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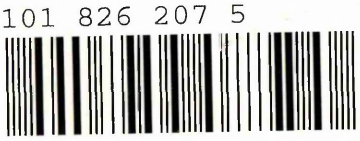

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ICT in the early years: Young children's experiences and capabilities

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Doctorate in Education

March 2006

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Acknowledgements

I would like to thank my supervisors, Prof. Brian Hudson and Dr. Liz Barrett, for their guidance and patience during the past six years. I am also grateful to the pupils, parents and practitioners without whom the research could never have been conducted. Finally I would like thank Lucy and Isobel for their encouragement.

Abstract

This research investigated the capabilities and experiences of Foundation Stage children (3-5 years old) in the maintained sector in relation to ICT. The research explored children's capabilities and experiences in four early years classrooms in two schools using observations and interviews. In the process it considered the reliability and validity of the relevant Early Learning Goals as guides for practitioners. The research also examined the experiences of children outside of the nursery / classroom by surveying and interviewing parents. The purpose was to learn about the extent and characteristics of the technological dimension to childhood for the children involved.

The thesis argues that children in the nursery and reception classes in both locations were able to learn about, and through, ICT where it was used appropriately but that ICT seemed to be underutilised in some areas of early learning. The thesis also suggests that some young children's experiences of, and capabilities with, ICT are not adequately described by the existing statements contained in the Curriculum guidance for the foundation stage. While a high degree of congruence existed across both locations in terms of the incidence of ICT there were some differences in the characteristics of children's interactions with these technologies in the home. The thesis makes recommendations concerning the role of practitioners, curriculum documentation, partnership arrangements with parents and possible areas for further research.

Introduction

ICT incorporates the technology associated with the handling and electronic transmission of information and its use in controlling the operations of machines and other devices (HMI, 1989). ICT can be seen to encompass such things as telephones, fax machines, televisions, video, audio recorders, CD and DVD players, CD-ROMs, programmable toys, personal organisers, radios, and of course computers. The purposes of education as set out in the Education Reform Act 1988 and restated in the 1996 Education Act, to prepare children for the opportunities, responsibilities and experiences of adult life, have helped to provide a rationale for the increasing use of ICT in education (NCC, 1990). The inclusion of ICT in the curriculum is seen by some as helping to prepare children to participate fully in a world that is expected to continue changing rapidly as a result of the introduction of new information technologies (QCA, 1999). This social efficiency approach to curriculum design in relation to ICT has now reached early years (3-5 years) settings (Kliebard 1987 in Soler and Miller, 2003).

A reader of national policy or monitor of government expenditure might well anticipate universal increases in the incidence and use of ICT in UK early years settings over recent years (Revell, 2001b; Cross, 2006). These anticipated increases might in turn be regarded as the product of a universally shared perception that socio-economic imperatives make such developments not only economically essential but also pedagogically valuable. However, the incidence and quality of children's ICT experiences in early years settings is much more variable than policy statements or accounting might suggest. The truth about young children's ICT capabilities is further complicated by the possibility of equally variable access in the home.

The research set out to explore the extent of young children's experiences and capabilities with ICT in maintained nursery and reception settings. In the process it reflected on the usefulness of existing documentation i.e. the early learning goals as a means of supporting practitioners in their efforts to provide young children with good quality ICT experiences. Finally the research sought to illuminate the children's ICT experiences in

the home and beyond. The thesis constitutes an investigation into the technological dimension of the childhood of groups of nursery and reception children in two schools and is set against the backdrop of recent policy developments surrounding ICT in the early years. The pressures, imperatives and drivers acting on practitioners and parents in respect of ICT cannot be properly comprehended without an appreciation of the policy environment and the sometimes competing and conflicting elements contained within it.

Chapter 1

ICT and early years education: The policy environment

1.1 Globalisation and government responses

Authors such as Crossley (2000) and Sweeting (1996) have identified intensified global economic competition and accompanying preoccupations with assessment, accountability, excellence and value for money in education as driving forces behind much policy reform in countries such as the UK. The perceived impact of globalisation upon national policy making is such that education policy itself can be viewed as an exercise in investment, production, distribution and marketing (Sweeting, 1996). In the case of ICT, references to globalisation and the new economic world order are particularly pronounced and developments in this area are seen by some as a fundamental pre- and co-requisite for the globalisation phenomenon itself. Globalisation agendas would not be practicable without tools of economic integration such as information and communications technology (Jones, 1998). Positive statements in favour of the place of ICT in education such as the one below can be found in numerous publications in England and Wales since the introduction of the National Curriculum in 1989 and before (HMI, 1989; HMI, 1992; BECTA, 2000):

> A modern economy puts a premium on skills, knowledge and understanding. Those who lack those assets face an uncertain future in the job market and increasing marginalisation in society. Higher skill levels also lead to higher national productivity, thereby helping the UK to compete successfully in the world economy. (DfES, 2001)

In the view of government departments and agencies therefore the country needs to build up the store of knowledge and keep abreast of rapid technological development if it is to prepare the future generation (DfEE, 1997c). Rationales for the inclusion of ICT in education routinely cite the inevitable advance of globalisation and the need to maintain,

and preferably enhance, the nation's economic position relative to other countries (DfEE, 1997a; DTI/DfEE, 2001).

For the Organisation for Economic Co-operation and Development meanwhile there exist three overlapping and converging reasons for the inclusion of ICT in schools (OECD, 2001a). Economically, learning about and through ICT improves pupil employability and national prosperity. Socially, ICT capability is a prerequisite for participation in both society and the workplace and its inclusion in the curriculum offers a means to ameliorate any possible digital divides between the haves and the have lesses that exist within populations (Selwyn and Bullon, 2000; OECD, 2001d). Pedagogically, ICT offers practitioners and pupils opportunities to increase the breadth and richness of learning, including the development of higher order thinking skills such as analysis and synthesis. ICT can facilitate learning in different locations (both real and virtual) and holds out the possibility of empowering the learner by accommodating different learning styles and preferences (OECD, 2001b).

Policy development relating to ICT and education therefore appears as a progressive and rational activity in response to, or in anticipation of, changing circumstances. As education in developed nations such as the UK becomes increasingly associated with the future development of societies and economies, as investments in it frequently take time to come to fruition, and as countries draw on the experiences of others in their search for policy options, the belief in forward looking and rational policy making on the part of governments is understandable. UK governments are sometimes quick to draw on international comparisons to demonstrate how poor the nation's education is in comparison with other economic competitors (EURYDICE, 2000; Hargreaves, 2003). The Secretaries of State for Education and Employment and the Department of Trade and Industry asserted in 2001 for example that, no matter how UK productivity was measured, it still lagged behind that of every other major industrialised country (DTI / DfEE, 2001). One component of the response to such perceived poor performance invariably includes educational reform as a crucial factor in halting and reversing such relative economic decline (DTI / DfEE, 2001).

Forward planning such as this is premised on the belief that it is possible to clearly distinguish from the totality of the available data, those facts that will shape the future. Where does the country wish to go? Where is it able to go with the resources available? What are the consequences of going there? Developing answers to these questions is thus the basis for policy making (EURYDICE, 2000). The UK Government publication Opportunity for all in a world of change for example, claimed that future developments were clear (DTI / DfEE, 2001). They included the continuation of world-wide economic integration, the increasing importance of science and technology, the increasing importance of a flexible workforce and the increasing use of ICT, amongst others.

Terms such as knowledge society or knowledge economy appear regularly in the media and UK Government statements (DTI / DfEE, 2001). Nor is such language restricted to the UK alone (Commission of the European Communities, 2001). At the policy making level there appears to be considerable common ground between England and Wales, the United States and many European countries in terms of the rationales offered in support of ICT in education and in the types of policy initiatives being implemented (Alliance for Childhood, 2000; Commission of the European Communities, 2001). By 2004, for example, all European Union (EU) member states possessed official documentation intended to promote and enhance the use of ICT in schools supported by national projects. ICT learning objectives were contained in many European primary curricula, and while ICT was compulsory in initial teacher education (ITE) in only half of European states, all countries had in-service training programmes for serving practitioners. As in England and Wales the EU documentation suggests that ICT is a clear priority area, in line with the development of the Internet and the many instruments of communication destined to become indispensable in everyone's daily lives (EURYDICE, 2000).

To understand the origins behind the ICT policies of the New Labour administration it is therefore necessary to bear in mind this wider economic and social environment. In the UK in 1997 the incoming government found itself urged to make a common sense act of faith in terms of ICT in spite of the contested issue of its transformative power in

education (The Stevenson Report, 1997). For supporters of the Government's ICT policies, its increasing use in the curriculum was seen as a means to raise levels of achievement and prepare pupils for adult life in a continually changing world in which ICT looms large (DfEE, 1997a; QCA, 1999). Introducing ICT into the curriculum, according to these arguments, ensures that children will become more knowledgeable about information; will become increasingly comfortable with new technologies and will be better able to exploit their potential. Here then was a set of tools with the potential to enhance learning, foster problem solving, promote higher order thinking and generally contribute to the development of children's physical and mental development (Loveless, 2003).

In England and Wales therefore the Government acted on its belief in the importance of ICT, pressing ahead with the introduction and development of the National Grid for Learning (NGfL) and allocating large sums of money to support the increased use of computers in teaching and learning (Revell, 2001a). June 2003 saw the allocation of £100 million in e-learning credits giving every school £1000 plus £10 per pupil to spend on ICT equipment with a promise of similar funding for the next two years (Savage, 2004). At the same time surveys suggested that the Government target of one computer for every eight children in primary settings had been achieved (Savage, 2004). Although the spending emphasis to date has leant heavily towards equipment purchases, these increases in resourcing have also been accompanied by parallel developments in curriculum design and the training of teachers, both initial and in-service.

In the primary phase (5-11) ICT in the National Curriculum evolved from a cross-curricular skill and adjunct to the Design and Technology Programme of Study to a de facto subject in its own right (Lawton, 1989; QCA, 1999). The National Association of Advisers for Computers in Education (NAACE) and the British Educational Communications and Technology Agency (BECTa) produced a joint discussion document aimed at stimulating debate on the key characteristics of good quality teaching and learning with ICT (NAACE/BECTa, 2001). The exemplar material given in support of these features covered classes of children throughout the primary and secondary age

phases, although not nursery. This document proposed five features of effective practice associated with enhancing ICT capability and the development of metacognitive abilities (learning to learn):

- Autonomy - The use of ICT can promote the development of pupil autonomy and independence as learners. It offers opportunities for children to take some control over their learning, either independently or collaboratively, working at a pace and level appropriate to the child.

- Capability - The incorporation of ICT into the curriculum enables children to acquire the knowledge and skills necessary to make effective use of new technologies (learning about ICT) and to be able to transfer these capabilities to support learning in other areas of the curriculum (learning through ICT).

- Creativity - ICT has the potential to inspire creativity in children by providing access to empowering tools.

- Quality - ICT has the potential to enhance the quality of finished products both in terms of their appearance and presentation but also in terms of enriching children's ideas through access to an enhanced range of source material.

- Scope - ICT offers children access to learning activities and experiences that would not be possible in any other way.

More recently Loveless has argued that the contribution of ICT to effective teaching and learning is as a result of four key characteristics (Loveless, 2003, pp.6-8). These characteristics are defined as:

- Interactivity - ICT offers immediate, dynamic and patient feedback coupled with opportunities to learn through trial and error about decision making, consequences and forward planning.

- Capacity - ICT offers enormous potential for storing, organising, manipulating, sending and presenting data at speed. ICT can do much of the 'donkey work'.

- Knowledge and information - ICT can present data and images in dynamic and varied ways including the use of animation and graphics to facilitate understanding.

- Modelling and provisionality - ICT enables the user to test out theories and hypothesises as well as improving outcomes by promoting the scope for editing

Advocates of ICT in education make clear the hoped for benefits in terms of children's physical development (for example, hand:eye co-ordination and fine motor control); improving and increasing their knowledge and understanding of the world around them (encouraging flexibility and openness of mind); and offering particular benefits from assistive technologies for children with special educational needs (HMI, 1989; Pierce, 1994). A frequent claim made in support of the educational value of ICT cites the power it has to motivate, excite and enthuse children (Baker, 1999; Passey et al, 2004).

Alongside the developments in the primary curriculum came parallel developments in curriculum documentation for early years (3-5 years) settings in England and Wales. Rumbold's reissued 'Starting with Quality' report (DfEE, 1997b) set out a proposed early years curriculum that included reference to young children's experiences with technology. Whilst the report fell into the trap of conflating ICT with design and technology and adopted an appliance of science model to technology generally it was much more in keeping with child centred approaches to early years education than SCAA's subsequent Desirable Outcomes for children's learning on entering compulsory education (SCAA, 1996; Soler and Miller, 2003). The SCAA documentation articulated a much more standardised and instrumental approach to early years education and was widely criticised both at the time and subsequently as a retrograde step (Soler and Miller, 2003). As for its acknowledgement of ICT as an appropriate component of an early years curriculum, the SCAA document contained an all-encompassing statement that young

children should use technology, where appropriate, to support their learning but it offered little or no insight into desirable ICT practice in nurseries and reception classes and did nothing to correct any erroneous conflation of ICT with computers in many people's minds.

The review of the Desirable Outcomes while making little mention of ICT did state that some respondents felt that it should be given greater emphasis (QCA, 1998; SMSR, 1999). The subsequent introduction in England and Wales of the Curriculum guidance for the foundation stage did not include a separate area of learning devoted to ICT, but it did offer increased detail on what were regarded as suitable ICT experiences for young children (QCA, 2000b). Areas of learning such as Mathematical development or Communication, language and literacy contain opportunities for the employment of ICT as a resource to support teaching and learning. These opportunities include listening to taped stories in a small group, instructing a programmable vehicle such as the Pixie, or working with CD-ROM talking books on the computer (QCA, 2000b, p.63 and pp.80-81). Statements relating to appropriate learning in ICT are also present under the heading of Knowledge and understanding of the world. These statements present practitioners with a model of progression in terms of children's knowledge, understanding and skills in relation to ICT beginning with showing an interest in ICT, learning how to operate simple equipment, and eventually performing simple functions on ICT and computer equipment (Appendix i). These stepping stones and their accompanying examples are intended to guide practitioners in assisting children to attain the early learning goal (ELG) of being able to find out about and identify everyday uses of ICT and use ICT to support their learning (QCA, 2000b, pp.92-93). Progression through these stepping stones is not age related but the documentation argues that it is more likely that younger children will be better described by earlier bands whilst later bands provide a closer approximation to the attainment of older children.

The picture of a progressive increase in the incidence and use of ICT in education in response to agreed socio-economic imperatives, guided and structured by national curricula could, however, be highly misleading when the educational institutions in

question are maintained early years settings (3-5 years) in the UK. There are a number of factors at work in relation to the use of ICT in the early years which could result in a significant mismatch between policy rhetoric and the reality of young children's day-to-day experiences with these new technologies.

1.2 Practitioner confidence and capability: The impact of existing practices, cultures and pedagogy

The Office for Standards in Education reported in 1995 that teacher competence with ICT and their ability to make the best use of the technology in their teaching needed considerable strengthening (Ofsted, 1995). Two years after this assessment the Stevenson Report cautioned against premature increases in hardware in schools due to the current state of skills and confidence among many teachers coupled with the shortage of appropriate software (The Stevenson Report, 1997). Although no specific reference to nurseries was included in its assessment of the contemporary context and the measures required to remedy the situation, the Stevenson Report did make clear the wide range of experience, knowledge, skills and even attitudes amongst teachers in general in relation to ICT. Concerns about the effective delivery of the ICT curriculum in the primary sector and the parlous state of teacher subject knowledge were still in evidence in 1998-99 despite the improvement in equipment levels and the operation of some extra-curricular provision (Ofsted, 2000). All that could be said of the experiences of under-5s in the maintained sector was that most children had experienced using a computer and that many nurseries had difficulties in providing adequate computer resources (Ofsted, 2000). These findings leant support to international comparisons at the time which suggested that whilst billions were being spent annually on ICT in education, the overwhelming bulk of the spending was on hardware and networking. A smaller proportion was being spent on software and only 5 percent on teacher education, much of which was deemed sub-standard by some observers (OECD, 2001c; BBC, 2002).

Attempts to explain the apparent failure of ICT to transform educational practice sometimes draw on deficit models of practitioners. Such models highlight a series of inhibiting factors at work, factors which might be overcome through the provision of ICT skills training coupled with further qualitative and quantitative improvements in equipment (Ofsted, 2000; Kenny 2001; Revell, 2001b). Deficit models of this sort frequently refer to factors such as:

- a lack of ICT experience and / or use in private life;
- a lack of previous ICT experience in school / nursery;
- limited training opportunities in the use of ICT;
- insufficient ICT equipment or funds to buy more;
- an absence of onsite technical support to deal with malfunctions and problems;
- no time for ICT curriculum development;
- no time for ICT teaching and learning due to competing curriculum demands and pressures, (e.g. literacy and numeracy targets).

For early years practitioners there could be unique challenges associated with the technology itself. The prospect of acquiring expertise in ICT can be particularly daunting given the mystique often surrounding this area and the rapidity with which existing technologies change and new technologies are developed. The struggle to acquire ICT expertise is further complicated as a result of factors such as ageing populations of teachers in the developed world, the multitude of competing computer systems and the manifold nature of available software, not to mention its appropriateness or usefulness in a 3-5 educational setting (Benjamin, 2000; OECD, 2001c). There is also the issue of securing adequate resources both in terms of cost and the speed with which equipment obsolescence is reached. Papert meanwhile has commented on the impact of past choices. Referring to the QWERTY phenomenon, named after the top row of typewriter keys, he points out that there can be: 'a tendency for the first useable, but still primitive, product of a new technology to dig itself in' (Papert, 1993, p.32). Concern has also been raised about the impact of competing policy pressures on schools in England and Wales, particularly the pressures of national literacy and numeracy strategies (Revell, 2001b). Developing

the effective use of ICT in nursery and primary education was, and remains, a high priority for governments and one consequence of this may be to force the pace of change creating additional situational complications for early years practitioners.

However there is a danger of assuming that any apparent teacher-resistance to an increased prominence for ICT in the early years is primarily skills and resources-dependent as this could mask more fundamental pedagogical concerns amongst practitioners. Dawes points out that the reasons why ICT may not feature as expected in schools may have less to do with stereotypical views of practitioners as technically fearful, inept and incapable, but result instead from professional judgements about the appropriateness of ICT in educational settings (Dawes, 1999). Narrow definitions of ICT that focus primarily upon computers and drill and skill software could contribute to this kind of professional judgement. Some teachers at least may be making choices and decisions concerning the use of new technologies based on their beliefs about good practice, rather than fears about their own capabilities.

Since May 1997 the UK Government has pressed ahead in terms of its stated commitment to improve the quantity and quality of early years provision (DfEE, 1997a; OECD, 2000a). This commitment resulted in a plethora of reforms aimed at extending and enhancing early childhood services in the UK. Research projects such as EPPE (Effective Provision of Pre-School Education Project) were established to offer advice on quality indicators. Although there are no imposed teaching methods nationally in English nursery settings, the QCA, EPPE and others recognised a number of common features of good practice (QCA, 2000b; Sylva et al, 2003). For example:

- practitioner knowledge and understanding of the curriculum. Children need participation in a range of activities taking account of their interests and achievements and their developing physical, intellectual, emotional and social abilities;

- adults who support children in the resolution of conflict by encouraging children to think and talk about their learning and to develop self control and independence;

- high quality adult-child verbal interactions characterised by sustained shared thinking;

- effective partnerships with parents and carers and supporting children's learning outside of the nursery / classroom.

Currently formal classes are largely absent in English nurseries, whilst first hand experience in real and relevant contexts, play and talk predominate as the preferred learning and teaching methods used. Formal testing and assessments are not externally imposed, but staff are expected to monitor and respond to pupil development and progression.

Steps were taken to improve the coherence of the training and qualification of early years teachers and these developments in staff training were paralleled by developments in the early years curriculum (DfEE, 1998). The result of this exercise was the Curriculum guidance for the foundation stage which set out the desired learning outcomes (early learning goals) for children upon completion of their reception year, bringing closer together, on paper at least, the practice of nursery and reception teachers in the maintained sector (QCA, 2000b). The development of a curriculum for the under-fives was influenced by a desire to ensure breadth and balance and a wish to achieve a measure of continuity with the National Curriculum (QCA, 1999). Yet unlike Key Stage 1 and 2 settings the structure, organisation and delivery of the curriculum in the early years is often different to that in primary schools. The term curriculum is interpreted in a holistic and inclusive manner in the Foundation Stage. Learning is not structured using subject boundaries as it is in the National Curriculum. The curriculum in the early years encompasses not just the six different areas of learning but includes all aspects of young children's experiences. The early years curriculum is everything children do, see, hear or

feel in their setting, both planned and unplanned (QCA in Drake 2001). This difference is based in large part on social-interactionist / constructivist understandings of how young pupils learn. Young children do not necessarily make the same subject distinctions with which adults seek to organise teaching and learning. In nursery and reception classes therefore activities can offer starting points for learning across a number of areas.

Even before the introduction of the Curriculum guidance for the foundation stage, some UK early years practitioners were making practical use of ICT in teaching and learning, as is evidenced by examining some of the articles published in professional magazines such as Nursery World during the last few years (Reidy, 1992; Appleyard, 1997; Grenier, 1999; Benjamin, 2000). In some UK settings, at least, early years practitioners have been engaged in innovative practice using ICT based on their understanding of the needs and characteristics of young children (Matthews and Jessel 1993; Baker, 1999; Vandervelde 1999; Freedman, 2001; Ager and Kendall, 2003). Generally however, in the context of nursery and reception classes, ICT has had a less than well-developed identity and seeing the state maintained early years sector as homogeneous would be erroneous. Practice can vary widely across the country, between Local Authorities (LAs) and within individual schools and nurseries. Policy changes have to work their way through institutions and their members' practice, and such institutions and individuals may well impact upon the ways in which policies take shape in reality (Robertson, 2002).

In other settings therefore an observer may well see practice with ICT that is patchy and uneven with little recognition that non-PC resources actually constitute ICT while the computer itself is used almost entirely for free-standing unsupported activity with drill and skill software (Haughton, 2000). Such a deployment of ICT can lead to unproductive interactions between child and technology and unfulfilled, unrealised learning opportunities (Plowman and Stephen, 2003). The need for participatory interaction and assisted performance so much in evidence in the early learning goals may not always be translated into practice where the use of ICT is concerned (Meade, 2000). There may even be an assumption that the technology can be relied upon to do the teaching. The technology itself may even be subverting good practice as teachers lose sight of their

learning objectives allowing the technology to dictate practice (Savage, 2004). The expected (by some at least) transformation of teaching and teachers does not appear to have happened. As Loveless points out, the issues involved are as much about teaching and learning as they are about technology. The potential of computers, for example, to act as managers and knowledge-givers, thus freeing practitioners to act as counsellors and fellow learners has not been an automatic or inevitable outcome of their appearance in primary and early years settings (Loveless, 2003).

