practice does not appear to have developed significantly as a result of the use of technology over the last two years. However, learners are better supported in independent learning as a result of access to technology and digital learning resources.

Impact on educational outcomes

The evidence indicates small but significant impact on attainment. Further statistical modelling has enabled us to identify key ICT-related factors in improvement:

Educational Impact of Broadband (Becta 2005). Significantly improved A-Cs at GCSE level, compared to other schools, in the year following the installation of broadband. This was explained by the increase in pupil-led research arising from the technology.

Children and Young People’s Home Use of ICT for Educational Purposes (DFES 2005). Controlling for other factors, levels of pupil home use of ICT for subject learning were linked to small, but statistically significant higher performance in Maths at KS 1, 2 & 3 and English GCSE.

ICT Test Bed Evaluation (Becta 2006). Test Bed schools were improving more rapidly in 2005 than the national picture in every subject area at KS 2. Comparator schools performing were more or less consistently with the national picture.

Improvement 2002 to 2005:

<table>
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<tr>
<th>Subject</th>
<th>Test Bed improvement</th>
<th>National improvement</th>
<th>Comparator improvement</th>
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<tbody>
<tr>
<td>KS2 English L4+</td>
<td>+8.6%</td>
<td>+4%</td>
<td>+3%</td>
</tr>
<tr>
<td>KS2 Science</td>
<td>+2.8%</td>
<td>0%</td>
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</table>
There is limited impact data from the Test Bed for secondary sector due to low numbers.

Statistical modelling has identified key ‘e-maturity’ factors in improved attainment – conditions under which technology deployment and use adds value to attainment:

KS1 & 2: data management; digital literacy strategy; KS2: reactive technical support; external linkage; KS 2 & A’ Level: curriculum maturity; A’ Level: specialist technologies.

**E-Strategy**

The UK’s **e-Strategy** for education describes the use of digital and interactive technologies to achieve a more personalised approach within all areas of education and children's services. It has six priorities:

1. an integrated online information service for all citizens
2. Online personal support for children and learners.
3. a collaborative approach to transforming teaching and learning
4. a good quality training and support package for practitioners
5. a leadership and development package for organisational capability in ICT
6. a common digital infrastructure to support transformation and reform

Current key activities in implementing the e-strategy are to support personalised learning offers. The e-strategy outlines that by 2008 every school learner in England should have “access to a personalised online learning space with the potential to support e portfolios” and by 2010 all schools will have integrated learning and management systems. Concerning training and support for practitioners and improving organisational capability much has been done in training head teachers in the UK. Head teachers are seen as a key driver for change. Over 10,000 head teachers have completed the Strategic Leadership of ICT professional development course jointly developed by Becta and the National College for School Leadership.

In the UK the **Mudlarking project** is an example where technology is used as a motivator for exploring alternative learning paths. The Mudlarking venture is a worldwide initiative to research the use of technology in education. This project gives students the opportunity to use mobile technology to discover and explore their environment, in short, a digital version of the traditional guide tour. The challenge for educators and designers is to understand and explore how best they might use these resources to support learning.

<table>
<thead>
<tr>
<th>L4+</th>
<th>KS2 Maths</th>
<th>L4+</th>
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<tr>
<td></td>
<td>+2%</td>
<td>0%</td>
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For Higher Education Institutions (HEIs) responsible for Initial Teacher Education (ITE), emPowering schools offers the possibility of ‘Enhanced Professional Practice for the Teacher...’ (DE 2004:18) using e-portfolios to facilitate professional development. E-portfolios can store media-rich personal histories; online dialogue with peers, colleagues, and mentors and a range of reflective accounts of their teaching, all of which can be used to identify pathways for future development. Of course, the notion of an e-portfolio is built on the traditional teacher portfolio, once the central component in providing “authentic assessment” (Darling-Hammond & Falk, 1997; Gensishi, 1997; Wolf, 1999). Increasingly, however, traditional practices are giving way to the emerging integration of ICT-based teaching with professional development, offering the possibility of a more rounded picture of teacher achievement through video, audio, blogg and interactive technologies.

A Common European Framework for Teachers’ Professional Profile in ICT for Education (CEF)

At the beginning of 2000, the European Commission launched the eLearning Initiative and Action Plan to foster the adaptation of the European Union’s education and training systems to the knowledge society through the effective and relevant use of Information and Communication Technologies and the Internet for learning.

The eLearning Initiative and Action Plan provide the basis for a wide debate at European level and encourage increased coordination of related actions within and between Member States.

The uTeacher project, carried out in the context of the eLearning Initiative during the period December 2003-June 2005. uTeacher aims to understand and define the professional profile of a teacher who is faced with the issues that the knowledge society and ICT pose to schools. This profile is captured in a “Common European Framework for Teachers’ Professional Profile in ICT for Education” (CEF). The CEF can be seen as a means for the exchange and transfer of experience in Initial Teacher Education (ITE) and Continuing Professional Development (CPD) across Europe. The CEF also provides an opportunity for educational administrators, course designers, teachers, examining bodies, etc. to reflect on their current practice, with a view to situating and coordinating their efforts and to ensuring that they meet the real needs of school in the knowledge society.