A teacher who remains unconvinced about the usefulness of ICT or who is anxious about her / his own ICT skills could produce a significant mismatch between an official policy and the actual experiences of children. Doubts about appropriateness or capability could result in a range of outcomes including resistance to change or even capitulation to change accompanied by the adoption of inappropriate practices. In the UK much of the reform concerning ICT and early years education has tended to concentrate (thus far at least) on the curriculum and resourcing, and these structural changes may not have much impact upon day to day teaching practice (Levin, 2001). Investment in ICT may create a powerful influence for innovation and reform implying a changed relationship between learners and teachers yet it could be argued that ICT has failed conspicuously to change traditional practices very much (OECD, 2001c). Instead ICT, in some settings at least, appears to have been captured and incorporated into existing and / or traditional practices (Selwyn and Bullon, 2000). As the OECD pointed out:

> ..even though most schools are well equipped with computers and access to the Internet, albeit not necessarily in every classroom. Mostly the technology use reflects traditional classroom methodology. (OECD, 2001c, p.9)

One area which raises interesting issues is the introduction of ICT suites into many primary schools (in which many reception and nursery classes are present). As Hargreaves points out, preparing children properly for life in a knowledge society and economy will not be achieved by offering more education in existing forms; 'you don't change what pupils are achieving by subjecting them to more of the same' (Hargreaves, 2003, p.12). The use of whole class, teacher directed, skills orientated instruction of the

kind often found in suites of this sort, a 'routinized curriculum of computer literacy', seems completely at odds with the model of good early years practices envisaged in the principles of the Curriculum guidance document (Papert, 1993, p.xvii). The removal of PC access from early years settings may not fit well with what is currently seen as good practice. It makes it much harder for example for practitioners to respond sensitively to young children's interests and unanticipated learning opportunities.

Restricting PC experience to computer suites could also generate practical difficulties; for example the staffing implications arising from thirty 4 and 5 year olds all encountering the need for adult support and input simultaneously. A concomitant of locating PCs in a separate timetabled suite is the length of time that young children may find themselves working on the computer. Some research has suggested that most young children left to their own devices do not want to spend long periods in front of a computer screen and are more likely to use the technology for short periods before opting to move on to other activities (Pierce, 1994). There are also potential health and safety implications for young children (not yet fully understood) associated with the overuse of new technologies, particularly new technologies designed for adults (Alliance for Childhood, 2000). One recommendation for example is that nursery aged children should only spend an average of 10-20 minutes in front of a computer at any one time in the interests of health and safety with occasional provision made for longer periods where children are particularly engrossed in an activity (Siraj-Blatchford and Siraj-Blatchford, 2002).

The uses to which educational software for young children is put raises a further set of pedagogical issues. Much of the software available to early years practitioners can be categorised as either generic (open-ended) software or content rich software. In some cases, for example certain graphics and music applications, software can incorporate elements of both categories (Sharp et al, 2000). Content rich software packages can constitute powerful tools for children. CD-ROM talking books, electronic encyclopaedias and computer (fantasy) games or simulations of the real world can all offer opportunities for exploration, reinforcement and referencing in which the user is being both active and interactive. Software of this sort may encourage young children's disposition to be

curious and to want to find out. At the same time, setting any problems or challenges in meaningful, familiar or relevant contexts, may lend itself to the promotion of collaborative work and discussion. Generic or open-ended software meanwhile is not related to any particular topic, but can be used to extend and enhance children's efforts to communicate and handle information across a wide range of activities. Generic software, such as word processors, databases, graphics packages, or music CD-ROMs, has the potential to empower the user by freeing her / him from some of the more mundane, mechanical or routine aspects of an activity, thus enabling her / him to engage in higher order thinking and problem solving skills. Editing and redrafting benefit in particular from the use of open-ended software (Sharp et al, 2000). Using generic drawing or painting packages for example offers advantages for children in terms of the quality of the finish and the opportunity to adjust their artwork in a way that does not require excessive use of materials or messy outcomes.

Yet the reality in many settings is that highly flexible generic software is sometimes used for little more than basic skills training, (often during timetabled sessions in ICT suites), with only peripheral relevance to the rest of the early years curriculum. Meanwhile much of the content rich software to be found in 3-7 settings is essentially instructional in nature with the computer acting as a teacher. Children have to complete simple tasks that require practising simple literacy or mathematical skills and knowledge with the meaning of on-screen buttons frequently depicted using symbols and animations with relatively limited use of words and explanations (Markopoulos and Bekker, 2003). Adult intervention when it does take place may not extend much beyond basic instruction on how to use a package, switching on the machine, loading programs, or fixing it when it crashes.

While there may be a place for this type of content rich software it is not without its problems and limitations and these have been pointed out at length by the United States' Alliance for Childhood (Alliance for Childhood, 2000). Some of these packages are premised on the belief that skills and knowledge can be reduced to, and learnt as, a set of discrete chunks of information such as word and letter recognition or addition and

subtraction tasks. However, isolated skills and knowledge learned in drill and skill activities may not bear much relation to the use of the same skills and knowledge in contexts where they are employed for a real purpose. Such packages frequently incorporate an essentially behaviourist approach to learning in which rewards such as flashing screens and jingles are assumed to improve young children's learning by reinforcing the correct responses (Sarama, 2003). Many early years researchers and practitioners would not share this assumption about young children as learners (Siraj-Blatchford and Siraj-Blatchford, 2002).

Unsupported involvement in the Foundation Stage with unsuitable drill and skill packages and undemanding skills training on generic software are unlikely to provide much in the way of intellectual and creative challenge for children (Edgington, 1998). During one preliminary observation three nursery children were sitting in front of a computer using a software package that claimed to help pupils with number recognition. Whenever the right number was matched to the right image the children were rewarded with a flashing screen and a simple jingle. Closer observation however showed that the children were not using their knowledge of number at all and may not even have been aware of the purpose of the task. Instead they were systematically matching every number to every image using a process of trial and error until they had cleared the screen of all the numbers and images. Good problem solving perhaps but it is debatable to what extent these children were really reinforcing their number recognition. Quality adult input could have helped them to make the most of the technology and to understand what was being asked of them. The fact that the software was content rich did not obviate the need for adult intervention to help the children get the most out of it in terms of learning about and through ICT (Turbill, 2001; Sarama, 2003).

1.3 Policy making as rational endeavour

Distinguishing those facts that will shape the future is much easier said than done. Levin refers to this phenomenon (using Dror's phrase) as fuzzy gambling (Levin, 2001). The

Stevenson Report's exhortation to government to make a common sense act of faith could be seen as a classic example of this kind of fuzzy gambling (The Stevenson Report, 1997). Levin cautions the reader against assuming the origin of government policy is entirely rational and objective due to the limits of human capacity to understand and solve problems (Levin, 2001). At the same time Broadfoot challenges the assertion that education practice can be proved to impact directly upon subsequent economic performance (Broadfoot, 2000). Hargreaves meanwhile challenges the focus of some policy initiatives aimed at promoting the knowledge economy and / or knowledge society (Hargreaves, 2003). In his view these are often misguided in their attempts to educate children in the knowledge and skills for a particular kind of economy. Instead he argues that such initiatives should be aimed at developing a population's capacity for learning in order to be able to adapt and respond quickly and flexibly to economic change. ICT skills can soon be rendered obsolete by technological advances and practitioners should focus on capability which addresses not merely the question of how to use ICT but also when and why to use it (Loveless, 2003).

Correctly gauging the complexities surrounding a particular issue may prove to be exceptionally difficult due to the interaction of numerous dynamic factors (Levin, 2001). The drive for standards in recent UK policy documentation has been characterised by governmental attempts to determine the definition of what constitutes excellence, efficiency and effectiveness. There is a danger that statements of attainment or early learning goals based on this view could be seen as objective, truthful, accurate and comprehensive. In reality it is an excellence frequently defined by behaviourist, competence models of skill acquisition (DfEE, 1998; QCA, 2000b). For Hargreaves the entirely laudable quest for higher educational standards has in fact morphed into a compulsive obsession with standardisation characterised in the UK situation by such things as governmental micromanagement, punitive inspection regimes, performance related pay and standardising the curriculum. The international comparisons frequently utilised by ministers have led policy makers to oversimplify and singularise the contribution of education systems to economic performance (Hargreaves, 2003). Schools and nurseries are required to demonstrate how they add value, at the same time the

criteria by which such calculations are made are based on a narrow interpretation of what is valuable.

This approach appears inherently reductionist, and takes little or no notice of those crucial social and emotional intangibles that can be so hard to measure in young children. Certainly the appearance of something new in a classroom can create considerable interest and excitement amongst children, although this is hardly peculiar to ICT and it remains to be seen whether the excitement created by ICT has a unique or particular longevity. It is equally possible that the supposed excitement associated with ICT has been overstated. New technologies may simply be treated as objects like any other by children after the initial novelty has subsided until or unless they become the focus of power struggles between peers or vehicles for facilitating and maintaining friendships (Moran-Ellis and Cooper, 2000).

While there is research evidence to support the notion that high quality early years care and education can have a positive impact upon the lives of individual children, their families and society, the notion of what constitutes quality is hotly debated (OECD, 2000a; Soler and Miller, 2003). At the same time debates also centre on whether ICT constitutes a huge leap forward for humanity or whether it has merely confused information processing with real knowledge and understanding whilst simultaneously blinding people through the creation of data smog (Schenk 1997 and Rozack 1994 in Loveless, 2003). Concern has also been expressed in some quarters about the impact of ICT on educational standards and that the considerable sums invested in it are often at the expense of other areas, e.g. spending on books (Pinnell, 2004). Human beings may well overestimate the influence of immediate or visible causal agents, inferring causality when the links are in fact merely fortuitous. Some government publications could be accused of adopting a simplistic technological determinism in which the transformative power (and essentially positive impact) of ICT is taken as read (Moran-Ellis and Cooper, 2000). Not only may some of the assumptions surrounding government policy on ICT be mistaken, many factors are beyond the control of governments and some may even be contradictory.

The implications for ICT practice in nursery and reception classes could be twofold. Firstly over-preoccupation with nationally imposed curriculum priorities such as literacy and numeracy could mean that there is insufficient time left to devote to the wider curriculum, including ICT. Secondly downward pressure to prepare children for the more formal modes of teaching and learning they will encounter later in their education could result in the employment of teaching and learning approaches in ICT that are ill suited to the ways in which young children learn best (Soler and Miller, 2003).

1.4 Competing constituencies

While the advocates of reform may be in the ascendant it does not mean that they are either unopposed by alternative viewpoints or of one mind about what form such reform should take. There is: 'a world of difference between what computers can do for example and what society will choose to do with them' (Papert, 1993, p.5). A reader of existing UK policy in the realms of ICT and early years education would find little evidence of the voices off, yet evidence of the struggles between competing groups and ideas does exist. The existence of these alternative viewpoints began to manifest itself more overtly as policy itself began to move from origins to adoption (Levin, 2001). Ministerial statements in which the author is fed up of hearing how unstructured play and free activity are all that a young child needs are revealing (Hodge, 1999b). As are statements from the then Secretary of State for Education, in which critics of Government education policy in general are described as sceptics who have missed the point and who are afflicted with the British disease – cynical sneering (Smithers, 2000).

Governments have to fight to get policies adopted; they do not necessarily win the contest on every point. In spite of the venting of ministerial spleens for example, the UK Government found itself modifying its original proposals in respect of early years education (Hodge, 1999a; Smithers, 2000). It gave ground on the importance of play and restructured the documentation to reflect the equal importance of personal, social and

emotional development alongside other areas of learning such as communication, language and literacy and mathematical development (Lochrie, 1999; Philips, 2000; Select Committee on Education and Employment, 2000). During the same period commentators in the media weighed into the debates over developments in ICT, praising the broad thrust of policy but questioning key aspects such as progression, and raising concerns about conflicting policy pressures caused by the primacy of literacy and numeracy hours which had often resulted in other curriculum areas such as ICT being placed on the back burner (Freedman, 2001; Haughton, 2000). Some commentators also challenged the effectiveness of policy implementation and outcomes such as New Opportunities Fund (NOF) ICT training for teachers and the limited availability of technical support in schools (Revell, 2001b; Kenny, 2001; BBC, 2002).

Meanwhile some early years researchers and commentators urged caution over the introduction of ICT into early years education, in some cases seeking to ensure primacy for developmentally appropriate uses for the technology, in others questioning its use at all in 3-5 settings (NAEYC, 1996; Alliance for Childhood, 2000 and 2004). Some authors and organisations both in the UK and elsewhere in the English speaking world categorised ICT as a new tool that could and should be incorporated into existing early years practice, but only in developmentally appropriate ways, for example supplementing, but not replacing, other important first hand experiences and interactions (Elkind, 1996; Anderson 2000). The American National Association for the Education of Young Children (NAEYC) reminded early years practitioners everywhere that there could be a considerable disparity between a child's computer skills and their comprehension of what was happening on the screen in front of them. For Savage, ICT offers an incredible range of tools of immense value but only when properly utilised (Savage, 2004). The potential benefits of ICT in educational settings may be considerable but the starting point for practitioners ought to be their educational objectives (NAYEC, 1996).

However, consensus on what is and is not developmentally appropriate is, inevitably, a matter for debate. Even the Alliance for Childhood were using the term by 2004 yet their

interpretation of it was very much their own. Various groups and individuals in the field of early years education have been much more hostile to the increasing incidence of ICT in early years settings, believing that the benefits have been grossly overstated while at the same time the costs have been underplayed (McVeigh and Paton Walsh, 2000). Claims that placing powerful tools such as computers in the hands of young children equates with the empowerment of those children have been challenged. Critics of ICT have argued that true empowerment involves the ability to think and make judgements rather than simple skills acquisition. True empowerment involves the development of creative and critical capacities in relation to the technology (Alliance for Childhood, 2000 and 2004). In some cases the technology has been described as inherently unsuitable for application in early years settings. For such commentators, the introduction of ICT is felt to fly in the face of good early years practice and of what are widely accepted as the needs of young children including first hand experience, play and talk. Computers, in particular, have been viewed as inappropriate tools that risk stunting children's intelligence and social skills and of damaging their health (McVeigh and Paton Walsh, 2000). The fiercest critics of the introduction of ICT into early years settings have cited the potentially harmful effects of prolonged computer use on young children in terms of their physical and social well being (Oppenheimer, 1997; Meltz, 1998; Kelly 2000; McVeigh and Paton Walsh, 2000). Over-preoccupation with the development of computer skills may impede the establishment of good social skills and concern for others, the inculcation of which early years practitioners rightly regard as an important part of their role (Alliance for Childhood, 2000 and 2004). Similarly there may be hidden health costs (vision strain, radiation / cancer risks, repetitive strain injuries, sedentary lifestyles leading to obesity), exacerbated by young children using equipment designed for adult bodies (DATEC, 2001; Alliance for Childhood, 2004).

While viewing ICT as a panacea to all education's problems is certainly a mistake, some of these criticisms seem to place responsibility for inappropriate practice on the shoulders of the technology rather than those using it. The degree to which for example an electronic white board is interactive or not, depends largely on the way in which it is used in the nursery or classroom. While its design may encourage certain teaching and

learning styles it does not preclude alternative, and possibly more appropriate, approaches. At the same time over-preoccupation with computers in the minds of some researchers and commentators could result in a failure to recognise that a myriad of other forms of ICT exist, some of which are already widely used in early years settings and others still with the potential to fit well with a variety of teaching and learning approaches.

1.5 Doubtful measures and different childhoods

Criterion-referencing and competence based curricula seek to develop and then gauge children's abilities against a set of standards or competences, normally utilising increasingly more demanding descriptions to judge and report on attainment. Such criteria can be helpful for early years practitioners in sharing the purpose of the activity with the children. They provide apparently clear goals and targets to aim for, they help to establish exactly what areas should be covered, and engender greater confidence in adults about the skills and knowledge that children have acquired. It may seem therefore that a criterion-referenced approach to curriculum design offers practitioners a fairer, less subjective approach as it utilises universally applied measures of attainment.

In the case of the ICT statements in the Curriculum guidance for the foundation stage there are four tiers of attainment utilising increasingly more demanding descriptions to judge and report on attainment (QCA, 2000b). As has been previously stated elsewhere progression through these stepping stones is not regarded as age related but the documentation argues that it is more likely that younger children will be better described by the earlier tiers whilst later tiers provide a closer approximation to the attainment of older children. But at the time of their development, research into young children and ICT was limited in the extreme. It is not clear what, if any, research informed the drafting of the existing statements or whether they constituted simply a best guess at the time.

Unfortunately, producing criteria or descriptions that are universally understood and unambiguous is not as easy as it might sound. No matter how carefully crafted, any criterion will still be open to a degree of ambiguity and interpretation thus threatening reliability and attempts to ameliorate this danger through moderation are potentially time consuming and expensive (Knight, 2001). In addition, competence statements tend to emphasise outcomes, they are statements about what children should achieve; they do not in themselves provide any insights into the process or processes by which these achievements are to be attained, nor can they necessarily guarantee that a competence once demonstrated, will be demonstrated again at other times and in other contexts. Furthermore, large numbers of criteria can result in an atomised view of the curriculum making it hard on occasion to see the bigger picture. A drive for precision may result in criteria proliferation with consequences for manageability, whilst developing manageable systems may result in a lack of precision (Knight, 2001). Teaching, learning and assessment are not just about acquiring skills and knowledge; the process also involves values and attitudes; values and attitudes which are not always easily identified in a competency or criterion-referenced approach. Introducing ICT into early years settings ought to be about much more than the unthinking mastery of a set of competences. Practitioners are trying to facilitate the growth and development of self-aware individuals with lively, creative intellects, able to exercise understanding, judgement, problem solving and communication skills.

Not only may existing documentation suffer from the tension inherent in any criterion referenced system between clarity and manageability, it may also prove not to be well matched to the experiences and capabilities of young children. Economic, social and cultural factors may mean that the technological dimension of childhood is significantly different for, for example, rich and poor, male and female (Passig et al, 2000). The OECD defined the term digital divide as the:

> .. gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard to their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities. (OECD, 2001d, p.5)

Their research suggested that at the level of households the extent of any divide would depend on income and education primarily, with other variables such as household size and type, age, gender, racial and linguistic backgrounds and geographical location also playing a part. Others have argued that the digital divide is in fact simply a digital delay (OECD, 2000b). In these analyses such delays are the norm with any new technology and that apparently marginalised groups will catch up. Increasing economies of scale will ensure that the market will eliminate any divide in time. In a society that accepts all manner of divides they ask, what is so special about information (OECD, 2000b)? One response has been to suggest that without policy intervention on the part of governments ICT will actually intensify societal divisions rather than close them (McNair, 2000). An unregulated market will favour the wealthier, better educated and more technologically literate individuals and communities. Even if moral and ethical arguments are economically unconvincing there are sound economic reasons for seeking to address the digital divide if it exists. Modern economies cannot afford a significant uneducated and excluded minority, such a group acts as a drain on a nation's resources and sows the seeds of political and civil instability (McNair, 2000).

In this situation the introduction and extension of ICT in educational settings coupled with government initiatives such as Computers In Reach could be seen as an effort to ameliorate social and economic exclusion (Haughton, 2000). Woodward for example suggested that children from poorer backgrounds are much more motivated by ICT in the classroom precisely because they have fewer opportunities to access it in the home (Woodward, 2000). There is some evidence from the primary sector to suggest that the use of ICT suites might go some way towards ensuring more equitable ICT experiences for some children (Selwyn and Bullon, 2000). Where practitioners are using ICT in their class primarily to facilitate existing organisational and management strategies (for example using the PC to pacify the disruptive or reward the fastest finishers), access to the technology for all through the use of an ICT suite could help to ameliorate access inequalities amongst children. Given the pedagogical concerns surrounding this kind of ICT experience for children in the 3-5 age range perhaps the development of wireless

technologies (e.g. class sets of laptops) offers the possibility of squaring this particular circle (Cooper and Brna, 2002).

Estimates in the UK of the extent of ICT in young children's homes varies with some authors suggesting a third of homes nationally own computers, others put the figure closer to 50 per cent (Wellington, 2001; Livingstone and Bovill in Kerawalla and Crook, 2002). Yet these figures mask some important variations as national figures conceal the differences between the haves and the have lesses with some estimates of PCs in higher income homes in excess of 80 per cent (Selwyn and Bullon, 2000; Wellington, 2001; BECTA, 2002). However, there are problems with these studies as measures of children's exposure to and familiarity with ICT outside of educational settings. Much of the data gleaned on ICT in the home tends to focus primarily upon computers, ignoring the multitude of other forms of ICT. Nor does the presence of a computer in the home mean that young children themselves are using it or if they are what they are using it for. While the rationale of higher income parents for providing children with such technology in the home centre on its educational potential, surveys of actual use have found that the children themselves are largely involved in game playing in much the same way as with children from lower income / non-professional backgrounds (Kerawalla and Crook, 2002).

The possible gendered image that ICT may have could further complicate matters. In some circumstances at least, some boys and some girls may behave in stereotypical ways when encountering ICT. This said the fact that childhoods can be so very different mean it is dangerous to make sweeping assertions about boys' and girls' behaviour. When it comes to ICT not all young girls will be powerless and not all young boys will be powerful, such a high degree of homogeneity seems unlikely. Some girls for example are able to develop highly effective means of managing the boys' behaviour and retaining their control of activities and equipment in early years settings (MacNaughton, 2000; O'Hara, 2004).

There may be some children therefore in marginalised groups within society for whom access to ICT is restricted. Alternatively the wherewithal to access some new technologies even within marginalised groups may be much more widespread given economies of scale in production. Elsewhere, some young children's experiences and capabilities may be well ahead of the model set out in the Curriculum guidance. The digital divide may actually be a complex of divides and is concerned with education and competence with ICT as much as with the technology itself (OECD, 2001c). As Selwyn makes clear the issue of a digital divide is much more than a simple matter of access to equipment. It is also about using ICT 'meaningfully', to 'live well in contemporary society'. The fact that some groups and individuals are better placed to do this is a deep rooted social problem requiring a deep rooted social solution. People have to have a reason to close the gap, the technology must have a purpose, being relevant, useful and / or pleasurable. Public investment in the creation of a convenient technological infrastructure creates only the potential opportunity for equal access. For Selwyn the huge expenditure on ICT since the 1990s has made little impact on the digital divide (Selwyn, 2003, p.3).

1.6 Summary

Viewing policy making on the subject of early years education and ICT as a purely rational endeavour may be problematic. Some of the causal assumptions concerning economic outcomes are questionable and competing policy imperatives can result in unanticipated and contradictory outcomes (Levin, 2001; Hargreaves 2003). Governments do not operate in a vacuum and within any policy arena there will be numerous constituencies, some of which may have competing or contradictory agendas (Soler and Miller, 2003). The belief that policy statements and documentation are effective as engines of changed practice fails to take into account the resilience of existing practices, cultures and in this case pedagogy (OECD, 2001c). In this instance the technology itself may act as an impediment to implementation if those tasked with implementing the changes feel under-skilled (Kenny, 2001; Revell, 2001b). Meanwhile the childhoods

experienced by pupils across the country are different in many respects including access and exposure to ICT; this diversity may present further challenges to national policy initiatives (Wellington, 2001; Kerawalla and Crook, 2002; Hall, 2004).

The image of ICT in the early years created by policy statements and curriculum documentation may mask a much more variable and complicated reality. The research therefore set out to explore:

- young children's experiences and capabilities with ICT in maintained nursery / reception settings;
- the usefulness of the existing early learning goals as a means of gauging young children's ICT capabilities;
- young children's experiences and capabilities with ICT in the home and beyond.

Chapter 2

Working with young children in schools and nurseries: Methodological considerations

The work of developmental psychologists such as Piaget, Isaacs, Bruner, Donaldson, Vygotsky and others has made a significant impact on the teaching profession's understanding of childhood and learning during the past century (Isaacs, 1951; Donaldson, 1978; Bruce, 1997; Wood, 1998). One result of constructivist and social interactionist ideas has been the development of an early years curriculum in England and Wales in which children are perceived as active learners who benefit from first hand experience in meaningful situations. These experiences capitalise upon children's natural desire to play and talk and are underpinned by high quality adult intervention (DfEE, 1997a; QCA, 2000b). Understanding young children's experiences and capabilities with ICT necessitates an understanding of children's development. For example ICT may present challenges to those interested in early years education in relation to exactly what constitutes concrete experience. A narrow view of this which precludes any claim to qualifying as first hand experience for activities involving ICT, coupled with an equally narrow view of ICT itself whereby the term is misused simply as shorthand for computers, could result in some instances in a rejection of new technologies as being relevant for the under-fives. The research had therefore to take account of:

- young children's intellectual, social and emotional development;
- the teaching and learning environments in early years settings and;
- the ethical imperatives that have to inform any piece of research involving human subjects.

2.1 The nature of childhood

For Piaget, children were not miniature adults in terms of their cognitive abilities. He postulated a series of developmental stages that children went through in regular and ordered sequence; sensorimotor, pre-operational, concrete operational, and formal operational (Donaldson, 1978). A key element of Piaget's ideas that distinguished him from earlier behaviourist psychologists was the belief that children actively construct meaning, rather than being the *tabula rasa* of some previous models of childhood. For Piaget, young children assimilate knowledge as a result of first hand experience. Subsequent experience forces a child to re-evaluate his / her original ideas in the light of new situations and observations in order to accommodate to the new reality (Bruce, 1997). The intellectual disequilibrium that results from new and different situations is resolved as new information is incorporated into, or used to supplant, old ideas. In each of the stages set out in the Piagetian model children are believed to refine their thinking in the light of direct experience as part of a sequence that is invariable; children cannot bypass stages or make short cuts to reach more advanced levels of thinking.

Like Piaget, Bruner also developed a stage model to explain children's cognitive development. However, Bruner suggested that children were capable of intellectual achievements at an earlier point than that predicted by Piaget as a result of instruction and carefully structured learning environments. For Bruner, children's progress can be scaffolded by teachers and others who are effective at questioning, guiding and instructing in ways that would extend and challenge children's thinking (Wood, 1998). Similarly, Vygotsky's concept of a zone of proximal development (ZPD) which represented the gap between what children can do with and without assistance from more knowledgeable individuals was another attempt to signal the importance of social interaction in cognitive development (Bruce, 1997). In the area of ICT for example, this could include one child teaching another child how to operate the Pixie, resulting in learning for both children. Where different levels of ICT experience and expertise exist amongst children, many are keen to seek help and to learn from one another (Burnett et al. 2004). For social interactionists playing, working collaboratively and co-operatively

and high quality adult intervention constitute an important learning mechanism (Bruce, 1997). Yet research evidence cited in Chapter 1 has suggested that the incidence of these factors in some settings at least may be patchy in relation to ICT. Inadequate resourcing and low levels of practitioner confidence may combine to obscure young children's true experiences and capabilities with ICT.

Some researchers have argued that for children to be successful learners they need to develop a series of super skills. For some these have been characterised as motivation; socialisation; and confidence and for others as learning dispositions; respect for self and others; and emotional well being (Ball in Keenan, 2002; Pascal et al in Keenan, 2002). Learning dispositions include such skills and attitudes as resilience, organisational skills, curiosity, concentration, inventiveness, self-management, and openness. The characteristics of play, exploratory and / or imaginary in nature, are regarded by constructivist thinkers as an ideal way to develop these skills. For Piaget, Vygotsky, Bruner and others play was a crucial mechanism through which children explored and made sense of the world. While people expecting formal teaching methods may see play based approaches as random informality they are instead carefully structured situations in which children work with peers, adults, or alone, to master important skills, concepts and attitudes (Keenan, 2002).

Piaget saw play as an immature functioning that children would eventually grow out of, however Vygotsky saw it as a means through which children could become a head taller than themselves (Keenan, 2002). Play constitutes an important approach to learning in the early years and has been regarded as a shortcut to this end (Bailey and Farrow, 1998). Play could be seen as a natural process through which children learn about the physical world around them (Bruce, 1997). Through play children can experience making choices; take responsibility for their learning; act out feelings; encounter and take on board new ideas; have opportunities to learn through movement and the use of all the senses; engage in long term, in-depth exploration; and draw all the above together to make sense of the world (Bruce, 1997).

Play is an ever-present feature of young children's everyday experiences in good quality foundation stage settings and offers children the chance to demonstrate their competence and knowledge (Clark, 2004). Young children for example may enjoy using a programmable toy, a paint programme, playing with a computer keyboard and watching what happens on screen when different keys are pressed, or talking to one another using walkie-talkies. Although to the untrained eye this type of activity may appear little more than messing about, this physical exploration is an important part of learning for young children (Smidt, 2002). Play involving ICT might therefore offer interesting opportunities to elicit information on children's wider experiences and capabilities in relation to new technologies. Ring argues for the need to adopt research methods that reduce adult conspicuity within early years settings (Ring, 2000). Creating play situations that involved the use of ICT and other resources as stimuli for observations and conversations meanwhile could offer inventive and creative ways forward in terms of data collection (Langstead, 1994 in Clark et al, 2003).

Data collecting in this way is likely to mean seeking the attenuation of one's own authority that is part and parcel of having adult status in the eyes of the children whereby attempts to exert overt authority over the children are not made (Holmes, 1998). Paying close attention to non-verbal signals, using appropriate language, using pupil furniture and equipment to get down to the children's level and learning how children ask to join in with activities and imitating this are all aspects of this kind of approach. Another strategy to reduce the intrusiveness might involve combining related (e.g. using digital cameras, audio recording children's voices) and even unrelated tasks (e.g. drawing, mark making) discussions. As children tend to concentrate on the task they may be less likely to be distracted by events around them or to regard any discussion as intimidating (Holmes, 1998).

Any explanatory model of children needs to make reference to the whole child; 'children are made up of far more than cognitive capacities' (Zigler in Hyson, 1994, p. ix). They are not simply cognitive beings but are also emotional and social beings, and there is a connection between growth and development in the first area and growth and

development in the second area (Isaacs, 1951). The environment in which a child grows, including cultural, social and economic factors, influences her / his social and emotional development and as the relationship between cognitive and social and emotional development is iterative this will have consequences for generic theories of childhood (Keinbaum and Trommsdorff, 1999). Any inquiry into young children's ICT experiences and capabilities therefore ought not to underestimate the power of emotions to motivate behaviour and learning. Just as there is a relationship between thought and action, so too there is a reciprocal relationship between thought and feeling (Bonnett, 1994).

The principles of good early years practice set out in the Curriculum guidance for the foundation stage (QCA, 2000b) acknowledge the emotional-cognitive link and the positive emotional bases of children's self-initiated learning, such as satisfied curiosity, pleasure in finding out, the intrinsic reward of mastery, identification with adults and teachers, and the impact of adult praise, recognition, confidence and trust (Hyson, 1994). Memory and learning for example may well be enhanced in settings that heighten interest and happiness, enabling greater tolerance of frustration and promoting perseverance. In the case of ICT some children may feel excited and enthused at the prospect of working with or sharing their experiences of new technologies whilst others remain disinterested or even experience anxiety. At the same time, the inevitable interplay between children's thoughts and actions may be misleading for a researcher as thought is not always conscious thought (Bonnett, 1994). The difficulties may be further exacerbated by problems over validity as the lines between fact and fantasy can, on occasion, become blurred for some children.

Questions remain over the universal applicability of theories on young children's cognitive development prevalent in western societies. Isaacs for example identified a series of factors in the 1920s and 30s that could play a role in determining individual differences, including inborn ability, temperament and character, and home and social background (Isaacs, 1951). Over-standardised models of childhood that advocate stages and ages of developmental change could result in a determined and determining conformity that might underestimate the impact of social, emotional and environmental

factors on young children's development (Christensen and James, 2000). Seeing young children as individuals is important in that it foreshadows the idea that there may be numerous, equally valid, constructs of childhood. Western developmental notions of childhood that apply the concept of incompetence or becoming in undifferentiated ways to children at various ages run the risk of ignoring the influence of social, economic and cultural factors (Mason and Steadman, 1996).

Ideas about the nature of childhood may also vary even within a society (Bruce 1997). The childhoods experienced by children in different areas of the UK, or from different family backgrounds are not necessarily the same and these differences may well include a technological dimension of childhood (David, 1998; Oberhuemer and Colberg-Schrader, 1999). Not all children will have been encouraged or at least allowed to play with new technologies outside of the nursery / school context. While many children may be happy to explore and gain ICT experience, others may fear that experience and suspect the worst in each new situation (Hyson, 1994). ICT might induce different emotions and responses in different children. MacNaughton's work on boys' and girls' choices of play areas and their use of space and time for example has shown how there is a tendency on the part of some boys to challenge or deny access to certain activities (MacNaughton, 1998). Although MacNaughton's focus was not ICT, there could be parallels. Young children can pick up and adopt notions of male and female roles and activities at an early age and some technologies may well carry connotations of toys for the boys. Given the possible gendered image that ICT may have, this could well have implications for research in this area.

In spite of the qualifications that have been added to the developmental theories above, others have argued convincingly that by taking a more holistic view of childhood it is possible to discern a period of infancy in which children do have some needs in common (Blenkin and Kelly, 2000). Children's development does appear to be broadly sequential in nature with things happening in a particular order, an order that to all intents and purposes is the same for all children (Sharman et al, 1995). As such it is possible to set out principles of good early years practice provided that practitioners remember that

children are individuals and as such are likely to be at different points in their development and learning. While children share a common biology and appear to follow broadly similar developmental paths, their social experiences and relative competences must always be seen as contextualised, rather than determined by, the processes of physiological and psychological change (Christensen and James, 2000). Researchers have to bear in mind that the rate of children's development can vary widely. These differing rates of development are the product of a range of factors that include environmental, social, cultural, personal, biological and economic elements. Some of these factors can enhance and promote a child's development, while others will hinder and inhibit it (QCA, 2000).

2.2 Researching in early years settings

Research into young children's ICT experiences and capabilities must take into account the impact of the context, namely the learning environment of the nursery / classroom in the maintained early years sector and the actions of practitioners working there. The learning environment in maintained nurseries and reception classrooms (particularly in nurseries) is highly dynamic. The structure, organisation and delivery of the curriculum in the early years is often different to that in primary schools and ought to be viewed as the best way of addressing the particular needs of 3–5 year olds during this crucial period of their development (QCA, 2000b). The term curriculum is often interpreted in a holistic and inclusive manner in the Foundation Stage. Learning is not structured using subject boundaries as it is in the National Curriculum.

One consequence of this pedagogical context is that examples of discrete subject teaching in early years settings may be less common than in primary settings. Unlike the slightly more formal classroom environment in many Key Stage 1 settings, children in many early years settings are able to opt into and out of classroom activities at will. Many teachers of nursery / reception children also make extensive use of outdoor areas as a way of broadening their pupils' experiences. These areas offer opportunities for a wide range

of activities including imaginative play, construction play, traditional games (e.g. hide and seek), and physical play (e.g. running, throwing, climbing). While much of this work can be done inside the nursery / school, the outdoor area provides an alternative arena for learning, one that may suit some children better and one that may also compensate for changes in lifestyles (Edgington, 2002). On the other hand, the development of ICT suites could lead to ICT being treated slightly differently to much of the early years curriculum by some settings, akin in some ways to physical education whereby children are moved to a special area for a set period of time in addition to any additional activities that may be ongoing in the nursery / classroom.

Consideration of the context inevitably also includes consideration of the adults involved. In part their significance to a researcher could be as a result of their interactions with children in situations where ICT is a factor, making them well-placed to provide additional data gleaned over an extended period of time about children's ICT knowledge and capabilities. Compared to an individual researcher they are legion and they are on site at all times before, during and after a period in which fieldwork is being carried out. Given the inability for a researcher to either be everywhere at once or even on site continuously the practitioners' perspectives provide an important means of member checking any data gathered as a result of weekly visits to a setting.

Practitioners also constitute an important group of gatekeepers that have to be satisfied regarding the purpose and ethics of proposed research before any fieldwork is possible. As gatekeepers, practitioners could be influenced by events beyond the setting. Early years settings have traditionally been more independent of centralised bureaucratic institutions relative to their primary or secondary counterparts. Consequently, early years practitioners have been freer than their colleagues in other phases of education to respond to a broader set of needs than simply the acquisition of academic skills and knowledge. However, the current drive to develop universal, high quality early years provision, has meant that this independence is being steadily eroded in parts of the maintained sector at least (OECD, 2000). The introduction of documentation such as the Curriculum guidance for the foundation stage and the Foundation Stage Profile as well as other government

initiatives means that practice in early years settings is increasingly affected by instructions and guidance from central government (QCA, 2000b; QCA, 2003). Early years professionals who feel their previous practice is being implicitly criticised or explicitly threatened may prove less than amenable to involvement in the research agendas of outsiders.

An additional complication was created by the inclusion of the reception year as part of the Foundation Stage. Whereas prior to this development reception teachers were working towards the National Curriculum they are now expected to employ the Early Learning Goals and to adopt approaches to teaching and learning rooted in nursery practice (QCA, 1999; QCA, 2000b). This change presented reception teachers with practical challenges involving organisation and resourcing, but it also placed them in a potentially difficult situation vis-à-vis their Key Stage 1 colleagues in terms of approaches to learning as a result of parallel initiatives such as the development of literacy and numeracy hours. The situation was complicated still further by the fact that at the time of the change many reception practitioners were not originally trained for early years settings. Organisations experiencing rapid change will not necessarily be well disposed to outsiders who may themselves be regarded as symptomatic of the changes afoot.

In the case of practitioners as research subjects, just as with children, positionality will be a factor. Not only may gender, ethnicity and role affect access to certain groups and activities, but any research with professionals has to be designed with reference to the perceptions that these adult research subjects might have regarding a researcher who is male, white and (in spite of being a teacher educator) employed in an ivory tower. Furthermore, the positionality created by a perceived maleness associated with the technology itself could have created additional obstacles to gaining access and information. Evidence from Ofsted and the Stevenson Report suggested that the choice of ICT as a theme for research could provoke a negative reaction amongst some practitioners (The Stevenson Report, 1997; Ofsted, 2000). One example of this is the ongoing challenge facing teachers, including teachers in the Foundation Stage concerning

the rapidity with which ICT expertise disappears. The rate of change and development is such that maintaining this expertise requires ongoing and continuous updating of skills. This is not easy to achieve in busy nursery and reception settings and adults who feel under-skilled themselves in a particular area may be reluctant to risk exposing what they perceive as a weakness. In this context therefore a male interested in ICT in 3-5 settings could run the risk of being seen as, at best, an irrelevance in relation to more pressing externally driven imperatives or, worse, as a symbol of inappropriateness.

Paradoxically, the extremely short half-life of ICT expertise could actually be a great leveller (Monteith, 1998). As everyone is faced with the same challenge, so it is possible to enter the race to keep up to date on a more equal footing due to the lack of sequential or hierarchical knowledge necessary to become proficient; provided of course that schools and nurseries have the financial where-with-all to keep up in this race. In addition, the very fact that an area such as ICT may be regarded as an aspect of current practice requiring development or improvement could actually have acted as a spur to potential research settings to get involved in research and or curriculum development projects in this area.

2.3 Ethical considerations

While ethical considerations are hardly unique to those intending to conduct research in early childhood settings, the nature of childhood and the intention to seek data on children's experiences and capabilities beyond the confines of the nursery / school raised some specific challenges. The ethical principles of autonomy and informed consent, beneficence and non-malfeasance, justice and confidentiality / anonymity provide a structure for the discussion.

Autonomy has been defined as personal rule of the self by adequate understanding while remaining free from controlling interferences by others and from personal limitations that prevent choice. At the same time, the term justice has been used to encapsulate the need

for researchers to treat the subjects of their research with fairness and with regard to what is their due or what is owed to them (Beauchamp and Walters 1989, in Greig and Taylor, 1999). Clearly a major concern in situations involving interactions between the powerful (adults) and those ostensibly without power (children) is that, handled insensitively, these interactions could constitute an abuse of authority. The application of the principle of autonomy means that research subjects must be knowledgeable about the focus and extent of the research and must feel free to become part of or withdraw from the research as and when they see fit. Justice meanwhile demands that amongst other things the identity of research subjects should be restricted to those with a need or right to know. Confidentiality and anonymity therefore constitute important features of ethical approaches to research. Research subjects are entitled to respect and have the right to veto wider access to data concerning them, their ideas or their actions (Gardner et al, 2004). Finally, the concept of beneficence summarises the overarching requirement upon researchers to do no harm to the subjects of research and to take on an obligation to weigh and balance benefits against harms, benefits against alternative benefits, and harms against alternative harms (Beauchamp and Walters 1989, in Greig and Taylor, 1999).

The means of gaining informed consent from young children within a setting in which adults may be associated with authority is far from straightforward (David et al, 2001). The term informed has to be carefully thought through given the developmental state of many of the research subjects. In some cases researchers are expected to obtain consent in writing using documentation that is comprehensible (SHU, 2000). While certainly feasible in research involving adults it is difficult to see how preliterate children or emergent writers would cope with this requirement. What is more, seeking written consent from 3 and 4 year olds might actually cause more harm in terms of children's anxiety than not seeking it. Rigorous application of the two principles of autonomy and justice would appear to require the researcher to ensure that the children know what the research is about; they know what their role is; they know that they have a choice about whether to participate or not; and they know that they can change their minds and withdraw at any point. However, Donaldson's work on language and communication suggests that this will be far from unproblematic in situations where researchers have to

try to explain the purpose of their research and seek consent from three or four year olds who may well be differently articulate (Donaldson, 1978). An explanation involving a lot of adult talk and ill-matched vocabulary at best might bore, and could even intimidate children. Researchers need to take great care over adult-child relationships in which adults know best and are therefore in a position to ignore children's feelings or wishes. Those without power ostensibly consenting to the requests of those with power, does not necessarily equate with autonomy. Asking a child if one can watch or join in an activity may not constitute seeking consent without interference. The child could feel as though no real choice is possible given adult-child power relationships.

One solution suggested to the problems that arise over young children's abilities to comprehend and thus give genuine consent for research to take place meanwhile is to ask whether others (parents, carers or teachers) have the right to give permission on a child's behalf. A second, is to consider whether research could be conducted, wholly or in part, by proxy through parents and / or professionals (Greig and Taylor, 1999). Although it is essential that the views of parents and practitioners are an integral part of this inquiry, proxy methods of research present the challenge of how to develop a shared understanding of the task and ensure reliability and validity (Keyes, 2000).

There may also be an issue of whether seeking informed consent from children could produce problems with data collection. Knowing they are being observed could result in uncharacteristic, unusual or exaggerated behaviour. Some children might seek to play to the gallery or to second guess what adults hope they will say, other children meanwhile might become shy, withdrawn, intimidated and monosyllabic (Tizard and Hughes, 1984 in Clark et al 2003) particularly where the adult is a stranger or the technology is new and they have not yet had time to explore its use. Whilst covert non-participant observation would offer one way of reducing the likelihood that children might alter their behaviour or views as a result of the presence of a researcher, this approach creates an ethical dilemma as it cannot exist alongside the idea of informed consent. Nor may consent be a one off event, consent may have to be renegotiated and form part of an ongoing process in which children have the right to opt in or out of the research as they see fit.

It is also possible that researcher positionality could impact on the responses of some of the children. Adults can influence the ideas, attitudes and behaviour of young children without even being aware of it. Gender in particular is something that young children are highly alert to not least as a result of the gender roles that they see around them every day in the home and the community (Holmes, 1998). Being male or female, old or young, black or white ought not to either preclude or guarantee one's ability to conduct useful research in early years settings. It would however require careful forethought about the implications, particularly where one's positionality meant membership of a highly visible minority. A key issue in the current climate, where males working with young children are frequently regarded with suspicion, undoubtedly revolved around child protection, and indeed researcher protection. The gender of a researcher will almost certainly affect the perceptions of those present and could even affect levels of participation (Holmes, 1998). While a female colleague might for example unselfconsciously demonstrate her care for a child in ways that involved physical contact, a male, particularly a male from outside the nursery or school, would be risking professional suicide or worse, were he to behave in the same manner.

Research into perceptions of males in early years settings ought to give any male researcher pause for thought (Sumsion, 2000). Yet while some children might regard women as more approachable and sympathetic, this does not mean that the consequences of male positionality are all negative. The novelty of a male in a Foundation setting could be advantageous with some children and adults responding positively to the difference. Furthermore, even female researchers are subject to generational difficulties when playing and talking with children (Corsaro and Molinari, 2000). It is clearly important though to attempt to minimise the potential for any possible Hawthorne effect by being as normal and unobtrusive as it was possible for an adult (white) male in a Foundation setting to be. Ironically in this case this might mean conforming to preconceived and stereotypical views of male endeavour on occasion, such as work involving ICT (Sumsion, 2000).

The promise of confidentiality and anonymity meanwhile is also central to an ethical approach to research and here too a researcher can face potential conflicts (SHU, 2000). While confidentiality may provide a useful mechanism by which access is agreed to, a researcher has to consider what course of action to take in the event that the research throws up information on topics other than that sought, or where health and safety or child protection are at stake. It seems ethically indefensible for example for a researcher to maintain confidentiality if it came to light that violent or pornographic images were being seen by young children through the medium of the Internet. Equally, a guarantee given to a child or parent that nothing will be divulged without their consent, may be impossible to uphold in circumstances where harm might result thus contravening the principle of beneficence.

The application of principles like justice, autonomy or confidentiality might at first appear to throw into question whether useful research with young children is ever possible (Bronfenbrenner, 1952 in Aubrey et al, 2000). Strict adherence to the principles seems to mean that the results of the research may be unreliable or non-existent as participants alter their responses or withdraw from the process. Alternatively, seeking to avoid these problems by keeping the subjects ignorant of events results in research being rejected on the grounds that it is ethically flawed.

One way to attempt to square the circle might involve the application of the concepts of non-malfeasance and beneficence. It is perhaps worth reflecting on whether ethical principles designed to avoid the risk of medical and scientific abuses, can necessarily be applied wholesale to educational contexts in which invasive or potentially physically harmful procedures are not being contemplated? This is not to say that because educational research rarely requires practitioners to wield scalpels or use powerful drugs, no harm is possible. The possibility of human error, misunderstandings, irrational and inconsistent behaviour is ever present (Aubrey et al, 2000). An educational researcher who ignored verbal and non-verbal cues as to the feelings of young research subjects, who displayed ignorance concerning their own positionality and who utilised inappropriate and intimidating data collection techniques would almost certainly cause

great distress. However a sensitive and thoughtful approach to the question of ethics seems the best way forward. Greig and Taylor argue that young children are special and that consequently special methods may be required (1999 in Ring, 2000). Researchers do need to apply the concepts such as autonomy, justice and confidentiality, but they need to do so in an intelligent, rather than a slavish, manner. Some researchers have pointed out that young children can actually be very powerful (Aubrey et al, 2000). They are quite likely to vote with their feet if an activity bores them, or will change a topic of conversation in order to discuss matters of significance to them rather than significant to the researcher. Researchers need to recast young children as potentially powerful players in research by consciously transferring some control at least of the research to the child (Ring, 2000).