Context

Improving education and training for teachers and trainers is the first of thirteen objectives in education and training systems set out for Europe by the European Commission1. The Common European Framework for Teacher’s Professional Profile in ICT for Education (hereafter called CEF) contributes towards the achievement of this objective by offering a shared basis for the definition of content domains, syllabuses and curricula in the field of ICT for education, both in initial teacher education (ITE) and in teachers’ continuing professional development (CPD).

In the “Europe of knowledge” we are faced with rapid change in all
sectors of society. Lifelong learning is required in all professions and particularly in the teaching profession. In the learning society, school has to be a learning institution and so teachers need to remain life-long learners and action-researchers in their own sphere.

The competencies of teachers can only be fully built up in a long process of professional development. Teachers’ professional development starts with recruitment and continues with initial training, induction (including classroom apprenticeship), in-service training and further education. Competencies ought to be build up systematically, in a cumulative manner. There is a need for the teaching profession to create a new professional profile which reflects the increasing heterogeneity of students, the provision of individualised support for every student, implementation of new methods in motivating and activating students, participation in building up learning organisations. Teachers are shifting away from their old role as the sole providers of knowledge towards helping students to learn on their own.

In context with the CEF teachers professional development has four interactions;

1- Teachers’ Interaction with the self- Becoming aware of the increasing need for continuous professional development and the means to achieve it.
2- Teachers’ Interaction with the pupils – Planning and taking actions to develop ones professionalism regarding the education and welfare of students
3- Teachers’ Interaction with the colleagues- learning to fully exploit ICT to co-operate with colleagues and teaching community.
4- Teachers’ Interaction with the external environmental –Identifying and exploiting the opportunities offered by the local and global environment to develop ones professionalism.

Using the CEF

The overview on ITE and CPD related to ICT for Education that resulted from the first phase of the uTeacher Project revealed a very complex picture, but one which goes some way toward answering crucial questions related to teachers’ professional development across Europe. Since the content domain dealt with in ITE and CPD is a key factor affecting the professionalism of the teaching community, one of the most important issues was to understand who defines the contents related to ICT for education. This overview underlined that, in many cases, this task was performed in ITE by individual university professors. As a result, neophyte teachers setting out on their careers possess very different professional profiles in ICT, depending on the individual attitudes and approaches adopted by their university professors: this multiplicity of profiles can be seen both at national and at European levels.

The situation regarding continuing professional development is even more complex, as there is great heterogeneity: in some cases the ECDL is the principal reference point for in-service teachers’ professionalism in ICT for education (e.g. in major CPD initiatives conducted in Italy and
Greece), while in others national pedagogical “driver’s licences” are adopted (e.g. Denmark, the Netherlands). Some countries set national standards (e.g. Scotland, France), while others leave this task to the responsible CPD bodies (e.g. Belgium, Germany and Sweden).

What emerges from the European picture derived from the uTeacher survey is that there is no common pattern related to the prescription of required teachers’ competencies in ICT for Education, either regarding ITE or CPD. If we are to achieve the aim of making European educational and training “a worldwide quality reference by 2010”, ITE and CPD processes ought to have clear reference points that can foster greater common understanding of the various needs being (and to be) addressed in the different regional, national and pan-European contexts; it is only in this way that common efforts can be undertaken and co-ordinated successfully to meet those needs. The CEF, cooperatively developed by experts from the different European countries, aims to provide exactly those reference points.

Using this tool, bodies and institutions responsible for ITE and CPD can define harmonised syllabuses. Institutions that already have their own syllabus can map it onto the common framework, thus fostering common understanding and the sharing of approaches, and helping to avoid “reinventing of the wheel”, i.e. unnecessary replication of efforts. Course designers, university teachers, examining bodies can all use this framework to reflect on their current practice, with a view to situating and coordinating their efforts and ensuring that they meet the real needs of school in a knowledge society. The CEF allows the development of mutual trust between the stakeholders in national ITE and CPD systems, and encourages cooperation between these systems: education and in-service training providers, teachers, trainers and learners, within and beyond national frontiers.

The CEF is also a tool for teachers who want to take personal initiative in developing their own professionalism in ICT for education by creating and following individual learning pathways, which is the legitimate business and ambition of the ICT pioneer teacher. It helps those teachers understand the skills and knowledge they possess and/or lack, and assists them to find suitable materials to develop aspects of their professionalism in ICT for education.

An increasing proportion of teachers in the EU are aged over 50, which implies that within the period 2005-2015 more than one million teachers in Europe will need to be replaced.