One example of what a sensitive and thoughtful approach might look like centres on the important issue of consent. A simplistic approach to the ethical principles outlined above would appear to dictate that the first part of any interaction between an adult researcher and a child subject would be for the adult to set out the purpose of research and then to seek formal consent and to make it clear that the child can leave at anytime. Yet Ring points out that this could be a mistake on a number of levels. To begin with, at this juncture the gap between researcher and subject is likely to be at its widest (Ring, 2000). The attempt to articulate the purpose, procedures and rights of the subjects could result in overwhelming young children with adult talk. The suggestion that they can withdraw at anytime meanwhile might provoke feelings of anxiety about an activity where beforehand there were none.

2.4 Summary

Young children are unlikely to need an adult's permission to withdraw from an activity they dislike or which bores them (Aubrey et al, 2000). Research sited therefore in contexts where children are already encouraged to be autonomous learners exercising choice and freedom and replicating these existing cultures and norms would seem to offer

a useful way forward on ethics. The greater the child's autonomy the greater the chance that he / she will be a willing and enthusiastic informant (Ring, 2000).

Young children ought to be regarded as competent, beings not becomings (Qvortrup et al, 1994 in Clark, 2004). The three year old who prints her picture off independently; the five year old who can navigate Sky television using the remote control; the four year old who tells her teacher she is 'texting' Julie to see if she can pick her up from nursery, although anecdotes, all suggest the possibility of research subjects who in some ways surpass many adults in terms of their technical awareness and capabilities. As Clark points out researchers need to find ways of giving these children their voice, a lack of literacy in no way equates with a lack of knowledge and understanding. Methodologies and methods need to play to children's strengths rather than their weaknesses and a multi-method approach to the task of listening to children may offer enhanced validity by providing a framework that better reflects the complexities of their everyday lives (Clark, 2004).

Chapter 3

Research design

The aim of the research was to investigate aspects of the technological dimension to childhood. This meant exploring young children's experiences and capabilities with ICT firstly in nursery and reception settings and secondly seeking additional data on their experiences in the home and elsewhere. Nursery and reception children would be observed and interviewed whilst involved in activities featuring new technologies. Further observational data would be reported by practitioners relating to any events when the researcher was not present in the settings. In parallel to this process parents would be surveyed about the incidence and children's use of ICT in the home. Finally parent volunteers and practitioners would be interviewed.

The manageability and realism of the research strategy was a crucial consideration. Simple random sampling in which every member of the population (i.e. nursery and reception classes in the maintained sector) had an equal chance of selection was not possible given the resources available (Aubrey et al, 2000). At the same time, non-probability sampling, targeting a particular group knowing that it does not represent the wider population, it simply represents itself, would not only leave the research open to the charge that it could offer no insights into practice more generally but crucially might fail to offer a picture of relevance to readers / practitioners (Cohen et al, 2000; Bassey, 1995). The research would not include any claim to provide empirically supported generalisations, however it would aim to tell a story that would resonate with individual readers and practitioners (Bassey, 1998). As a result it was necessary to take steps to ensure that the cases eventually chosen would not prove to be hopelessly atypical.

3.1 Combining survey and case study approaches

Some form of representative or purposive sampling in which cases were handpicked on the basis of their typicality was the chosen approach to the task of identifying settings in which the research could be conducted. The two stage approach adopted was to seek baseline data on the availability and use of ICT in maintained Foundation Stage settings. The purpose was to provide a benchmark against which, in the second stage, further settings could be identified in which more detailed enquiries into children's ICT capabilities and experiences could be conducted. The initial challenge was to identify criteria that would enable decisions to be made as to whether a particular setting approximated to typicality in terms of the availability and use of ICT. The more atypical the settings eventually chosen the less likely it would be that the research findings would resonate with the experiences of practitioners more widely.

The elicitation of the baseline data on the availability and use of ICT was achieved using a survey on the incidence and use of ICT in reception classes and nurseries in the maintained sector across two regional Local Education Authorities. Surveys are administered to a sample of a population to learn about the distribution of characteristics, attitudes or beliefs within that population (Marshall and Rossman, 1999). The intention is to describe or explain statistically the variability of certain features of the population. Surveys and questionnaires can be a useful technique for obtaining small amounts of information from large numbers of subjects and are often associated with accuracy (enhanced by quantification, replicability and control over observer effects), generalisability and convenience.

3.2 The baseline survey

Northtown LEA was a large LEA located in one of the country's largest cities. The city was only recently experiencing a degree of economic upturn after years of decline as a result of the demise of traditional heavy industries. More than 30 per cent of the electoral

wards in the city were amongst the most deprived nationally and income and employment levels were well below national averages. Ofsted inspections showed that standards of pupil attainment in every key stage were below national averages but that this disguised considerable variation between different schools within the LEA. The LEA had experienced a number of significant developments since its last inspection including the achievement of Beacon and specialist status by a number of its schools as well as the establishment of a number of Education Action Zones (EAZs) and the operation of the Excellence in Cities (EiC) initiative.

Eastshire LEA was a small LEA centred on a large town with the rest of the population living in rural areas in small market towns and villages. Employment rates were close to national averages at the time although wage levels were not and the area included pockets of considerable social deprivation. Ofsted inspections showed that standards of pupil attainment in every key stage were in line with or above national averages and those of similar LEAs. A small number of schools within the authority had achieved Beacon status and the LEA as a whole had been awarded Beacon status for a number of its operations. The LEA was praised at inspection for its forward-looking approach, its effective leadership and its excellent relationships with schools. The LEA had capitalised on the advantages and minimised the disadvantages associated with its relatively small size.

The survey used a snowballing technique with the questionnaire being distributed and collected by LEA staff (e.g. Principal Training and Development Officer, Early Years Advisory staff) following approval from the appropriate officers. In line with the principle of beneficence outlined in the previous chapter an undertaking was given to furnish both LEAs with written reports on the data collected. This information could be used to assist the LEAs in targeting their energies on those aspects of the existing ICT provision where their early years practitioners would welcome additional resources, training and advice. A copy of the questionnaire was sent to every state maintained and voluntary aided setting within each LEA in which nursery and / or reception children were taught. A covering letter was addressed to the head teacher to be forwarded to the

most appropriate person; this might be a nursery or reception teacher or the head of the Foundation Stage. The survey sought responses from a global total of 168 (Northtown LEA) and 59 (Eastshire LEA) nursery, infant and primary settings respectively. The response rates for unsolicited questionnaires from unknown sources can be low and it was hoped that the apparent sponsorship achieved through involvement of LEA staff would ameliorate this problem (Bell, 1987). This said, there was a danger that this advantage might be offset by the timing of the survey which coincided with the Christmas period and may have led some practitioners to rank it fairly low on their list of priorities.

The self-selecting nature of the respondents may have threatened their representativeness and the approach cannot claim to have eradicated the risk of sample bias i.e. selecting settings that were atypical in terms of the ICT resources at their disposal and the ways in which these resources were deployed (Fink, 1995a; Fink, 1995b). It did however reduce the risk of future sample bias by ensuring that later sampling decisions were based upon some evidence rather than on impression, gut feeling, or as a result of opting for a line of least resistance. The member checking envisaged by LEA advisory staff as part of the second stage of the sampling process also offered another means of testing whether the image of typicality generated by the survey resonated with experienced early years practitioners.

From the total populations 44 and 36 settings respectively submitted returns constituting response rates of 26 per cent (Northtown LEA) and 61 per cent (Eastshire LEA). There was therefore a considerable percentage difference in the response rates and this was largely due to the resource that the different LEA teams were able to deploy. In Northtown LEA, the Principal Training Officer had no resource with which to follow up those settings that had not responded. Consequently the response rate was close to the 30 per cent average typically associated with unsupported impersonal questionnaires (Gillham, 2000b). In Eastshire LEA by contrast a team of staff were engaged in regular visits to nursery and reception settings across the LEA and intervened personally to

encourage school and nursery staff to respond. As a result the response rate in Eastshire LEA can be considered good (Gillham, 2000b).

It was important to be confident that any information that was elicited through the survey was a representation of what practitioners knew was happening in their settings. All but two of the respondents from each LEA had daily experience in early years classrooms and bases; the majority of respondents were class teachers working with children in the Foundation Stage. A small number were nursery nurses or head teachers. Many of the respondents had additional roles within their settings. Some were ICT co-ordinators and of the early years teachers, many were also acting as head of the Foundation Stage. The majority of respondents worked in the state maintained sector while a small group of respondents worked in the voluntary aided sector.

Respondents were asked to give two examples of ICT work in their settings during the previous twelve months. This question was deliberately placed before subsequent questions on equipment levels and usage to reduce the risk of sensitising respondents to the range of possibilities. A total of 41 and 24 respondents gave work using a PC (including Internet use) as their first example (93 per cent and 67 per cent). The figure for the second example was 33 and 30 (75 per cent and 83 per cent). Out of a total of 88 and 72 examples given respectively therefore 84 per cent and 75 per cent overall involved the use of a PC. This result could be indicative of thinking about the nature of ICT in which the majority of respondents equated ICT primarily with PC use, usually involving content rich software. The other examples of ICT cited in response to the question involved the use of the tape recorder / listening station (6 per cent and 12 per cent), the digital camera (3 per cent and 3 per cent), telephones in the role play area (0 per cent and 6 per cent) and programmable vehicles / other electronic toys (7 per cent and 3 per cent). No other examples of ICT were cited by any of the respondents in either LEA and none of the examples involved work in the outdoor area. This was interesting as outdoor provision is considered to be an extension of the classroom in early years education (QCA, 2000b). All areas of the early years curriculum are taught outdoors as well as indoors but the responses to this question suggested that ICT may be an exception in many instances.

The survey then asked respondents to provide data on the range of ICT equipment (i.e. hardware) available to practitioners and the extent to which those resources were shared or permanently available in the classrooms. There were some unexpected results on the availability of PCs in classes with one respondent claiming access to 6 machines and two others claiming access to 8 machines. However moves in the LEAs concerned to develop Foundation Stage units incorporating both nursery and reception classes may explain the unusually high numbers. In all 38 and 31 respondents had access to PCs in their classes (normally between 1-3 machines) meaning that there were 6 and 5 respectively that did not. Reasons for the absence of PCs in some early years classes were not offered but could have included short term technical difficulties or errors in completing the questionnaire. A third reason might have been the removal of machines to ICT suites; 13 and 18 respondents respectively stated that they had access to such suites for use with Foundation Stage pupils. One respondent commented elsewhere on the questionnaire that she / he was concerned that PCs in her / his setting had been removed from the nursery in order to relocate them in a whole school ICT suite.

Appendix ii shows the results overall and the range of equipment available included shared resources (e.g. computer suites) as well as those that were permanently available in classrooms and nurseries. There was a noticeable similarity in availability in spite of the very different nature of the LEAs in terms of their sizes and characteristics. There were small differences, for example settings in Northtown LEA were slightly better resourced in terms of walkie-talkies whilst those in Eastshire LEA had a greater number of calculators and concept keyboards. However the overall picture was one of a high degree of congruence in terms of the peaks and troughs representing the ICT resources that were present across the two LEAs. This similarity added some weight to the notion of being able to develop an approximate baseline in terms of the availability of hardware at least. It is worth noting that the incidence of some technologies (such as interactive whiteboards and digital cameras) is likely to have increased considerably since the survey was conducted as a result of targeted government funding since 2003-2004.

The survey also sought to identify any common examples of software across the Foundation Stage settings. With a small number of exceptions such as Dazzle (10 in Northtown LEA); Tizzy's Toy Box (10 and 9); My World (16 and 6) and Colour Magic (8 in Eastshire LEA); the survey showed that there was little common ground between the settings in terms of the individual software titles being used on a regular basis. Respondents cited 46 and 39 different software packages respectively across the settings concerned, 26 and 19 of which (57 per cent and 49 per cent) were cited by only one respondent. Although there appeared little common ground therefore in terms of individual software packages there did appear to be a pattern in terms of subject matter / type of software. The majority of software cited was content rich and aimed at literacy and numeracy. The next largest category was generic software related to art and creative development.

In addition to being asked about what hard- and software was available in their settings respondents were also asked about the frequency with which such resources were employed in early years teaching. The intention was to elicit information on the extent to which the availability of ICT resources was matched in terms of their use. Respondents were asked to grade the frequency of use using the five categories below:

1. never used
2. occasionally used (i.e. once or twice in the year)
3. sometimes used (i.e. termly or half-termly)
4. regularly used (i.e. most weeks of the year)
5. frequently used (i.e. most days of the year)

Appendix ii shows the frequency of use across the two LEAs with the resources split between those that were being used half-termly or less often and those that were being used weekly or more often. There were some fluctuations with for example practitioners in Northtown LEA appearing to make more use of floor robots, whilst those in Eastshire LEA made greater use of digital cameras, calculators and the Internet. However many of the fluctuations were small and were the result of only one or two questionnaire

responses. The overall pattern was broadly similar in spite of the variations mentioned above; the most marked of which being the use of digital cameras.

In some cases there was a high degree of match between availability and frequency of use, most notably with the use of PCs, televisions and listening stations. Subsequent government initiatives to promote certain manifestations of ICT such as electronic whiteboards are also likely to have increased both incidence and use since the survey was conducted. In other cases however while availability was high or relatively high, actual usage was much lower, for example the use of Internet access, floor robots, digital cameras, telephones, photocopiers, fax machines, music keyboards and electronic cash tills. It would however be unreasonable to expect that opportunities to make meaningful and appropriate uses of the different technologies would be evenly spread. It seems likely that the incidence of PC use or listening station use would be higher than, for example, the use of fax machines, OHPs or photocopiers given that these may have more limited educational affordances in 3-5 settings and are also more likely to be located away from classrooms and bases. It could also have been the case that concerns about child protection could make the use of some technologies (particularly digital and video images) problematic for practitioners.

This said there may have been unrealised opportunities for integrating ICT more fully into existing provision such as making more extensive use of digital cameras, or incorporating ICT equipment such as music keyboards and electronic cash tills more systematically into creative areas or role play scenarios. In one nursery in Northtown LEA, for example, children were encouraged to answer the telephone under adult supervision giving them valuable opportunities relating to personal and social development as well as real world experience of ICT. The responses to the question on the use of ICT resources lent some support therefore to the notion that increases in resourcing and developments in curriculum design on their own may not have much impact on day to day classroom practice in the short term.

The survey also sought data on the levels of expertise possessed by practitioners and their views on issues relating to ICT in their own settings. The results indicated an increase in the availability of training since the introduction of the Curriculum guidance for the foundation stage. Prior to 2000, 17 and 7 of the respondents respectively had received no training relating to ICT at all. Between 2000 and 2003 all the respondents had experienced some form of ICT training (sometimes in a private context). 23 and 21 respectively had experienced NOF training and 18 and 9 respectively had received in house training within their settings. Much of the training since 2000 however seemed to have centred on the teachers' own skills levels rather than pedagogy. There were 37 and 24 responses respectively, meanwhile, to a question about perceived training needs. The needs identified by respondents ranged from tuition with specific pieces of technology to training to use ICT for administrative purposes. The largest single area identified (9 and 13) was for training that targeted the use of ICT in teaching and learning in early years settings rather than developing teachers' own ICT capability. The second largest area (6 and 9) concerned the use of electronic white boards and this may have related to the increasing incidence of these technologies in classrooms and the development of ICT suites in many of the schools.

Finally respondents were also given the chance to record any other comments that they wished to make concerning ICT in their settings or in general. The comments all fell into one of two broad categories, either resources or pedagogy. Nearly 30 per cent of the comments were related to pedagogy and training. These respondents made observations about teaching and learning with ICT in their settings or desired advice, guidance or training on what they should be doing. For example, 'I haven't come across any specific training linking ICT and Foundation Stage. All courses I attend in my role focus more on KS1 and KS2.' The remaining remarks concerning resources were manifold and constituted more than 70 per cent of the total made with statements such as, 'an up to date PC in classroom. More software for reception children' being common. Just under a quarter of the resource related comments concerned the need for more software, more appropriate software, opportunities to trial software prior to purchase, or more advice on what software to provide.

Embedded within the comments on resourcing were statements related to the need for additional teaching and technical support in order for teachers to be able to properly promote children's learning in this area. For example 'what we do not have is enough adults to support the children or a technician to repair / sort out problems when things do not work' and 'works well with extra pair of hands! It's OK if all up and running...printers etc!' A small number of the respondents (4) also made comments that centred on the need for parity of esteem for early years settings in terms of resourcing. Comments such as 'funding and training is directed at junior pupils e.g. Internet, computer suite', 'lack of resources due to co-ordinator's favouring junior aspect in relation to ICT' and 'only the best for Foundation Stage!' suggested that in a few settings resources were being directed more towards the primary phase. In two cases respondents complained explicitly that new equipment was being given to Y5 and 6 pupils while the older, obsolete equipment was being passed on second hand to practitioners and pupils in the Foundation Stage.

The similarities in the responses received across two very different LEAs, widely spaced geographically, lent support to the notion that while not statistically 'proven' the picture created by the questionnaire responses would be widely recognised by many early years practitioners. Having examined the data emerging from the baseline questionnaire it was possible to sketch a picture, albeit fuzzy, of a typical 3-5 setting at that point in time in terms of the range of ICT equipment available, the frequency of technology use and practitioners' capabilities and concerns. The typical setting had a wide range of ICT available when one included items such as digital cameras and other shared resources. The typical setting had an ICT suite as well as individual PCs (normally one or two per class) located in each classroom. In the typical setting nursery and reception pupils were timetabled to use the ICT suite each week. In the typical setting ICT was largely equated with PC use by practitioners, with relatively little attention paid to the potential for integrating ICT more fully into role play, creative areas or the outside environment. In the typical setting opportunities and time for staff training and development (internally or

externally) were limited and this contributed in part to the mismatch between availability and actual usage of the ICT resources within settings.

3.3 The case studies

The case study research was designed to contribute to the understanding of an aspect of the social condition of childhood, namely the incidence and use of ICT in young children's lives (Mayall, 1999). As the research sought to elicit information on young children's experiences and capabilities with ICT in highly dynamic and complex environments, it required a methodology and accompanying data collection techniques that would provide insight into actions and the purposes and meanings underlying those actions (Guba and Lincoln, 1998). There was a material reality to the research in that the technology exists independently of people's views of it. However while it is possible to objectively describe the incidence of ICT, that data in itself may offer little insight into how that technology is being used, by whom, for what and when. A methodology was required therefore that would offer opportunities to gain a more holistic perspective of children's lives in and out of education and that would be sensitive to the context (Goodwin and Goodwin, 1996).

Research methodologies rooted in qualitative traditions offered the chance to generate theory out of data and to facilitate the discovery of meaning and understanding. Grounded theory and phenomenological methodologies recognise the complexity and 'embeddedness' of social truths (Cohen et al, 2000, p.181). The former seeks to produce theories about specific phenomena or populations whilst the latter constitutes a search for wisdom by identifying the essential essence of such phenomena or populations. The underlying themes of these approaches are that in order to understand something research must first take account of the context and secondly accept that the reality of an object includes one's perception of it. One of the strengths of a qualitative methodology is the observation of effects in real contexts, recognising that context is a powerful determinant of both causes and effects. This approach also permitted a degree of flexibility in the

research design and ensured that small-scale survey data could be included to complement observational and interview data. Such flexibility is the result of an acknowledgement of the level of uncertainty, ambiguity and openness surrounding qualitative research (Goodwin and Goodwin, 1996).

As the intention in this research was primarily to seek understanding and depth of meaning, a case study approach appeared appropriate. Case studies are an approach to research design whereby an individual, a group, an institution or a wider community is investigated to answer specific research questions in order to inform judgements or decisions (Bassey, 1999). They constitute an attempt to offer plausible explanations of examples of human activity located in the real world, which can only be understood and studied in context (Bassey, 1999). They can penetrate situations in ways that are not susceptible to purely numerical analysis illuminating the subtleties and complexities in the process (Cohen et al, 2000). Some of the questions may be loosely defined at first and Gillham points out that it is important to begin case study research without too many a priori theoretical notions (Gillham, 2000a). Taking a single research subject or a small number of selected examples, case study researchers then deploy a range of methods in order to study them. For Bassey there are three types of case study:

- theory seeking / theory testing;
- story telling / picture drawing;
- evaluative. (Bassey, 1999)

Irrespective of the type, the case study seeks to explore significant features of the case, build up an argument or narrative supported by the literature, communicate that argument or narrative to an audience and provide an evidence trail (featuring numerous sources) by which the argument or narrative can be checked or challenged.

Adopting a case study approach provided a flexible and sensitive means with which to tackle the complexities associated with research involving young children. As argued in Chapter 1 the potential for mismatch between rhetoric and reality, policy and practice

was considerable and using a case study approach offered a means of gaining insight into the translation of the former into the latter by story telling or picture drawing (Bassey, 1999). The propositions and qualitative generalisations to emerge from this story or picture would in turn facilitate the development of evaluative remarks and recommendations concerning young children's ICT experiences and capabilities and areas for further study.

One criticism of this approach would be that by focussing upon a case, it would not be possible to generalise in the scientific or statistical sense of being able to say with certainty that 'it is true that..' or 'x follows y' (Bassey, 1998, p.1). A case study involving a relatively small number of 3-5 year olds might be seen as too specific and unable to offer reliable insight into this aspect of young children's lives more widely. Research into the phenomena to be observed in and around one or two early years settings would not make possible scientific or statistical claims for young children's ICT experiences and capabilities everywhere. One response to this critique of case studies as too particular to be of use more widely has been to suggest that this kind of research work has an essentially exploratory purpose acting as a pilot and being used to generate hypotheses that could be subsequently tested in larger scale surveys, experiments or other forms of research (Yin, 1984 in Cohen et al, 2000). In other words the purpose would be to describe and explain events within a particular context and grow theories out of these observations and explanations. A case study approach could prove effective at illuminating issues, suggesting possible explanations, providing a means of establishing what really happens in a few settings at least and even throw up issues susceptible to further research. Case studies could therefore constitute a step to action insofar as they:

> .... begin in a world of action and contribute to it. Their insights may be directly interpreted and put to use for staff and / or individual self development, for within institutional feedback, for formative evaluation, and in education policy making. (Cohen et al, 2000, p.184)

Yet Adelman et al caution against seeing case studies as merely the preliminary to other work (Adelman et al 1980 in Cohen et al, 2000). They exist in their own right. Qualitative methodologies have been criticised for a lack of statistical analysis and

emergent design, however these features do not automatically equate with an absence of rigour (Denscombe, 2002). For Bassey meanwhile the criticism of case study methods as being unable to provide generalisations is flawed because the term generalisation is being defined scientifically or statistically in the first place. In educational settings such claims will always be suspect no matter how big the sample, indeed the size of the sample should be linked to the type of study planned (Bassey, 1998; Aubrey et al, 2000). Cohen et al too comment that the correct sample size depends on the purpose of the study and the nature of the population under scrutiny (Cohen et al, 2000). The amount of data generated is not necessarily determined by the number of settings involved but more by the nature of the work conducted in those settings that are selected. For Bassey, case studies offer the possibility of reaching fuzzy propositions or fuzzy generalisations about an instance and hence from an instance to a class (Bassey, 1998; Cohen et al, 2000).

Case study approaches can also present research and evaluation data in a more publicly accessible form (Cohen et al, 2000). Although one of the criticisms of case study approaches is the relevance of their specific peculiarities for the wider population, Bassey points out that the audience for generalisations are policy makers, but these generalisations may be of limited practical use to individual practitioners:

> To many of them it will not apply, and to those to whom it does apply it is unlikely to make any impact on their practice, for they will say 'Circumstances unfortunately prevent me from doing this thing which I know would be worthwhile'. (Bassey, 1995, p.108)

Bassey makes the point that singularities (involving one or more people at a particular place and at a particular time) concern particular rather than unique experiences (Bassey, 1995). He acknowledges that there is no certainty of the relatability of findings from one situation to another, but the value of the comparison is that it may stimulate worthwhile thinking. Case studies therefore offer the potential at least for research outcomes that are credible and authentic for practitioners. Cases have the potential to generate 'naturalistic', 'inside-the-head, propositional' or qualitative generalisations (Bassey, 1998, p.6). It was not the purpose of this research to say that this or that phenomenon will occur in all

settings and at all times, but rather to hold up to the reader a picture of events. It is for the reader / practitioner to consider the extent to which this has relevance for her / his setting.

The case in question focussed on Foundation Stage children in two early years settings. Each setting was in the state maintained sector and contained nursery and reception classes. Staff and children in each early years class were involved; four classes in total. In the case of the nurseries only the morning children were included as a result of staff concerns over certain organisational and practical constraints. The parents of the children in the classes concerned were also involved both in terms of consent and also as important research subjects in their own right. Both settings were in the same Local Authority (Middleham LA). The LA concerned covered a large geographical area and contained widely contrasting pockets of advantage and disadvantage. While unemployment across the Authority was broadly in line with the national average this fact masked significant disparities at district and ward level. Economic regeneration associated with a shift away from traditional heavy industries was a council priority along with the raising of educational achievement and the promotion of social inclusion. The effectiveness of the LA was graded as highly satisfactory with well-managed services and functions although the standards in some schools were not as high as they should be according to the Ofsted inspectors. The most recent inspection report acknowledged considerable progress in this area since the previous inspection. The LA had characteristics therefore in common with both Northtown LEA and Eastshire LEA.

A formal written request was submitted to the Chief Education Officer (CEO) in Middleham LA. The LA had not been involved in the earlier baseline survey in order to avoid the risk that practitioners might have been sensitised as a result. This also meant that practitioners would be less likely to alter their behaviour as a result of personal knowledge of the researcher. Although head teachers and governors were free to give their consent if they wished without the agreement of LA officers, courtesy suggested this would be a more ethical approach and it would also be essential if the co-operation of LA advisory teams was to be secured for the task of identifying possible settings in which to conduct the research. The letter outlined the proposed nature of the research and sought

permission to contact individual nurseries and schools to secure participation in the research.

Upon receipt of permission from the CEO the information concerning the baseline survey data was shared with early years and ICT advisory staff in Middleham LA. The discussion served a dual purpose. Firstly, it provided a means of member checking the data derived from the baseline survey. Secondly it facilitated the process of sample selection by drawing on their professional opinion to identify settings that would approximate to the outline of a typical setting. Likely schools were contacted by telephone and meetings were subsequently held between LA advisory staff, head teachers, heads of Foundation Stage and the researcher to ensure that practitioners could explore any outstanding interests or concerns before making their decisions. Following these discussions a formal written request was made to head teachers and their respective governing bodies requesting permission to conduct research. Receipt of these permissions meant that a letter could be sent to every parent with a child in either the nursery or reception classes informing them of the nature of the proposed research and requesting their permission for their child to be included in any classroom observations. The letter made it clear that nil responses would not be treated as consent by default. The distribution and collection of these letters and the reply slips was handled by the schools as this was both a more efficient and cost effective means than individually addressed letters from the researcher.

In view of the very small scale of the research some thought was given to whether a single setting might have been just as valid as two. However, seeking to recruit two settings offered enhanced opportunities to look for data that the ICT dimension to childhood might be different for different children. The two settings eventually involved were widely spaced geographically and served very different communities based on Ofsted inspection reports. One by-product of this decision was that it also provided some insurance against experimental mortality and this proved to be fortuitous when staff illness in one setting part of the way through the fieldwork forced the research there to be delayed and interrupted over a number of months and finally to be cut short.

Tower School was a smaller than average Nursery / Infant school serving a suburb of the county's main city. The area was described at inspection as having average economic circumstances. Most children started nursery as soon as possible after their third birthdays and the majority of pupils were white with only a small number having English as an additional language. The percentage of pupils entitled to free school meals was below the national average while the number of children with identified special educational needs was in line with national averages. There were no statemented pupils. The school was categorised during its most recent inspection as a very effective school. Children made good progress during the Foundation Stage with teaching and learning characterised as either, good, very good or excellent. The nursery and reception areas were in separate parts of the school and space was at a premium. The nursery children had access to a dedicated outdoor area which was used on a timetabled basis. The reception children meanwhile had the same access to the outdoors as the Key Stage 1 children. Both classes had a single PC in them and this resource was supplemented with timetabled visits to the school's ICT suite which contained approximately 20 laptops, an electronic whiteboard for staff use and 2 Pixie floor robots.

Park School was a Nursery, Infant and Junior school amalgamated 2 years prior to the research. The school was located in an area in which traditional industries had declined and the children were predominantly white. A number of the pupils presented very challenging behaviour and there was a higher than average number of pupils with special educational needs. Overall the school was felt to be providing a satisfactory standard of education; however within this the Foundation Stage was singled out by the inspection team as a strength of the school with children progressing and achieving well in all areas of learning. The Foundation Stage classes were co-located in a brand new, purpose-built Foundation Stage base. The base comprised of a large open space nursery with a range of general purpose areas, specific areas related to the different areas of learning within the Curriculum Guidance for the foundation stage and a reception classroom. The reception and nursery areas also had a shared annex as well as a purpose built outdoor area as part of the new building which was well resourced and available to pupils on an open access

basis at certain times of the day and timetabled at other times. The reception class contained two PCs as did the nursery area. In addition, both spaces contained interactive whiteboards set at a child-friendly height to enable children to work directly with the boards. The Foundation Stage shared floor robots such as the Pixies with the rest of the school. The school also possessed a well-equipped ICT suite that the nursery children did not use.

3.4 Research methods

Early years practitioners constantly check on children's progress through classroom observations, discussions and questions involving the whole class, groups and individuals. These observations and conversations, such as overheard remarks between children or being presented with a striking piece of work, provide a means by which children's knowledge, skills and dispositions can be checked and explored and can help to define more clearly any individual contributions to a group task. They are an informal and integral part of work with young children, a natural part of the minute by minute interactions in the nursery or classroom and are essential for children's continuous assessment. However, ongoing and unplanned observations and conversations centre on those things which draw themselves to the practitioner's attention. While important, they would not necessarily offer a more rounded picture, they may for example fail to pick up the events that took place quietly. While it was not possible to observe everything that went on in a nursery or reception class, making use of more planned, targeted and focussed observations would serve to complement the unplanned, ongoing kind (Edgington, 1998). Focussed observations of this sort would challenge any unsupported adult assumptions about children and their ICT capabilities because they would offer information that might otherwise have been missed.

It seemed likely that children's learning about ICT would be easier to evidence than their learning through ICT as causality would be difficult to demonstrate unequivocally. Furthermore, using data collection methods which were primarily language dependent

raised questions about how wording and non-verbal signals might carry different meanings and thus be interpreted differently. However, such data collection techniques provided opportunities to gain an insight into children's actions and the purposes and meanings underlying those actions (Guba and Lincoln, 1998). Observations, conversations and interviews therefore offered the chance to obtain clarification of responses and actions. They would enable lines of enquiry to be modified, facilitated the pursuit of interesting responses and would provide opportunities for the investigation of underlying motives as well as ensuring access to non-verbal cues and clues (Robson, 1993).

Although the term observation suggests passivity on the part of the observer, the reality was far more active and involved much more than just sitting and watching. Any observation is akin to a camera shot, while it does not necessarily lie, it can distort (Sharman et al, 1995). Practitioners often have to check their observations through careful questioning, discussion and further observations. The affordances associated with different artefacts for example might result in different outcomes (Carr, 2000). A child's response to a plastic vegetable used as a telephone in imaginative play could be qualitatively different to the response that same child might make to a toy phone, a real but non-operational phone or even a real and working phone. Consequently any summative judgements and assessments about children's ICT capabilities would have to be based on more than one snapshot and involve a series of observations over an extended period of time (Appendix iii).

At the same time communication problems between adults and children who were differently articulate might have resulted in children's true capabilities and experiences being incorrectly assessed. Discussing activities with children as part of classroom observations can offer a very useful device for locating evidence of their success, diagnosing learning difficulties, monitoring progress over a period of time, and developing some insight into the ways in which a particular child learns and works. A child's initial response to questioning however would not necessarily be an accurate or reliable guide to knowledge and competence, similarly actions and behaviour could be

misinterpreted (SCAA, 1997). For researchers such as Bruner or Donaldson a key aspect of children's ability to learn and come to understand the world more fully is language acquisition (Donaldson, 1978; Wood, 1998). Donaldson's work suggested that there could be a fundamental mismatch between what adults are saying or asking and what children are apparently understanding or answering:

> ...the questions the children were answering were frequently not the questions the experimenter had asked. The children's interpretations did not correspond to the experimenter's intention; nor could they be regarded as normal, given the rules of language. The children did not know what the experimenter meant; and one is tempted to say they did not strictly appear to know what the language meant. (Donaldson, 1978, p49)

The language capabilities of young children could therefore result in problems over the validity of research as adults, who may be speaking a different language, try to accurately interpret the meaning of children's talk. Attempting to obtain data through discussions with young children made questioning techniques important. Similarly as observation and discussion were being employed as methods for data collection, inappropriate approaches to the act of observing and talking with children could affect the outcomes of the research. It was important to be alert to the dangers of stifling children through inappropriate, badly timed or ill-judged interventions. Nor did it seem likely that taking children out of their normal settings and into artificial laboratory conditions of some description offered a solution to the problems associated with researching in an early years setting. Removing young children from their normal points of reference and security seemed likely to be potentially anxiety provoking. Far from being motivated and excited by new and unfamiliar surroundings, some young children might have construed such *Sonderbehandlung* (special treatment) as a sign that they had misbehaved in some way and could have become distressed. Leaving aside the ethical questions for one moment, there was also a question mark over the usefulness of any conclusions drawn. What might be gleaned in a highly controlled and alien learning environment might prove to be wholly misleading in terms of children's real levels of knowledge, understanding and skills.

Observation and discussions with the children therefore were better conducted in familiar environments with trusted adults and included opportunities for appropriate debriefing, praise and thanks (Gollop 2000, in Clark et al, 2003). Children were observed using a wide range of ICT in a variety of settings and curriculum contexts including indoor and outdoor provision. The technique gave access to spontaneous disclosures about children's knowledge and experience of ICT both in and out of school, such as the four year old who demonstrated his awareness of a use to which technology could be put when he pointed at a printer and said, 'it makes it draw doesn't it?' At the same time his subsequent remark, 'you know my printer, it makes a wheeee', comparing the relative quiet of the nursery printer with his noisier machine at home also provided a glimpse of his experiences outside the classroom.

The observations included examples of both exploratory and imaginary play. In some instances the observations were conducted in a participatory fashion, for example sitting with a child while she used the Fresco software to draw a picture of her mother or working in the carpeted area with children using the Pixie. At other times where adult intervention or involvement might have stifled children's endeavours the observations were conducted in a non-participatory manner, for example observing from a distance as a child with speech problems broadcasted enthusiastically using the public address equipment in his role play Post Office. Children in the nurseries were used to making decisions about which activities they wished to engage in and no attempt was made to alter this state of affairs. Any child that became bored or wished to do something else was able to do so. None of the children observed appeared to experience any difficulties in telling the researcher that they were not interested in playing anymore, supporting in the process the argument that young children can actually be powerful players in research (Aubrey et al, 2000; Ring, 2000). Children's decisions and statements such as 'I've finished!' were affirmed as legitimate verbally and non-verbally. Children were not compelled to stay.

As interviewing, no matter how informal and unstructured, would be more intrusive than non-participant observation, inventive and creative approaches were needed in devising

interview strategies for use with children (Langstead, 1994 in Clark et al, 2003). Listening to children did not have to be limited to conventional two-way conversations between one adult and one child. Children being encouraged to talk together for example would replicate small group settings that they were already familiar with (Mayall, 2000). Alternatively interviewing or talking to children in pairs or small groups might prove to be less threatening by helping to lessen the sense of the adult as an authority figure and might also allow the children to sustain conversations for longer periods of time. These approaches would create chances for peer interactions and could foster more evenly spread levels of participation (Holmes, 1998).

Research conversations of the sort outlined above allow the agenda to be handed over (in part at least) to the children with the result that the research subjects have some control of the pace and direction of the dialogue, raising and exploring topics with relatively little input from the researcher (Mayall, 2000). Children were observed individually and in group situations; many observations that started out as individual encounters soon became group in nature as other children became interested and joined in. This kind of approach chimed with Ring's advice and held out the prospect of responses of greater depth and breadth, with less intimidated children and enhanced validity as a result of consensus and / or the airing of different views (Ring, 2000; Carr, 2000). This said the acceptance of an adult by children will always be affected by generational issues and such group situations could increase the likelihood of children testing the adult's status and position (Corsaro and Molinari, 2000).

It was also the case that while group settings may constitute potentially powerful tools for data collection with young children as a result of the way in which they can break down the teacher controlled structure of interviews, they were by no means unproblematic. A group interview for example might not be an appropriate venue in which to try to elicit data on children's feelings due to the lack of privacy and some children might prove to be less forthcoming in group situations (Ring, 2000). Irrespective of the data collection methods chosen the affective dimension of early childhood also had to be considered. Children are emotional and social beings, not simply cognitive ones.

The emotional side of young children's development, which is reflected in the strong emphasis on care as well as education in Foundation settings, had to be thought through. Firstly, the emotional bonds between early years professionals and young children that are typical of good quality early years settings, seemed to contrast with an ideal of the detached and distant researcher (Hyson, 1994). Ways had to be found to develop a rapport with the children. These strategies included exhibiting patience; demonstrating an ability to play; expressing enjoyment of time spent with children on ICT activities; offering praise, recognition and respect for their ideas and contributions when using the technology; and demonstrating a willingness to be instructed by the children particularly in play situations (Holmes 1998). At the same time however, retaining the ability to collect data and assess outcomes was essential. Relinquishing adult status (or, more likely assuming a special status as neither adult nor child) could lead to problems with children pressurising the researcher into activities that distract from his / her focus (Holmes, 1998). An additional complication also arose as a result of the high levels of initial excitement, accompanied by a temporary reduction in play quality that the introduction of new technologies can result in. Children had to be allowed the time to develop skills and familiarity with any new technologies before the quality of their play was likely to return and before planned observations could be made into their knowledge, understanding and skills with that technology.

Meetings were also scheduled with practitioners to ensure that opportunities for the inclusion or incorporation of ICT into existing provision within the settings were realised. Preliminary meetings took place with staff in the settings that dealt not only with details such as the schedule for nursery / school based research to take place but also with maximising the opportunities for ICT work within the settings. This intervention would seem to directly contradict earlier claims to be adopting a phenomenological approach to data collection. It left the work open to the criticism that the data might be affected thus undermining any claim to be conducting naturalistic research in order to build a 'true' picture of ICT in Early Years settings. However there were good reasons for adopting such a hybridised approach that were both practical and ethical in nature. Practically after

all it was the presence of these technologies that could trigger, or promote at least, disclosures from children about their experiences and capabilities as well as creating questioning opportunities for the researcher and the practitioners. There were also good ethical reasons for adopting this approach. The benefits of the research ought to flow to all participants if the relationship was not to be seen as completely exploitative. Adopting a slightly more participatory style at this juncture was a means of contributing to professional development for staff and enhanced curriculum experiences for children. This said clear limits had to be placed on the extent of any intervention so as to minimise the risk to data collection. For example opportunities for incorporating ICT into existing role play provision were discussed, but no attempt was made to replace existing role play provision with any externally generated alternatives. Similarly practitioners were supported with ICT resources but only to implement those ideas that they themselves had previously had but for which they had lacked the equipment, for example loaning digital video cameras and software.

Practitioners were asked to make use of the observation protocol during their day to day interactions with the children so that additional data could be gleaned in relation to the children's experiences and capabilities with ICT (Appendix iv). The observation protocol was employed at first but in the face of the dynamism of the nursery classroom, this soon gave way to the use by all observers of tried and trusted techniques such as naturalistic notes, transcribed on the day they were taken (Appendix v). Practitioner interviews meanwhile would provide a means of member checking in order to improve the validity of any observational data obtained and would also provide data relevant to the discussion of the early learning goals (Cresswell, 2003). While it was certainly feasible to conduct individual interviews with practitioners, given the constituency of most early years teams, researcher positionality was going to be an issue and it was hoped that a group situation would offer a greater feeling of security to respondents than that afforded by an individual interview. The group setting offered a means of ceding power to group members allowing those members to challenge the researcher's agenda if they so wished. Without the alternation of questions and answers, relying instead on group interactions, a group approach could also be used to gather the views of less articulate respondents, to

elicit attitudes on sensitive issues or even as an element of action research in order to secure commitment to change from those who were the subjects of the study (Field, 2000).

Group interviews have benefits in terms of the richness and thickness of the data that emerges as a result of the group discussion (Goodwin and Goodwin, 1996). Group situations made it possible in theory at least to move beyond the thoughts and actions of individual practitioners in isolation, to the thoughts and actions of individuals in relation to others (Field, 2000). A group interview approach with practitioners had advantages in terms of trying to understanding data collected by proxy. It had the potential to involve participants in an iterative learning process in which people's views evolved, changed, or were shared, debated and challenged (Litosseliti, 2003). Discussing the topic of ICT with others in this way would offer researched and researcher alike the chance to refine their thinking through the act of articulation and in the light of the views of others. In this sense therefore providing staff with an opportunity to discuss ICT collectively constituted a learning process as well as a finding out process and this was felt to be particularly important where interpretation of children's actions and statements was involved.

Unfortunately group interviews also have drawbacks. To begin with, the potential for group bonding might be perceived as a threat by gatekeepers. In theory for example practitioners sensitised to the nature and significance of ICT could produce a lobby group that would apply pressure to school management; although this possibility did not materialise in this research. The outcomes of the group discussions could also prove to be misleadingly seductive as the power relationships (overt and covert) between group members might result in the over-reporting of individual articulate group members rather than the collective opinions of the group (Field, 2000). The issue of power relationships also extended to the relationship between the researcher and the group. The notion that numbers equals power is a moot point and the group nature of the method did not automatically preclude the possibility of a researcher leading respondents or dominating the proceedings. The group setting also risked idle chatter unrelated to the purpose of the research adding to the already considerable task of transcribing. In spite of these

shortcomings however, the group approach offered a valuable means of moderating the data on children's perspectives and capabilities in relation to ICT. It provided a forum for the development of enhanced practitioner understanding of the ICT needs and capabilities of the children in their care as well as providing a collective input to the analysis of the raw data based on practitioners' extensive knowledge of individual children.

A series of formal interviews was originally planned between practitioners and researcher to cover the period in which fieldwork was being conducted. This was an attempt to ensure that monitoring children's ICT capabilities and experiences remained prioritised in the minds of practitioners during the fieldwork. In practice however the strategy ran aground on the prosaic but intractable problems associated with the often hectic nature of early years practitioners' roles. Practitioners were alert to the children's actions and utterances and were keen to share their planned and unplanned observations. Practitioners were also keen to work collaboratively on planning for the subsequent terms. The formal group meetings however proved much more challenging to organise. Staff were simply too busy during lunchtimes and after school to attend regular meetings *en masse.* Planning, preparation, other meetings, extra curricular clubs and even general housekeeping tasks all conspired to make this virtually impossible as a regular event. Consequently an alternative strategy had to be adopted in the face of day-to-day classroom reality. Practitioners much preferred to make verbal reports in an on-going fashion as this was more manageable from their perspective. Under the circumstances it would have been insensitive and potentially intrusive not to appreciate and respond to the practitioners' priorities. As a result a decision was taken to work within the existing ways of doing things and to retain the group interview as a summative activity to be carried out at the conclusion of the classroom based observations.

Eventually staff illness in one setting meant that the second group interview had to be cancelled however the group interview that did take place introduced six topics for conversation. The first was factual in nature and practitioners were asked to discuss the equipment at their disposal and the frequency with which it was used. The factual nature of the question was intended to encourage staff to talk before introducing potentially

more contested themes. In the event respondents began to digress quite quickly and to make disclosures concerning their views about ICT. As the objectives of the research included acquiring information young children's experiences and capabilities with ICT, the next three questions centred on the practitioners' assessments of children's learning and skills. Staff were asked whether in their opinion ICT made any contribution to children's learning. They were also asked about the skills, if any, that children displayed and whether they had observed any creative endeavour on the part of children when using ICT. The group interview concluded by exploring practitioners' views on the role of the adult in learning teaching and assessment involving ICT and their experiences of working with the early learning goals.

3.5 Summary

The baseline survey enabled a rough sketch to be drawn of the typical setting in terms of ICT in the Foundation Stage in the maintained sector and the results were shared with experienced LA advisory staff in order to identify potential settings for the research. While not generalisable in the scientific or statistical sense the image created did not appear unrepresentative when examined by staff in Middleham LA. In the typical setting:

- there was a wide range of ICT available, including an ICT suite as well as individual PCs located in classrooms;
- ICT was primarily envisaged as work with computers, often unrelated to the rest of the early years curriculum;
- time for staff training and development was limited by the impact of other policies and priorities.

While the ICT had a physical presence, getting at the nature of young children's experiences and capabilities with it would require a methodology and methods that would provide insight into actions and be sensitive to context. A qualitative methodology utilising a case study approach offered a means of enquiry that was both fit for the

purpose and manageable given the resources available. The data collection methods meanwhile were chosen for their lack of conspicuity, being indistinguishable from existing data collection tools that practitioners were using on a daily basis as part of their assessment and reporting roles.

Chapter 4

Young children's ICT experiences in school and nursery

Given the predominantly qualitative paradigm within which the research was located, the process of bringing some semblance of order, structure and interpretation to the data was inevitably iterative, lengthy and, on occasions, messy (Marshall and Rossman, 1999). The approach adopted had its roots in an editing analysis style in which the interpreter engages text naively, without a template, searching for segments of text to generate and illustrate categories of meaning (Marshall and Rossman, 1999). Qualitative research is often characterised by data collection and analysis apparently running in parallel, whereby researchers are guided by initial concepts and developing understandings but shift or modify these as they collect and analyse the data.