Consequently ITE is gaining ever greater importance throughout Europe. High quality ITE (along with CPD) is necessary to equip teachers’ communities with suitable professionalism for their role in the knowledge society over the coming decades.

In Europe, initial teacher education is largely the responsibility of the universities and other higher education institutions. The basic approach of the CEF is located in the mainstream of the Bologna Declaration process, as it aims at promoting the necessary European dimension in ITE for ICT in education, particularly with regard to curricular development, inter-institutional cooperation, mobility schemes and integrated programmes of study, training and research.
**ITQ initiative in the UK**

ITQ is the National Vocational Qualification for IT Users which demonstrates staff competence in the use of IT in the workplace. It is offered at levels 1, 2 and 3. In Scotland, the qualification is called the Scottish Vocational Qualification in Using IT.

ITQ is primarily aimed at IT users and not professional IT staff such as engineers and developers. ITQ was developed by employers for use in the workplace and has the full backing of a number of awarding bodies. It has been in use in all sectors of business and industry for 3 years.

ITQ has been designed to provide you with an up to date IT user qualification for your workforce, tailored to the needs of your business and your staff. It provides analysis of workforce skills such as making the best use of technology in business systems and in communication with colleagues and customers. It recognises that all organisations need IT skills but that these will vary in level and type depending on individual business needs and the use made of technology in the organisation. ITQ even allows for the inclusion of bespoke units in recognition that many employers have their own unique IT systems.

The fundamental difference in ITQ, unlike any other IT User qualification, is that it is **highly customisable**. The content of the qualification can be adjusted to suit the requirements of the workplace and employee, as well as the skills level of your chosen disciplines. In other words, the employer ends up having 'created' their own ITQ, allowing their staff to learn and be assessed on tasks that they need to know as part of their job, and taking into consideration any existing qualification they have.

In addition to being able to mix-and-match traditional IT skills in an ITQ (such as word processing, databases, email and so on) ITQ also recognises bespoke software. This means that if an organisation runs a proprietary program/system for managing client data, logistics, statistics and analysis, for example, it too can be incorporated into the qualification.

The impact of this framework is ranked one of the best throughout the UK due to its sustainability for employers to gain the specific skills they require for their workforce.
6. RECOMMENDATIONS

Throughout this secondary research for best practice of ICT in education certain recommendations are evident;

Access to technology is key to the development of ICT across the spectrum

- Leadership & Management play important roles to the progression of ICT in all educational institutes from Primary to Higher Education. Good quality school leadership and co-ordination of ICT are crucial factors in determining that pupils have worthwhile and challenging experiences in ICT;
- Continuous professional development is the key for the further integration of ICT in education. The introduction of new technology and the associated staff development need to be aligned closely
- Integration of platforms such as E-Portfolios, e-assessments is the key to progression.
- a dynamic core team to: debate the potential of ICT to improve learning; share and demonstrate good practice; enthuse and motivate; provide opportunities for innovation; gain the confidence and support of the staff and develop their professional expertise
- Strategic issues and challenges are priority if ICT is to be embedded and embraced fully into education.
- the encouragement of the staff to ‘try things out’, to innovate and experiment; to learn from successful pedagogy and the not so successful pedagogy, and to share this with others;
7. CONCLUSIONS

The main concluding message from this review is the continuing need to find effective ways to deliver the change so clearly required in order to realise the full benefits of technology for the education system.

The idea of using ICT, at least in some part of the teaching and learning process, is now commonplace in most schools and colleges. Teachers and lecturers prepare lessons using ICT, exploit presentation software and word processing and may expect students to access and use online resources and course documents. Few practitioners, however, fully exploit the possibilities for learning and teaching offered by technology, especially learning platforms, and although 46 per cent of secondary schools report having one, only 24 per cent of teachers report using it. Schools have a range of technologies in place to facilitate access to shared ICT resources, but the amount of resource sharing and collaboration within the school, and at local and regional level, is currently limited. In contrast, there is evidence of collaboration in the FE and skills sector, often encouraged by the tradition of ‘in house’ resource development and a more limited commercial software market.

While the growing use of ICT by teachers indicates an increase in their competence with technology, teachers continue to seek training in specific technologies and are increasingly discriminating in both the topics and format of the professional development available to them.

This review tells us something about the complexity of that change, including the factors and barriers, and roles and actions required to delivering it effectively. It adds up to a challenging agenda which can only be delivered in partnership across all educational and skills systems. The need for continued clarity and coherence of vision and leadership at all levels in the system, from institutional to local and national, is essential.

Use of technology to support effective continuity of learning is still at an early stage, particularly in the schools sector. Issues of home access still need to be addressed, and both schools and colleges have some way to go in making educational information and resources accessible to learners (and their families) at times and locations that suit their learning preferences and choices.

Developing awareness and understanding of what technology supported continuity of learning looks like for different learner groups and sectors is essential.