Notwithstanding the somewhat parallel nature of the data collection and analysis elements of the research, the first stage in the process of analysis was to organise the data which included sorting and arranging children's work, photographs, accounts and transcribing interview tapes. This was followed initially by reading and examining the data to acquire an overall sense of meaning and then subsequently engaging in a more detailed analysis involving coding and generating categories, themes and patterns under which the different data could be located (Marshall and Rossman, 1999). For Cresswell labelling these categories or themes using the actual language of participants and respondents is important (Cresswell, 2003). Marshall and Rossman too argue for the need for editing analysis approaches to identify and use indigenous typologies. However, they also envisage a place for analyst constructed typologies and argue that this process is not merely technical in nature but can also produce new understandings (Marshall and Rossman, 1999). As a result Chapters 4 and 5 are organised using a combination of both participant language and researcher constructed categories.

Analysis of the data gathered through classroom observations and practitioner interviews was broken down into five themes:

- Interpreting young children's ICT capabilities using the existing early learning goals.
- Evidence that children were learning about ICT and / or through ICT as a result of their experiences in the nursery / classroom.
- Evidence that work with ICT might inhibit or foster children's social skills.
- Evidence of ICT contributing to imaginative and creative play opportunities for young children.
- The role of the adult in young children's early ICT experiences in the nursery / classroom.

4.1 'Any child will get a tick for that unless they actually run kicking and screaming': Challenges posed for the early learning goals

While the stepping stones and early learning goals set out a supposed progression in terms of young children's ICT skills, knowledge and understanding, the data from observations and interviews called into question the reliability of the statements (QCA, 2000b, p.92-3). The early learning goals received a mixed reception from the practitioners. When asked for their opinion of the current documentation staff commented that:

They're not really very specific.

Not very useful really are they?

During the observations meanwhile, some of the children's actions and disclosures appeared easy to locate within the existing hierarchy of criteria (Appendix i). For example the four year old in a nursery asking why a photocopier was not functioning would seem to be a clear example of a young child 'showing an interest in ICT' (QCA, 2000b, p.92). Observations of nursery and reception children using microphones during a Karaoke session or a home made public address system in a role play Post Office to announce which counter is free might be deemed to constitute good examples of children demonstrating their ability to 'operate simple equipment' (QCA, 2000b, p.92). Meanwhile, observations of nursery and reception children using simple drawing packages on PCs or floor robots all signified varying levels of ability on the part of the children to 'use simple programmes or to perform simple functions using ICT' (QCA, 2000b, p.92). Finally, the five year old reception pupil who criticised an adult's imprecise use of technical language and then talked about faxing a message as part of his role play scenario, seems clear evidence of a child who could identify everyday uses of ICT. However the picture may be more complicated as some of the observations made did not sit comfortably within the model of progression contained within the Curriculum guidance for the foundation stage.

The progression of children's ICT capability set out in the documentation suggests a parallel development of knowledge and understanding alongside technical skills. Yet the data gathered in this study indicates that some children's knowledge and awareness was greatly in advance of their practical capabilities. Practitioners for example were convinced that children's physical development was a factor as the comments below illustrate:

> *Some do find it very difficult for quite a long time. Others have no problem.*
>
> *They do need lots of practice. They find it difficult to press on hard enough.... move and press and we've put a little spot on the left-hand one* [mouse button].
>
> *The majority of them have got it* [mouse control] *by the time they come to reception.*

They tend to find the tape recorder a bit difficult to start with. Because you have to press on. Sometimes if they just press it, it doesn't actually click on. It tends to take them a while to get used to that.

Children's development of ICT skills, knowledge and understanding may be more uneven and complicated than the picture offered by the Curriculum guidance suggests (QCA, 2000b). As one of the practitioners put it when commenting on the introduction of the Foundation Stage Profile:

You can have a child that really understands how to use it but may be physically hasn't quite got it so isn't actually able to complete the profile. You could have another child that has got quite good physical control but doesn't really understand how to.

In another comment a practitioner referred to some of the girls in her class who had high levels of competence when it came to using ICT such as the PC successfully but who paradoxically were not interested in doing so. The handbook to accompany the Foundation Stage Profile, meanwhile, was felt to be more useful by practitioners in Tower school as it offered more examples with which to level children's attainment. However, here too staff questioned the value of the material:

I think that's useful [FSP] *but I tend to think that most of them, children can really do.*

Unless they're severe special needs and cannot do those things without support you tend to find that the majority of the children fulfil the expectations.

If they show 'interest in' that's a disposition, it's an attitude isn't it, not something you can measure. It's not a measurable.

You can't say exactly 'How interested?

Yeah, it's not quantifiable. Interested on their own or .... if you give them lots of support?

I suppose any child will get a tick for that unless they actually run kicking and screaming.

It depends what they mean by 'show interest'. How much interest, you know? A real fascination? Or is it just 'OK, I'll use it if I need to.

Practitioners' impressions of uneven and combined development were borne out by one of the observations that took place during a lesson involving nursery children in an ICT suite using a drawing package. The children observed knew that the technology would enable them to produce images yet their ability to position the cursor accurately enough to deploy tools such as Fill, Change Pen Width or Eraser were restricting their attempts to put this knowledge into practice. Similarly when another four year old nursery child lifted the lid on a photocopier in a role play office, placed his drawing face down on the copier, pressed a series of buttons, lifted the lid, withdrew the drawing and handed it to a nearby adult stating: 'It's copied'. Was the child showing an interest? Was he operating simple equipment? Was he performing a simple function? Was this an example of the child's knowledge about the everyday uses to which ICT is put? Perhaps it was evidence of all of these things.

During one preliminary observation a four year old child approached a painting table in one of the nurseries carrying a mobile phone which she had taken from the role play area. She placed the phone on the table next to her as she began to paint a picture alongside the other children. After a few minutes she picked up the phone and began to jab the buttons. On being asked by the practitioner what she was doing she replied that she was texting Julie to see if she could pick her up from nursery. Having finished texting she replaced the phone on the table and returned to her painting. This in itself was surprising but the child then demonstrated an even greater level of awareness of the technology and the social protocols surrounding its use. After a minute or so of painting she picked the mobile phone up again suddenly and placed it to her ear in response to an imaginary call from Julie who was in turn responding to her original text message (O'Hara, 2004). In terms of her practical skills the child was clearly at an early stage and was imitating the actions of the adults around her, operating equipment and performing a particular function (i.e. texting). There was no evidence that the child had the actual capability to send a text message yet her understanding of the skills required and the social protocols involved was clearly much more advanced and hence presented a considerable challenge to anyone attempting to categorise this event using the Curriculum guidance statements. She appeared to be operating on different levels simultaneously. On the one hand she was

certainly showing an interest. Yet she was also very knowledgeable about the everyday uses to which this piece of technology was put and although she was able to role play her knowledge and understanding was ahead of her technical (and indeed her literacy) skills.

4.2 'He just comes alive when he's on the computer': Learning through ICT and metacognition

All the children encountered, in each of the settings, provided evidence of learning about ICT to varying degrees. Comments made by nursery children for example, across both settings included:

That takes you home. You click on that to go out of it.

That bucket is for filling in.

I want it big [pen size]. *Let me show you.*

Children using PCs for example understood that icons carried meaning. Some children as young as four had mastered the meaning and use of a great many icons including Fill, Symmetry, Print and Return to Main menu options.

Data supporting the notion that young children were learning through ICT e.g. acquiring factual knowledge of subjects other than ICT as a result of interacting with new technologies was much less apparent. Yet it might be a mistake to assume therefore that claims made for ICT as a means of enhancing and extending learning across the wider curriculum are unfounded. Had, for example, some of the children's actions with ICT been observed using any other equipment or materials they might well have been cited as evidence of schema in action.

Children sometimes behave in ways that appear obsessive, for example repeatedly carrying things around in bags, posting objects or lining things up. In so doing they may be providing evidence of schema (Athey, 1990). A schema is a pattern of repeatable

behaviour that some young children are thought to engage in when exploring the world to learn how things work. Bruce describes schemas as patterns of linked behaviours which children can generalise and use in a variety of different situations (Bruce, 1997). The Curriculum guidance for the foundation stage also refers to certain ideas that captivate children and steer their learning; apparently random play might be integral to children's development of concepts such as position, connection or order (QCA, 2000b). There is no set order to the development of schema, parallel development is possible and some children do not appear to engage in this kind of behaviour at all, perhaps having alternative approaches to learning about the world. This said, broad categories of schema include enveloping / enclosure, rotation, trajectory, transporting and connection (Appendix vi). For Athey children can demonstrate schema in a number of ways including sensorimotor actions, symbolic representation and functioning (e.g. pretending or representing things through drawings / writing), exploring functional dependency (i.e. cause and effect) and finally engaging in abstract thought (changing and transforming things in their minds) (Athey, 1990; Arnold, 1999).

Some of the children observed demonstrated great enthusiasm for practising recently acquired ICT skills and capabilities repeatedly. This practice could be at the expense of any teacher set task. In one instance the child being observed was enjoying making bold left to right, right to left horizontal sweeps with the cursor, covering the screen in black bands saying: 'Dark! I'm going to do a dark palace. I'm doing a black palace' (Appendix vii). The sweeps continued until almost every part of the screen was coloured black. In another example a child had learnt that switching to a white pen colour had the same effect as using the on-screen eraser. She then proceeded to go over every part of her picture using similar left to right sweeps of the white pen until the screen was completely white again. In another instance one child was so enamoured with the Fill tool that he used it repeatedly to such an extent that the entire page was filled. He then selected the eraser icon, altered the width to its widest possible setting and then proceeded to erase the entire page in a similar fashion while calling out to his friends: 'I'm rubbing out! I'm rubbing out! I'm rubbing out!' Only after this did he create a new page with guidance and set out to complete the task set by the teacher. In another instance a child played with a

Pixie pushing buttons in a seemingly random fashion before laughing and pointing at the robot's antics. However the button pushing was not entirely random. The child always made sure that he cleared the previous sequence and he clearly understood the need to instruct the robot to begin each sequence of moves by pressing the green Go button.

These behaviours were reminiscent of the intense, absorbed and repetitive behaviour that one associates with young children and schema. Unfortunately there was no corroborating evidence from other areas of the learning environments. It was possible that schema relating to trajectory, rotation and transporting were being explored through the medium of ICT but without further evidence it must remain a possibility only.

In addition to the contribution that ICT may have been making to children's concepts about the world around them, the observations carried out in the different settings also showed that working with ICT offered young children opportunities for learning about learning, i.e. metacognition. In one case a child systematically tried as many different icons as possible in order to discover what effect they would have exclaiming excitedly when something unusual or unexpected happened: 'Hey look at that!' The task set by the teacher came second to the child's agenda of discovering the capabilities of the software through exploratory play, trial and error. In this instance there was no product at the end of the task, no picture. Yet the child had been highly motivated and had sought energetically to share his learning and excitement with his peers. Even in those cases where children understood that icons were meaningful but lacked sufficient familiarity with the software to know exactly which icon to select, they were still able to demonstrate curiosity and an ability to find out, for example:

What's that?

How do you clear it off?

I'm going to rub it out. I don't know how. Is that the rubber?

When it came to ICT and the super skill of motivation, practitioners commented that some children at least were not motivated by many other things. Motivation may be a

difficult concept to define and measure but it certainly involves aspects of pleasure or enjoyment. For Laevers the level of involvement a child demonstrated in a task could be used as a measure of enjoyment, motivation and learning (Laevers, 1994 in Bertram and Pascal, 2002). Involvement meant intense mental activity and concentration, during which time children were strongly motivated and engaged in deep level learning. Motivation about the use of ICT may be both intrinsic and extrinsic in nature. Extrinsic motivation may be related to completion or achievement whilst intrinsic motivation entails a child having an inner desire to participate in the task regardless of any end product or outcome and becoming fully immersed in the task, often losing track of time (Passey et al, 2004). Laevers' scale consisted of five levels (Appendix viii) ranging from activity that lacks energy, is simple, repetitive and passive to total involvement where children are concentrating, creative, energetic and determined (Bertram and Pascal, 2002). The level of involvement could be gauged by looking at key signals which included concentration, creativity, expression and posture, persistence, precision, language, energy, reaction time and satisfaction.

It was suggested by the practitioner interviewees in Tower school that some children who displayed short attention spans when faced with the majority of classroom activities, were attracted to ICT and would: 'concentrate on it for much longer than other things'. One practitioner reflected on her experiences with a specific child in her class saying:

> *He just comes alive when he's on the computer. He knows he can do it; probably he plays games at home I don't know. But if we didn't have that* [PC] *he would be struggling to succeed at much..... that is something that he can do.*

Another practitioner commented though that the reverse was also possible and that she had a number of children in her class who were confident, motivated and interested in most things but for whom ICT, and the PC in particular, seemed to hold little attraction. Her follow-up comment was equally interesting:

> *I'm not being stereotypical but it was certain girls when we were doing all that work with Digital Blue, weren't really interested even after they'd seen what you could... watched some of the children's work back and talked about all the wonderful things you could do. They just weren't really that interested at all.*

Using ICT also put children into situations which made it necessary for them to make use of their problem solving skills. During one observation in an outdoor area three children were using a digital camera to take pictures of spring flowers. The digital nature of the technology afforded the children the opportunity to review, retain or delete their pictures. This facility offered immediate feedback that enabled the children to realise that they were obscuring the images with their fingers. The simple operating characteristics of the mechanism were being offset by the fact that it was quite difficult for little fingers to cope with the chunky design of the camera. However once the children realised what was happening they became more systematic in their work, advising one another and introducing what in effect amounted to a verbal checklist in which they reminded themselves of where to position various digits and how to take aim. A repeat observation later that day showed different children encountering the same challenge and adopting the same collaborative thinking aloud strategy to ensure that they did not obscure the image with their fingers in spite of the adult sized equipment.

Children's problem solving skills were further displayed in their efforts to develop strategies to compensate for their less than fully developed fine motor skills. For example, none of the settings had child sized mice for the PCs and children's abilities with this peripheral varied. For one nursery child, moving the mouse and pressing the button simultaneously proved difficult. The child responded by adopting a sequential approach in which movement and clicking became discrete operations resulting in a distinctive polka dot pattern (Appendix vii). In another instance a four year old experienced difficulties in positioning the on-screen cursor as accurately as she wished in order to be able to select different tools such as colour options and pen widths. Displaying considerable concentration, perseverance and determination the child responded with a spiralling technique in which the circling cursor steadily got nearer and nearer the sought after icon. In a further example one child adopted a two handed approach to the manipulation of the mouse in order to gain greater control. Another used his right hand to move the mouse while he traced a path on-screen where he wanted the

cursor to go using his left hand, with the words: 'I need to click back on my blue. I can't get to it though.'

4.3 'Oh no! He's doing it wrong!': Social skills and collaborative learning

A key criticism of the increasing use of ICT in early years settings has centred on the isolated and individualised learning style that can result (Alliance for childhood, 2000). Some authors however have argued that this need not be an inevitable consequence of the introduction of ICT (Cooper and Brna, 2002). Indeed, if used in developmentally appropriate ways ICT can facilitate high quality social interaction and communication between children. Arguments in support of the positive contribution that ICT can make to children's social development are further strengthened if one can avoid conflating ICT with computers. The data gathered here during classroom observations suggests that whilst some technologies might encourage certain teaching and learning practices ill suited to early years environments, this is by no means an inevitable consequence of their use. Certainly children were observed working alone at PCs in classrooms. However the apparently individual nature of the activity belied the incidence of short interventions from passing peers. It was also as common to see children working in twos and threes and for there to be more sustained dialogue and discussion between the children about their activities. Practitioners commented that while some technology (PCs using content rich and / or generic software) did not automatically suggest collaborative endeavour to children, practitioners could still deploy the equipment in such a way as to make it more likely:

> *If you haven't specifically said to them 'I'd like you to work with a partner and you're going to do this together' they wouldn't necessarily.*

The active encouragement of collaboration when using ICT was also seen by practitioners as having benefits for the helper as well as the helped. For example:

You do get more able children helping others.... and sometimes..... it's not necessarily the child that is more able generally. But if they're quite good on the computer then that can build their confidence. That's good for their self-esteem.'

Children's technical language and competences could be extended through this kind of interaction.

Where technologies such as interactive whiteboards were being used, experienced practitioners were able to make intelligent use of them. In one reception setting children had been using a digital video camera in the classroom to retell well known stories. The practitioner then used the interactive whiteboard in an adjacent ICT suite with small groups to build story boards and insert credits pages and special effects as part of a group activity. In one of the nursery settings an interactive whiteboard had been installed in the communication, language and literacy area at a child friendly height and practitioners worked with small groups using interactive and speaking books downloaded from the Internet. The children were encouraged to engage in collaborative activities such as discussing the stories, sharing their ideas and moving characters around using the touch sensitive screen accompanied by much advice from their peers, solicited and unsolicited.

In addition to PC based activities other forms of ICT also presented considerable scope for collaborative learning. Where settings incorporated ICT into imaginative and role play areas the incidence of social behaviour and communication was particularly high. In one reception setting the role play area consisted of a travel agency. Children could book a holiday in the travel agents, which featured a telephone, PC, electronic cash register and calculators. In one of the nurseries the opportunities for new story lines in the Post Office, which was normally created in the run up to the Christmas period, were extended by the introduction of an operational public address system incorporating a simple On/Off mechanism. Children were observed incorporating the technology into their play with ease, play that was social and collaborative in nature.

Other examples of social and collaborative endeavour in which communication between peers was central to the activity were also observed during exploratory play with

technologies such as audio equipment (walkie-talkies, microphones, CDs and listening stations) and programmable vehicles. In one reception setting practitioners organised a music area which included electronic keyboards and tape recorders to encourage children to sing and play together. Programmable vehicles meanwhile were observed in every setting to a greater or lesser degree and these activities were highly social and collaborative in nature usually involving small groups of children, sometimes working with individual practitioners. In all these instances children were encouraged to discuss the activity and share their ideas. Conversational conventions and interpersonal skills such as turn taking were as much a part of the learning objectives from the practitioners' perspectives as was the acquisition of technical competences.

Some technologies such as programmable toys and floor robots presented children with a considerable intellectual and cognitive challenge which seemed to result in a high level of peer support and tutoring with some children attempting to scaffold the learning of others by autonomously advising and helping less experienced peers. One practitioner talking about floor robots commented that she had witnessed several occasions where the children:

> *... have wanted to tell somebody else or show somebody else what they can do. So that immediately is encouraging them to interact with others isn't it? And then the other children have said 'Oh I want to do it. Let me have a go. Can I make it do that? Can you?' and then immediately there's something there.*

During one observation two nursery children experimented with the Pixie using a process of trial and error in a self-initiated enquiry into distance. Three other, older and more experienced, children approached and joined in, in an attempt to make the robot follow a preset route, one saying: 'Remember what we showed you. You press that one, then that one, then that one.' However sequencing and predicting more than one move in advance proved an insurmountable cognitive challenge for the younger children. As one of the older children commented: 'Oh no! He's doing it wrong!' However even these older children who had seen previously, and therefore knew, what was possible in principle, proved less adept at realising their ambitions in practice. In another example an older, more experienced girl held the index finger of a younger boy and showed him how to

programme the Pixie. She helped him to input a simple sequence using the buttons, holding and positioning his fingers whilst she explained her thinking about where she thought the Pixie would go (visualising the route in her mind) as she did it. When the Pixie's route proved not to be quite what was expected the two children collaborated with another younger child to move the brick obstacles to match the route that robot actually took. Shortly after this the older child left the two younger children to play independently while she relocated further along the carpeted area with a second Pixie to pursue her own objectives.

Whilst there was a social dimension to many of the ICT activities observed in the nurseries and reception classes it was not always positive or unproblematic and as a result there were implications for the role of the practitioner which are discussed in more detail later in this chapter. Paired or small group work with ICT could suffer from a tendency for the more able, confident or experienced children to monopolise the activity. In some cases there was perhaps a disparity between the development of children's technical capabilities in comparison to the development of their social skills. The former could be well ahead of the latter. This manifested itself on occasion in low level, short lived disagreements and squabbles such as:

That's no good, you're scribbling!

It could also result in a more substantial impact on the activity. Peer support sometimes crossed the line and became a hostile take over in which the more experienced, competent or older child took possession and control of the equipment and the task whilst the less experienced, less competent or younger child was relegated to the role of observer whose suggestions and ideas, if indeed they offered any, were ignored or overruled. One such victim remarked indignantly:

We're supposed to share aren't we!

The lack of input and control would sometimes result in children opting to withdraw from an activity. A further issue concerned gender as there were occasional examples of some boys seeking to restrict or even block access to new technologies by girls. In one of the

preliminary observations for example two boys had attempted to wrest control of a computer away from two girls in the role play area where it had been integrated into the rest of the props and resources to promote imaginative play. In an inspired response one of the girls suggested to the boys that:

You be dogs!

Having acceded and once in role, the boys' attempts at a takeover were neutralised; dogs, as the girls were quick to point out, have little need for computers (O'Hara, 2004).

4.4 'That's the wind': Promoting creativity

In the context of early years settings it is important to shun commonsense assumptions about the nature of creativity, i.e. that it is a genetic gift granted to very few and manifesting itself largely in the arts. The situation is not helped by the fact that the Curriculum guidance for the foundation stage uses the term creative development to describe work in the realms of art and music. However it would be a mistake to think that creativity is exclusive to the realms of art, music or drama. All children have the ability to think and act creatively nor are their creative endeavours restricted to particular subjects or areas of learning (Craft, 1999; Prentice, 2000). The Report of the National Advisory Committee on Creative and Cultural Education provides a helpful counterbalance to the commonsense view. Creativity has three characteristics. To begin with it involves a melding of imagination with purpose. Second is originality in the sense that something is original to the child. The third characteristic is value as calculated by whether the outcome works; is useful; offers a valid solution to a problem; or is aesthetically pleasing (DfES, 2004). Using this definition ICT can be said to offer young children enhanced opportunities to be creative in the nursery / classroom.

One area in which the potential existed to encourage creativity with ICT was in imaginative / role play. The value of imaginative play may be less immediately evident than that of exploratory play which is thought to have a powerful role in children's

intellectual development (Hutt in Brierley, 1994). For example, exploratory play such as trial and error with a floor robot may be characterised by serious, concentrated activity involving investigation, manipulation and a desire to succeed. Although the merits of imaginative play may be less obvious, it has been argued that the strong desire on the part of young children to play in this way suggests an inherited base and thus an evolutionary imperative. Imaginative play may well have physical, social and emotional benefits and provide opportunities for symbolic, creative and internal thinking (Brierley, 1994).

Although the Curriculum guidance for the foundation stage suggests that practitioners make use of ICT in role play areas, indigenous examples of this prior to the classroom observations were far less common than instances of ICT as part of exploratory play or teacher directed tasks. The majority of the indigenous ICT tasks observed in nurseries and schools involved the use of the PC either in the classroom or in an ICT suite. The inclusion of ICT into other aspects of the early years curriculum and learning environment were more limited (e.g. a telephone in the Travel Agents role-play corner). Joint planning with practitioners led to an expansion of ICT into these role play areas.

Disclosures during role play about their knowledge and experiences in relation to ICT revealed a sometimes surprising level of awareness on the part of some children about the world around them and the uses to which technology could be put. On these occasions the affordances offered by the technology facilitated their creativity. In one example from another school, four reception children stage managed and then enacted a news broadcast using a video camera and television monitor. The group demonstrated that they could independently incorporate the technology into their story lines as well as a surprising level of awareness about the functions of technology in the world around them (O'Hara, 2004).

In those instances where ICT was integrated into role play areas, levels of initial pupil interest and excitement were affected by the novelty of the technology. Far from promoting creativity the paradox at first was that the novel introduction of new technologies into these role play areas could result in apparent dips in the quality of the

play. For example, following the introduction of a public address system into the nursery 'Post Office' at Park school, children spent their time focussed almost exclusively on the technology. They were very excited and little or no imaginative play incorporating the technology was taking place. Instead the children sang songs, hailed friends or practiced funny voices. It was only a week or two later during a return visit that children were observed integrating the equipment into their stories. The novelty had to wear off before the children could use the affordances offered by the technology to become really creative.

Practitioners supported the idea that new technologies in imaginary play could provide new opportunities for children to think and act creatively. Even with the existing, relatively limited, use of ICT in some role play areas children were demonstrating their creative potential:

> *I've heard some great telephone conversations. Very creative.*
>
> *Because we always try and model don't we when we've got telephones in the role play area....the sorts of conversations that you might have. The children will quite often, some children, will copy them and develop them into their own ideas. That's them being creative isn't it? Especially using their own ideas and opinions isn't it?*
>
> *They do that all the time with the telephones.*
>
> *Even the less able children might just with a bit of encouragement, with you on the other side of the phone, it might just help them a little bit.*

Other examples of creativity were also observed elsewhere in the settings. In one reception class the teacher had initiated a small project on story telling that made use of a digital video camera. She stated that the inclusion of the camera had encouraged and motivated many of the children to make up their own stories. Even in activities that were more tightly constrained and essentially teacher-directed children could still be surprisingly creative. In one instance in an ICT suite when being asked to explain her drawing one four year old responded 'That's the wind', waving her hand as she did so to emphasise and illustrate her meaning (Appendix v and Appendix vii). Similarly children

could be surprisingly inventive in defending their intentions from unwanted adult intrusion and perspectives:

I'm having a pink snowman. I'm putting the sun in.

Won't that make your snowman melt?

No because it's a wooden snowman!

4.5 'It needs somebody with them': Children as ICT competent and the role of the practitioners

ICT is but one thing amongst many which early years practitioners have to think about:

I've got an electronic keyboard in my car boot that I keep meaning to bring in but it's where do you have it and when?

We tend to forget about it [ICT].

I've got a catalogue... I've been trying to get around for ages waiting... to find 10 minutes to sit down together and look at it.

The Internet, I don't use that regularly, probably it's having the time as a teacher to search for the... for what's suitable and appropriate for your children's needs really.

I planned one week that we were going to [use the Internet] *and then we didn't go in* [to the ICT suite] *so that was something I haven't done.*

We have got some Roamers but we don't use them.

When we first got Pixie I had one in use at all times.... I'd still probably try to have it out once a week if I could.

The role of the early years practitioner in promoting children's learning and development has a number of interrelated dimensions. Practitioners need to plan and provide an interesting and stimulating learning environment for children. They need to monitor children's progress and needs. They need to intervene sensitively in children's play to

support and extend learning, as well as knowing when to stand back. They need to provide emotional support for children, acknowledging their efforts and praising their achievements. They need to challenge children to try new things, take risks and attain new levels of achievement (DECS, 1996). The school-based observations and interviews suggest that this is as true for situations involving the use of ICT as it is in other areas of the curriculum. Staff in both schools certainly stressed the need for adult involvement:

> *It needs somebody with them to be able to do it.*
>
> *That is a big problem ... you just need an adult with one or two at a time.*
>
> *If we got walkie-talkies for the outdoor play for the first couple of weeks of having those out an adult would have to be with children showing them what to do.*
>
> *We're always getting new children in all the time!*

According to Sayeed and Guerin the adult plays a crucial role in mediating between the children themselves as well as between the environment and the child (Sayeed and Guerin, 2000). Concentration levels and the quality of outcomes were improved on occasion as a result of timely and appropriate adult intervention. In one instance a nursery child had been asked to draw a picture of her mother for Mother's Day using a drawing package on a lap-top. At first the child worked alone and produced a purple mark in the middle of the page. At that stage the child became dispirited and was on the verge of abandoning the task. At this point an experienced nursery nurse intervened. Sitting next to the child, offering praise, encouragement and advice on how to operate the equipment the nursery nurse was able to revive the child's interest and the final image was recognisable as a person (Appendix vii).

One issue facing practitioners was how to introduce ICT to the children. One option was for staff to model the use of the technology with individuals and small groups of children at a point of need. Although of high relevance for the children concerned and offering instant feedback, the approach could prove to be problematic in settings where there might be up to 25 other children in the class and non-teaching support was intermittent or

unavailable. One practitioner reported that she had tried to introduce the Pixie floor robot into her ICT sessions but even with two or three adults it proved impossible to adequately support the whole class at the same time. Introducing new technology to the whole class and then allowing children to rotate around the activity during the day or week was a second option. However, with large groups it could be hard for all the children to observe the introduction clearly and unless the technology involved was reasonably transparent and children were able to use it fairly quickly they were unlikely to remember much of the introduction (Siraj-Blatchford and Siraj-Blatchford, 2002). As one of the practitioners interviewed remarked:

> *If you're doing it just once a week session it would take a long time for them all to have a turn and they'd probably have forgotten about it by the time.*

A third option considered by practitioners was the use of other adults to disseminate ICT expertise to the children. Most early years practitioners are involved in working with other adults in the classroom, although in England and Wales at least, the number and availability of non-teaching colleagues may be much more favourable in nursery settings than it is in reception classes. Non-teaching colleagues may include nursery nurses, special needs teachers, language support teachers, specialist classroom assistants or students as well as parent helpers and other volunteers. Potentially all these adults have a valuable contribution to make in supporting children's learning about and through ICT. In some cases for example volunteers may have particular skills and knowledge of use in teaching and learning involving ICT or access to resources that can supplement those available in the setting. Practitioners raised concerns about the feasibility of this third approach:

> *If you don't have a member of teaching staff doing it, when do you then find the time to train your other adult how or what to do with that piece of equipment?*
>
> *Yes, it's all right saying we can get parents or whatever to do it but if they're not knowledgeable....*
>
> *I just tend to find I just haven't got the time to talk to them to explain what I'd like them to do.*

This said, one reception teacher in one of the settings made effective use of other adults in the classroom to assist with work involving a digital video camera. The practitioner first ensured that the teaching assistant (TA) involved was aware of the purpose of the activity involving ICT. She adopted an inclusive approach to planning in which, while she retained responsibility for producing any supporting documentation, the other adult was included in a discussion and the generation of ideas. A second requirement was for the adult to be properly introduced to the technology. For this the class teacher asked the researcher to undertake some staff training to ensure that the TA was familiar with the operation of the camera and the software. Ironically the TA became the expert in the early stages not the teacher and later on in the term the TA trained the teacher.

Practitioners also remarked on the impact that ICT had on their organisation and management of the early years curriculum and learning environment. In one nursery setting practitioners had noted that some children found it difficult to sustain levels of concentration for extended periods of time in the ICT suite when the task involved individual work. In response they had stored construction kits in the suite for children to play with once they had completed any task set. During an observation in an ICT suite five nursery children (four boys and one girl) had completed or abandoned the activity involving the computers and had begun to play with the constructions kits on the floor within ten minutes. Practitioners felt that when it came to skills acquisition it was better to offer children blocks of time rather opting for once-a-week ICT sessions or taking advantage of any incidental opportunities for learning about ICT that presented themselves on an ad hoc basis. A blocked approach had the advantage of: 'giving them all chance to get familiar with it.' The hope was expressed that this approach meant that: 'in the future because they're familiar with it they might initiate thinking that they could use it.' One practitioner in Tower school suggested that a blocked approach was a precursor to more autonomous learning on the part of children: 'If they've had those chances to revisit and gain some confidence it won't be so adult intensive next time round.' One example given involved the Pixie floor robot which had been used everyday for a week and then the following week left:

... as an independent activity so they could choose it as an option and then you see the children who get it.

Classroom observations certainly supported the practitioners' contention that in general young children did need and benefit from adult support and intervention. It was certainly the case that children's knowledge and understanding was not always matched by a perfect grasp of the vocabulary; one nursery child wanted to know where her 'photo' was whilst waiting next to the printer for her work to emerge. One reception boy meanwhile asked if he could 'have the line' when he wanted to explore and experiment with the symmetry tool on a drawing package. Language could prove a difficult medium for adults trying to help children understand what happens as the technology works. An attempt to explain to three reception children what was happening as images from a digital video camera were being transferred to a PC prompted the sceptically amused response from one of the children: 'Cameras can't talk!' However, the observations also showed that levels of children's ICT competence and awareness varied widely across the classes and settings involved. It is possible that while practitioners had a good grasp of young children's general need for support in using ICT they might have underestimated the knowledge and capabilities of some specific pupils.

Some young children displayed a surprising knowledge of technical terms and procedures. One of the nursery children observed commented during a computer's start up procedure whilst watching the steadily advancing coloured bar that: 'When it gets up again it'll come on.' Another nursery child disclosed, entirely unprompted or solicited, that he had: '....a folder at home.' Further enquiry revealed that the child was referring to his father's PC where he had an electronic file. Some pupils meanwhile proved to be highly skilled users of some technologies. When faced with the task of producing a portrait of her mother for example, one nursery child dashed off an image so casually and so fast that the observer was left wondering about differentiation and whether this particular child needed a more challenging activity. In another instance a reception child proved sufficiently skilled to not only to produce a recognisable representation on the screen but then proceeded to sign the picture by writing her name using the mouse.

Ironically, having stated that a blocked approach was the preferred option to organising the early years curriculum in principle, it rapidly became apparent that in practice this approach was the exception rather than the rule with the children in all but one nursery class going to an ICT suite on a weekly basis. It was also apparent that some staff had also identified, and were exploiting, opportunities for children to learn about ICT through continuous provision in spite of earlier reservations as to the value of it. In one nursery for example children were encouraged to answer the telephone albeit under supervision. In another, a classroom assistant sometimes took small groups of children through to the staff room in order to photocopy samples of work and teaching materials. Nursery practitioners also commented that technologies such as the listening station were on open access and that children were using them: 'all the time'. A reception practitioner remarked to her colleague when discussing children's use of the PC in the classroom: 'they're perfectly able to use them [CD-ROMS] aren't they, get them out and put them in and load them up and all sorts.' In her reception class during carpet time children were also making regular use of the CD / Radio:

> *We use it first thing in the morning and they press Play and Stop for me because I'm on the chair and it's on the other side and I can't reach.*

4.6 Summary

The early learning goals and their accompanying stepping stones seem, at first, to offer an element of precision for practitioners trying to gauge children's capabilities and make decisions about future ICT provision. However in reality the precision may be illusory. The children observed in Tower and Park schools often acted or commented in such a way as to provide an observer with very equivocal evidence that a particular target had been met. Frequently, the evidence appeared to support attainment at different levels simultaneously. In addition the statements themselves seemed to underestimate the knowledge, understanding and in some cases skills, that some of the children possessed. If the existing statements are not working as well as they could then this begs the question of whether they can be improved on or whether the premise of relying on

criterion referencing of this sort is too restricted as a means of assessing children's achievements?

Not surprisingly, given the increasing incidence of new technologies in schools in recent years, there was plenty of evidence that young children were learning about ICT. The emphasis was often on skills acquisition. In spite of this the technology did provide children with opportunities to apply their developing super skills such as perseverance, motivation, curiosity or problem solving in a new range of contexts and activities. It was also possible, though by no means proven, that ICT provided some children with an additional vehicle with which to explore schemas.

Many of the children were encountering computers in the context of ICT suites and some of the software in use in classrooms was sometimes deployed in a free-standing manner. This raised the question of whether some ICT was better than no ICT? The answer may well vary according to the individual children concerned. Whilst some were excited and enthused enough to persevere and experiment without much encouragement others might have gained more from situations in which the technology had been incorporated into the curriculum differently.

Much depended on the decisions taken by practitioners as to how they would make use of ICT. The electronic white board for example could be employed as part of a didactic teaching and learning style more akin to the kinds of approaches used with older children. Equally, the same device set up differently was also seen used in a much more participatory fashion. Social and collaborative experiences were also provided for children on occasion as a result of work with control technology and the introduction of ICT into existing role play areas to extend the possible story lines that children might develop. This potential for supporting less isolated learning experiences for young children did need monitoring however as inequalities in skills and knowledge, accompanied on occasion by stereotypical views of boys' and girls' activities, could have adverse effects if not checked.

Opportunities for creative ICT endeavour on the part of young children can be hard to envisage when ICT is conflated with PC. Taking a broader view of ICT made these opportunities easier to see. Role play in particular seemed to offer scope for the promotion of symbolic, creative and internal thinking (Brierley, 1994). Given time some children showed that once any novelty had worn off they were able to incorporate the technology into their story lines in ways that were sometimes startling. Children's creative urges could even be seen finding expression on occasion in the most unexpected and teacher directed of ICT activities.

For the practitioners meanwhile the challenges associated with developing their practice in relation to ICT often centred on time and training. The multifaceted and extraordinarily busy nature of the role coupled with the consequences of competing policy pressures acted as a brake on developments. Ensuring that children acquired the skills and knowledge necessary to make use of ICT was potentially highly labour intensive and time consuming; even improvements in staffing ratios had not solved the problems.

Chapter 5

Young children's experiences in the home: Parental perspectives

No investigation into the technological dimension to childhood could rely solely on children's experiences in nurseries and reception classes. To create as full a picture as possible concerning young children's experiences and capabilities in any field, including ICT, it was essential to know what sorts of experiences they were having beyond the nursery / school gates. This is the environment after all where young children spend the majority of their time and where the most significant others in their lives are to be found. Whilst children occasionally made classroom disclosures in relation to this it was also important to seek confirmation and additional data. Ascertaining the type and extent of children's ICT experiences and capabilities in this wider context meant seeking data from their parents and carers. For Clark such data needs to sit alongside that gathered directly with and from the children. Accounts from those who know the personalities and daily routines of individual children are essential if researchers are to build up a more detailed understanding of young children's experiences (Clark, 2004). The remainder of the chapter refers frequently to children's reported ICT experiences in the 'home' as a shorthand for any encounter with new technologies beyond the school / nursery environs.

A successful partnership with parents is often cited as a vital prerequisite for quality early years provision (Strahan, 1994; Edwards and Knight, 1994; QCA, 2000b). Teachers are continuing a learning process that has been begun by parents. Parents can support schools and nurseries by exhibiting positive attitudes towards education and they can also provide practitioners with valuable insights into the true capabilities of the children in their care (Roffey and O'Rierdan, 2001; Paige-Smith, 2002). Dialogue with parents can also result in parents becoming much more knowledgeable about young children's learning and the curriculum, for example being persuaded of the value of play in learning, or becoming aware that ICT can include much more than just the computer. Where practitioners communicate with parents, parents are in a better position to support their child's achievements across the curriculum including ICT (Edgington, 1998). The gains for the

children and their teachers of parental involvement can include increased motivation, increased confidence, and increased knowledge, understanding and skills. In addition to their impact on pupil experiences, capabilities and attitudes, parents and carers are also important gatekeepers with the right to accede to or deny access to the children.

Parents of nursery and reception children in the two schools were surveyed using a simple questionnaire to gather data on the range of ICT in children's homes and information on which of these technologies children were able to use with or without support. Respondents were also asked to indicate whether they would be willing to take part in a follow up interview in order to explore in more detail and depth the sorts of experiences young children were having and the sorts of capabilities that they were displaying outside of nursery and school.

5.1 ICT in the home: Methodology

While the availability of ICT in the home is on the increase and may confer an educational advantage on those children with access to it, it is by no means universally available (DfEE, 1997c). Nor should the acronym ICT be conflated with computers, ICT in the home is likely to take myriad forms. Furthermore the increase is unevenly spread and practitioners cannot be certain about the uses to which ICT in the home is being put (OECD, 2001d). Social, economic and cultural factors may mean that this aspect of childhood is different as a result of variables such as income, education, household size and type, age, gender, racial and linguistic backgrounds or geographical location (OECD, 2000b). Research conducted with children whose parents have provided them with access to ICT at home may not offer much insight into the experiences and development of children without such opportunities. Although seeking the insight of parents has much to recommend it, it is by no means unproblematic to initiate or to execute. Attempts to gain some insight into events outside of the school / nursery contexts raised a number of methodological issues associated with the theme of ICT, the context of the home-school relationships and researcher positionality.

It was likely that the majority of parents' ideas about ICT would be based on their own school or work experiences rather than on any educational training. As a result parents could have drawn on common sense or received notions based on the images all around them in society in which ICT is equated primarily with computers. Narrow interpretations of this sort might have led some parents to worry that their own ICT knowledge and skills were negligible or non-existent. Believing themselves unable to support their children's learning in this area they may have declined either to respond to the questionnaire or to volunteer to be interviewed. Other parents however might have been highly knowledgeable and skilled users of computers, possibly as part of their employment, and assume that investing in similar hi-tech equipment in the home was essential for their child's educational success. Given the much wider interpretation of ICT used in the research this could have had an impact on the responses to questionnaires and during interviews. Making clear therefore that ICT included all manner of technologies that most of them would use regularly seemed a good way to demystify the subject and encourage participation.

Methodological issues associated with obtaining data from parents also arose from the contexts. In schools and settings where the lines of communication between parents and practitioners are limited and where little time, support and training has been available for staff to develop such contacts further, parents may be less inclined to respond to requests for information. There might have been a lack of will on the part of some parents to be involved in partnership with the nursery or school. Some parents may have had negative experiences in relation to their own schooling or may have been anxious about their own skills and knowledge, for example parents whose first language was not English. In other cases parents might have welcomed the opportunity for involvement in the research but found themselves unable to participate due to other commitments or problems, for example those in full-time employment; those caring for younger siblings or elderly relatives; those wishing to re-enter education themselves now that their children had started nursery / school; or those who were experiencing personal traumas of one kind or another such as marital breakdown, ill health or bereavement. Both the schools involved

in the research had good partnership arrangements between early years staff and parents according to Ofsted reports and the professional opinion of LEA advisory staff.

There was also the context related question of where the interviews should be conducted. Visiting parents in their own home seemed the most respectful approach at first. To conduct the interviews in the schools might make the researcher appear as an agent of the school and therefore inhibit respondents' remarks. However once the issue of male positionality (discussed below) had been thought through it was decided that on balance conducting the interviews in the schools was a better means of humanising and equalising the research relationships (Reinharz and Chase, 2003). This would be less threatening and intrusive than asking to visit female respondents' in their homes.

Thirdly then, the elicitation of data from parents and carers raised once again the issue of researcher positionality. There was a risk that parents and carers could react to the presence of a researcher in such a way as to skew the outcomes of the research. In the case of ICT for example it was possible that a parent might respond to the researcher's work in the school by coaching their child in some way. Perceived differences in terms of social location between respondent and researcher could also inhibit responses and lead to a reluctance to disclose information. However perhaps a more serious potential issue centred on the fact that as the research involved young children the majority of parental research subjects were likely to be women as they were the parents most likely to have day to day contact with the different settings. Male researchers interacting in some way with female research subjects are presented with potential challenges, even where the research does not constitute a: 'deeply personal enquiry into sensitive gendered experiences' (Reinharz and Chase, 2003, p.79). In the case of some groups in society for example, religious and / or cultural protocols coupled with the maleness of the researcher could preclude or inhibit any contact.

The importance of social location also made the exercise of restraint and caution essential when encountering respondents whose perspectives on ICT and / or education generally differed markedly from that of the researcher. Care would have to be taken to engage in

active listening, making sure, through gesture and response, to encourage and not to criticise respondents. Reinharz and Chase advocate serious consideration on the part of researchers of what they regard as inappropriate aspects of male behaviour (i.e. arrogance and an inability to listen) with the intention of ameliorating or preferably eliminating them (Reinharz and Chase, 2003). While it is perhaps debatable whether males have quite the monopoly on arrogance and an inability to listen that Reinhard and Chase suggest, it was certainly the case that respondents who felt intimidated or uneasy would not make good informants.

To establish the necessary degree of trust and rapport research subjects would be treated courteously and thanked for their time and trouble at the start of the process. Where appropriate in interviewing, small talk, both related and unrelated to the research, would be used to reassure and settle subjects. In addition the interviews would also be used as a means of providing feedback to parents on their children's experiences with ICT in the settings, strengthening the research ethically by allowing the researcher to offer respondents information which they had a right, and in all probability a desire, to know about. A decision was also made to make self-disclosure a part of the interview process where appropriate. This was a difficult decision as self-disclosure risked leading or inhibiting respondents. It was crucial not to overplay the strategy however it did offer a useful means of establishing some common ground between researcher and respondent in the areas of parenthood and human interactions with ICT (Sumsion, 2000). Personal appearance was also a factor in humanising the process as a result of the face to face contact being envisaged (Reinharz and Chase, 2003). Over-dressing might risk implying a formal and hierarchical character to the process, whilst appearing overly casual and familiar risked causing offence or generating doubts in the minds of research subjects about the researcher's competence.

Data collection from parents and carers was achieved in two stages and began with the distribution of a simple questionnaire to every parent / carer with a child in reception and the morning nursery classes. The questionnaire (Appendix ix) was designed to elicit data from the respondents on the incidence of ICT in their home and their children's use of

these technologies both unaided and with support. The results of this survey were fed into a spreadsheet in order to look for patterns and relationships. In Tower school 29 out of a total of 48 parents (60 per cent) responded to the initial questionnaire. In Park school 26 out of a total of 46 parents (57 per cent) responded to the questionnaire. The survey returns made it possible to compare availability of, access to and use of different types of ICT between the respondents, looking for similarities and differences by location, by gender and by the incidence of supported and unsupported interactions between the children and the technology.

Serious consideration was given to the question of whether or not to employ statistical tools such as a T test in an attempt to gauge whether any of the data that emerged from the parents' questionnaire were statistically significant or not. However, as Gorard points out, if research does not involve random sampling then attempting to measure probability through the application of significance tests is a meaningless exercise:

> There is often actually little need for such tests, but in current practice and due to general ignorance of their limitations they retain considerable rhetorical power. (Gorard, 2003, 4.1)

Gorard argues for caution in the application of statistical tools to datasets, particularly where the data has been generated from convenience or snowball samples. Statistical tools only work properly when the sample is truly random, when there is a full response, no dropout rate and no measurement error (Gorard, 2003). The data from the parents' questionnaire fell well short of this measure and so the application of statistical tools risked generating invalid claims from the data. Instead therefore the decision was made to utilise actual and percentage figures only, in both tabular and graphical form and to avoid making spurious claims about statistical significance on the basis of the sacred value of 5 per cent which has no mathematical or empirical relevance (Gorard, 2003). Any patterns and relationships implied or suggested by the questionnaire data could then be explored in more depth during the interviews.

The questions themselves had to be relatively simple and the potential for misunderstandings was ever present; one recipient in Park school for example sought reassurance from a practitioner that the questionnaire was not a ploy to discover which house would provide the best target for a burglary. The more likely problem however was one of data quality. As Fontana and Frey point out the spoken or written word always has: 'a residue of ambiguity, no matter how carefully we word the questions and report or code the answers' (Fontana and Frey, 1998, p.47). A further concern with questionnaires concerns internal and external validity, in particular the threat of the reactive effects that simply completing the questionnaire might have had on the subjects (Fink, 1995a). Careful consideration had to be given to the order and layout of the questions so as not to lead the respondents in any way and as a result of these deliberations the decision was made to keep the format as simple as possible, to focus on the collection of easily quantifiable data.

Questionnaires are thought to be much less effective as a means of exploring more thoroughly beliefs and / or deeply held values that people hold, or for examining complex social relationships or intricate patterns of interaction (Marshall and Rossman, 1999). Although the respondents were able to determine when and how they produced the data, there was no way to be aware of all the factors influencing an individual's choice of response (Gillham, 2000b). When for example parents indicated that their child was using a piece of ICT 'with support' what exactly did they mean by support? It seemed prudent to check. The second stage of the process therefore involved the use of a semi-structured interview with a percentage of the respondents to the questionnaire. The purpose was to explore in more detail the children's ICT experiences and capabilities and to seek insight into the richness or otherwise of children's interactions with new technologies. As a result questionnaire respondents were asked to indicate if they would be prepared to take part in short individual interviews to discuss their child's capabilities and experiences of ICT.

Using a follow-up interview strengthened the validity of the research by checking one source of data by means of another. These interviews also provided a forum and a vehicle to prompt additional disclosures that the questionnaire was ill suited or unable to reveal

or which had previously been overlooked or regarded as lacking in significance by the respondents. The individual nature of the interviews also ensured that respondents' comments could be made confidentially, their anonymity could be preserved and the dangers of an inter-parent dynamic in which unflattering comparisons between children were drawn that could inhibit some respondents were avoided.

A total of 20 parents across both schools volunteered to be interviewed, and it was eventually possible to arrange interviews with the parents of 10 of the children. Six of the parents had a child in Tower school and four had a child in Park school. Following up on additional volunteers from Park school was cut short due to the staff illness reported in the previous chapters. As with any questionnaire there was a risk that those volunteering may have been different in some way from those that did not and that data collected from them would therefore be misleading. While this danger could not be completely eradicated it was possible to examine the questionnaire data to establish whether or not volunteers for interview represented home environments in which the ICT provision seemed unusually comprehensive or parlous in comparison to the other respondents. They did not.

The interviews lasted between 20-30 minutes each. Interviewees were asked if they had any objection to the use of an audio tape recorder and note taking was also used to supplement the tapes. The audio tapes would prove extremely time consuming to transcribe and risked making the interviewees nervous, however the tapes would, if clear, ensure that every word spoken as well as some of the non-verbal data were recorded (Arksey and Knight, 1999). The interview schedule followed the pattern of the questionnaire but also sought to elicit qualitative data on children's capabilities and experiences outside of the home and on parental attitudes towards ICT. The questions avoided any use of technical or educational jargon as this seemed likely to intimidate respondents and had the potential to restrict and inhibit answers. Similarly multi-component and hypothetical questions were also avoided as the former seemed likely to confuse while the latter would offer little insight into respondents' actual actions or experiences (Arksey and Knight, 1999). The schedule did seek to offer respondents an

opportunity to volunteer information on anything that they thought the interview had failed to reveal but this rarely produced anything of any significance as it ran into the problems of memory recall highlighted by Arksey and Knight (1999).

Whilst most of the questionnaire data was essentially quantitative in nature and therefore easily susceptible to conversion into numerical form, the products of the semi-structured interviews with parents resulted in data that was complicated, resistant to conversion into numerical form and varied in levels of abstraction and relevance (Marshall and Rossman, 1999). The task therefore involved not simply textural description and accounts of events but also necessitated structural description in which an attempt was made to interpret and explain events (Moustakas, 1994). A key factor in the analysis and presentation of the data was that emergent understandings would need to be tested and alternative explanations considered. Negative or discrepant data would therefore have to included and considered as part of the analysis (Cresswell, 2003). The use of interviewees' comments also raised problems in that some remarks were relevant to more than one of the emerging themes and so difficult decisions had to made about where best to locate the evidence to support the arguments contained in the thesis.

Transcribing interview data is well known as an immensely time consuming activity and at an early stage some thought was given to the possibility of either simply using the audio tapes themselves or of employing the services of a professional transcriber. However on reflection it was decided that the task of transcribing imposed a discipline and rigour on the process of data collection and analysis and that given the methodological standpoint of the research, the act of transcribing would be an important part of the data analysis. Comments that might be missed or appear innocuous when listening to a tape might assume greater significance when seen in written form. Furthermore the tapes themselves would not provide the complete record that might be expected (Poland, 2003). Although in the main the tapes faithfully recorded the verbal exchanges they did not always offer much insight into some of the non-verbal data that only the interviewer could know. These non-verbal dimensions included a number of elements. Proxemic communication involved the use of interpersonal space to

communicate attitudes. Chronemic communication meanwhile refers to the pacing of speech and the use of silence in conversation. Kinesic communication centred on body movements and posture whilst paralinguistic communication describes variations in volume, pitch and quality of a voice (Gordon, 1980 in Poland, 2003).

The context meanwhile, which was crucial to interpreting the data, involved more than just the interview itself and could involve historical and socially located events that an interviewer might well be unaware of. This meant that an interviewer cannot fully appreciate a context, their understanding of it is inherently incomplete and selective. Consequently transcripts will always be open to alternative interpretations. For this reason it was necessary to acknowledge that trustworthiness is not guaranteed by verbatim reproductions of the verbal exchanges alone (Poland, 2003). Researchers drawing on interview data have to accept that there are inevitable limitations on their ability to present the reader with the full flavour of an interview. The potential for contested meanings and divergent interpretations is unavoidable. In one case a parent described a CD-ROM as voice activated for example when she actually meant that it had a sound track. What needed to be provided therefore was sufficient information to allow others to assess the trustworthiness of both the data and the interpretations put upon it (Poland, 2003).

As with the class-based observations it was important to produce the transcripts as soon as possible after the event. It was at this point that the true extent of the difficulties associated with recording a verbal interaction in written form became apparent. The tendency for both respondents and researcher to employ 'run-on sentences' and for overlapping conversation and meaning being conveyed without the use of any vocabulary made for an apparently chaotic event once seen in written form (Poland, 2003, p.271). Indeed, so chaotic did the raw transcripts appear that they led to a reconsideration of the ethics associated with the process of interviewing. The original intention had been to provide respondents with raw transcripts so that they could challenge them as accurate versions of what had been said should they wish to do so. However, once the transcripts had been produced it was decided that sight of this material alone might dismay and

distress the respondents who might feel they were being presented as inarticulate. Instead it was decided to provide the respondents with copies of the final data analysis which incorporated extracts from the anonymised transcripts.

Further challenges were also presented by the tape quality. The decision to conduct interviews in the settings meant that on occasion they were interrupted by children or adults entering the interview area; in some cases the latter even engaged respondents in passing conversation mid-interview, apparently oblivious as to the consequences. Fortunately such interruptions were rare although the clarity, speed and accent of speech did lead on occasion to some difficulties in discerning exactly what had been said. Some sections had to be listened to repeatedly and confirmation was sometimes sought in terms of coherence (Hodder, 1994 in Poland 2003). However in situations where the tape remained unclear, even after countless attempts to clarify exactly what was being said, this fact was clearly indicated in the transcript rather than inserting what the researcher thought was said. Challenges also emerged in the form of omissions and hearing what one expected to hear. Every part of the tapes, even those sections that were of the best quality, had to be listened to at least three or four times in order to produce the first draft of the transcripts. Given that even the smallest word or punctuation mark can fundamentally alter the meaning of something this was essential if anything approaching a verbatim transcription was to be achieved.

The theoretical technical difficulties associated with transcribing anticipated from earlier reading rapidly became real therefore and some form of standardised and consistent means of recording had to be devised. Silverman's syntax of conversational analysis seemed overly complex and very difficult to manage for a relatively inexperienced interviewer (Silverman, 1993 in Poland, 2003). Consequently an adapted form of Poland's abbreviated instructions for transcribers was employed in an effort to impose a standardised form to the data. Tidying up of data would be post- rather than pre-analysis and the disclaimer that 'some transcription details have been omitted in the interests of readability' adopted for the data analysis sections of the thesis (Poland, 2003, p.272). Further challenges to accurate transcription arose from the fact that the tapes only hinted

at the non-verbal aspects of the discussions. The limited insight into the non-verbal dimension to the interviews provided by the tapes alone coupled with the notational challenges in providing this information for a third party in the form of supporting field notes were key factors in the decision not to employ the services of a professional transcriber.

The analysis of the data gathered through the questionnaire returns and the parent interviews generated five themes, and mirrored some of the themes arising from the school based data:

- The availability of ICT resources to young children in the home.
- Young children's ICT skills, knowledge and use.
- Evidence that children had learned through ICT.
- Social interactions between children their peers and adults whilst using ICT.
- The role, or roles, if any, that parents saw for themselves in relation to their children and ICT.

5.2 'We had one but we've just dropped it in water': Incidence and availability of ICT in children's homes

Research into digital divides suggested that children's access to ICT beyond the classroom might be characterised by disparities as a result of a range of economic and cultural factors (OECD, 2001d). This research did not conduct any in depth detailed assessment of the socio-economic differences between the parents in Tower school as opposed to Park school. However the sample selection did make use of Ofsted inspection reports and their assessment of each of the schools made it clear that they did serve

different communities with different needs. The questionnaire and interview data suggested that overly simplistic notions of a digital divide whereby those with greater economic resources were better equipped technologically were inadequate to the task of explaining children's experiences in the settings involved. If there were digital divides for these children they were more complicated than the haves and the have nots (Selwyn and Bullon, 2000).

The data from the parents' questionnaire produced a similar pattern in terms of the incidence of ICT in the home across the two schools (Appendix x). There were occasional interruptions to access due to accidents or breakage. One parent from Park school for example when discussing mobile phones remarked: 'we had one [mobile phone with camera] but we've just dropped it in water so!' However, high, and very similar, incidences of technologies such as radio, television, video, CDs and DVDs were reported from both locations. Evidence of young children encountering ICT extended well beyond technologies such as television and DVDs. In Tower school for example, 23 out of 29 respondents (79 per cent) reported that their child had access to a PC in the home. The figure for Park school was 19 out of 27 respondents (70 per cent). The incidence of mobile phones meanwhile was higher still; 90 per cent in Tower school and 93 per cent in Park school. Parents in Tower school reported a slightly greater incidence of DVD players (97 per cent to 85 per cent) and digital cameras (54 per cent to 40 per cent). Responses from Park school meanwhile showed slightly more games consoles (81 per cent to 75 per cent).

There was therefore a great deal of similarity in the questionnaire responses across the two schools. If the Ofsted descriptions of the contexts in which the schools were located were accurate then they did not seem to impact greatly on the incidence of ICT in the home. It is a possibility that the questionnaire attracted similar respondents from both locations, hence the similarity in results. The 40 per cent of parents that did not respond to the questionnaire could have been markedly different in some way so as to give a misleading picture. However response rates of 60 per cent are reasonable and the claim here is not that disparity was entirely absent, simply that the differences may be more

subtle and complex and in some cases a matter of degree. For example, digital cameras appeared slightly more common in the questionnaire data from Tower school but they were present in both contexts and interview data hinted that the incidence was likely to increase over time as the new technologies replaced the old. In terms of incidence therefore perhaps this was an example of a digital delay rather than a digital divide.

The questionnaire data did not suggest that the incidence of ICT in the home would be greatly affected by whether the children were in nursery or reception classes. The parents with children who were in the nursery or in reception across both schools that responded to the questionnaire were equal in number and the results showed that the incidence of ICT was very slightly higher in the homes of the nursery children than those of the reception pupils but the differences were very small (Appendix x). There was some evidence however that the incidence of some technology might be affected by the gender of the child. Thirty-three of the parents that responded to the questionnaire had boys in one of the two schools, 23 had girls. The ratio therefore was nearly 3:2 overall. The imbalance was more pronounced in Tower school where 18 of the completed questionnaires referred to boys while only 12 referred to girls. In Park school meanwhile the ratio was 15 boys to 12 girls. The absence of an even, or almost even, split complicated any summary however whilst the incidence of ICT was generally similar for both sexes across the two schools, a higher proportion of the boys in both schools were reported as having access to programmable toys, games consoles and scanners attached to PCs (Appendix x).

It is certainly the case that 'incidence' is not the same thing as 'use'. Although 20 of the boys whose parents responded to the questionnaire had scanners in their homes, only a fifth of these were reported to have had any experience with them, and then only under supervision. The situation could be complicated further by the existence of older siblings which may have masked the true extent of ICT disparities between boys and girls in terms of access and use. The presence of an older brother for example might ensure that there was a games console in the house but it would not necessarily mean that his younger sister was allowed or encouraged to use it.

All of the interviewees meanwhile were female and seven of them remarked on gendered involvement with ICT in the home during interview. One respondent from Tower school stated that both she and her partner shared the role of ICT supporter: 'depends on ... who's about or who they say they would like to come up and help them'. A second interviewee from Park school claimed that neither she nor her partner were: 'any good at computers'. However five of the remaining interviewees all made remarks that suggested degrees of demarcation in the home in relation to ICT. When talking about word processing, saving and printing digital images with her daughter one interviewee from Park school commented that: 'He does all that part'. Another from Tower school remarked that both she and her partner had spent time working on the computer with their son but that it was: 'mainly him actually'. A third parent, also from Tower school, stated in relation to games consoles and similar toys: 'That's Daddy's area'.

5.3 'She knows what to click': Young children's developing autonomy with ICT

The survey asked parents to indicate those technologies in the home that their children were able to operate independently and without any adult intervention or support. Once again, although the picture overall was very similar between the two schools, there were some specific differences. Respondents from Park school reported higher levels of unsupported and independent use of video and DVD players as well as games consoles (Appendix x). In the case of games consoles in particular, independent use as reported by the parents was more than double that reported by parents in Tower school.

The questionnaire responses showed a slight difference in children's ICT experiences between the two schools according to pupil age. Nursery children were reported to be engaging in more independent activity with home computers, CD and DVD players than the older reception children (Appendix x). To suggest that younger children were engaged in more independent activity than the older children appeared counter-intuitive

in that one might expect older children to have acquired greater skills and knowledge and to display higher levels of autonomy and independence. However what the survey could not gauge was qualitative differences in the levels of autonomy and independence displayed by children. Subsequent interview data for example illustrated the presence of dated or obsolescent technology in some homes and on occasions younger children were being given the older, less advanced equipment to cut their teeth on as this equipment was regarded as expendable. It was also the case that the higher number of nursery children from the respondents in Park school could have skewed the results and that in fact the difference was one of location not age range.

When comparisons were drawn between boys' and girls' experiences of ICT without support, a higher proportion of the girls across both schools were independently using video players, CDs and DVD players than the boys. In addition, as a group the girls appeared to be slightly more eclectic in their interactions with ICT with scores in 15 out of a possible 18 columns compared to 11 out of 18 for the boys (Appendix x). However the totals for these additional columns were very small. The data for games consoles and programmable toys meanwhile showed only slightly higher levels of autonomous use by boys. Once again this defied expectation. However what the questionnaire data could not do was to differentiate between the quality of an experience or the time spent on it. The interview data provided a useful counterpoint to the questionnaire data. All of the boys of interviewees had access to a games console of their own (mainly Gameboy or Play Station 2) whilst the girls only had access to someone else's or none at all.

There were further differences in the questionnaire responses between Tower school and Park school in relation to independent use of ICT and gender. Slightly more boys in Park school were reported to be using games consoles independently in comparison to the boys in Tower school. This was consistent with the earlier data on the incidence of these technologies between the two schools. The results for the girls were more striking. Whilst 7 respondents with daughters in Park school reported that their children had made independent use of games consoles, only one respondent from Tower school reported the same (Appendix x). This seemed to support the earlier contention that disparities between

children in terms of ICT were likely to be more complicated than the simple incidence of that technology in their home.

Meanwhile the ambiguity in any written statement meant that the phrase 'without support' could have been interpreted differently by different respondents to the questionnaire (Fontana and Frey, 1998). As a result the concept of autonomous use of ICT by children in the home was explored during the interviews to provide an opportunity to discern any such variations and also to ascertain in more detail exactly what skills and knowledge children were demonstrating. The interviews also enabled data to be collected on children's past ICT competences.

All the interviewees in both schools were able to give examples of young children displaying basic operating skills using a variety of common ICTs in the home such as CD players, televisions, DVD players and computers. In the event of a problem for example, one five year old girl from Park school was reported to be capable of checking battery levels and ear piece connections on her CD walkman before seeking assistance from her parents. One interviewee in Tower school described how her child was able to switch the television On and Off independently at the age of two and was able to use the video player by the age of three. In another example from Tower school, a parent claimed that her child was able to switch the television On and Off, insert videos and press Play under supervision at the age of eighteen months. The parent then went on to describe how the same child, by then aged four and a half years, could now operate three remote controls in conjunction with one another in order to switch on and view the television, video and DVDs. Some of the children proved to be surprisingly adept at working with some complicated and occasionally idiosyncratic systems in order to make use of some technologies. As one parent from Tower school commented when describing the sequence of actions involving two remote controls that her reception aged child had mastered: 'it's a bit complex..... my husband's wired it up funny'.

Another Tower school parent described her five year old's ability with digital television including his ability to switch the interactive resource on using the red button, before

navigating his way around a children's interactive site using the remote control. His mother estimated the emergence of this level of competence at around four and a half years of age. A fourth interviewee with a child in the nursery reported how surprised she had been at her child's level of understanding and competence whilst operating a CD-ROM on the computer:

> *I didn't think she would understand it..... She can't read yet, she can't spell and she can't read the whole word. So she knows mainly by the pictures which... the one she wants.*

A similar picture was described by interviewees with children in Park school. One respondent described how her child was able to switch the television on and off independently at the age of two and was able to use the video player by the age of three. A second parent reported that her child then in the nursery had mastered the Zoom and Fast Forward options on the DVD player and was able to skip over parts of films that she found boring. One interviewee reported that her son could switch the PC on, turn the monitor on, locate particular games on the desk top, make the screen wider and knew the shut down procedure. The fourth interviewee meanwhile claimed that her daughter had been able to use the television's remote control with support from an early age and that by the age of two she was able to adjust the volume, select channels, and change the picture to widescreen.

Estimates of when a child was able to perform a particular task are bound to be questioned in terms of their accuracy. The interviewees were not aware at the time that they were going to be asked about any of these events and so their estimates must be treated with caution. For example the claim by one interviewee in Tower school about her daughter's competences at the age of eighteen months did seem surprising. This said, one interviewee from Park school reported that her daughter, aged four and a half at the time, had been able to enter a six digit number, call her father at work and then put him on speaker phone while her mother worked unawares in the kitchen. The children's capabilities could be surprising on occasion and a rough progression did emerge common to both schools. Technologies such as the television were consistently reported to be operated independently by children from 18 months to two years of age. The ability to

engage in independent operation of video recorders and DVD players (i.e. inserting tapes and discs, playing and stopping) was reported from two to three years. By the time the children were in nursery they had all shown some ability to operate PCs and games consoles of various kinds.

Not only were the children of the interviewees in possession of sufficient manual dexterity and fine motor control necessary to perform simple functions with ICT, the children were also developing their knowledge and understanding of the technology. Parental comments supported the notion that young children were developing a technological literacy i.e. recognising icons and symbols and this was often in spite of being only beginning, or emerging, readers. In talking about their children's experiences with games of various kinds two parents in Tower school reported that their children were able to scroll down menus, select options and play games that required the simultaneous operation of joy stick and buttons. Two of their fellow interviewees suggested that their children were more accomplished users of a Tamogotchi and a Gameboy respectively at four and five years of age than they themselves were. A fifth respondent meanwhile reported how her four-and-a-half year old was able to navigate through an internet site to locate his preferred games. He could drag and drop using the mouse and was proficient at using the arrow keys to be successful in a racing game. His mother stated:

> *He can navigate the car.... there's a timed track and he can navigate it.... along a road and I couldn't even get it to go forward, never mind bends.*

Interviewees from Park school reported similar competences with games. One parent reported that her son could scroll down menus of his Play Station 2, select options and play games that required the simultaneous operation of joy stick and buttons. Another interviewee suggested that her reception child was more accomplished at computer games than she was. One interviewee commented on her son's ability to navigate his way around the menus and levels of his computer games in order to locate a particular game from a list in spite of his lack of reading skills. The fourth parent referred to similar activities that her daughter had experienced when playing with a range of CD-ROMs on

the PC and remarked that her four and a half year old knew that: 'she's got to go back with the menu to, to get to something else'.

'Relationships with the real world come first', yet for many of the children in these two schools, their real world included ICT (Alliance for Childhood, 2004, p.5). As two of the parents demonstrated when playing shops at home with their children, ICT, in the form of Powerpoint and a toy cash till and bar code scanner, was used to support the children's play. What was more, the children were drawing on their experiences of ICT in the world around them to create their play areas and inform their story lines. In the view of the Alliance for Childhood, society needs to 'slow down' and 'honour the developmental needs of children' (Alliance for Childhood, 2004, p.4). Certainly growing up takes time, however ICT need not necessarily be inherently inimical to anything on the Alliance's list whether it be close relationships, direct experience of the world, child initiated play, experience of the arts, hands-on work with tools or rich language experiences. A counter proposal might be to suggest that the obvious enthusiasm of many of the children in Tower and Park schools to engage with ICT suggests that their curiosity and inclination may have:

> .... an inherited base and thus an evolutionary imperative. (Brierley, 1994, p.78)

Rather than viewing the glass as half empty therefore, perhaps it is half full. Perhaps too there is a danger in seeing children as helpless victims. Children are resilient and they have their own ideas. ICT may be of interest to them but so too are other things. As one interviewee made clear when talking about her son and the arrival of warmer weather:

> *He used to be on it* [Gameboy] *everyday, but at the minute he just wants to play out as soon as he comes home.*

5.4 'You learn if you need to know': Learning to learn and learning through ICT

Some of the interview data suggested that young children might be learning through ICT as well as about ICT. Parents in both schools reported instances of children using ICT to reinforce, practice or learn about a range of topics. All six parents with children at Tower school reported that their children had played literacy games such as spelling, letter and word recognition activities through a variety of media including interactive television, literacy CD-ROMs and programmable toys. One interviewee also reported how a toy lap top belonging to her son: 'helps them with numbers..[and]...how to do music'. One of the Tower school interviewees commented in relation to her child's spelling that: 'you learn if you need to know'. She suggested it had improved as a result of him wanting to make a software package work. Another of the respondents meanwhile commented that her son had mastered spelling his name by having to type it out against his score on a computer game. Two parents also reported how family events and personal interests could give an added relevance to some ICT experiences. In the first example one of the nursery children had used his talking book to initiate an exchange with his mother in a discussion about an overseas visit she would shortly be making, saying: 'Mummy you're really going that far aren't you over that bit of sea'. In the second example given, one of the reception children, fascinated by distant people and places, used his ICT skills to watch his Round the World in 80 Days videos and to play with his interactive globe.

In Park school meanwhile one parent reported that her four year old son had mastered counting to 100 in part with the help of a programmable toy. Another mother suggested that her daughter had acquired a rudimentary understanding of co-ordinates as a result of a playing a simple computer game. Three out of the four interviewees reported their children playing literacy games such as spelling games and letter and word recognition activities using the interactive television, literacy CD-ROMs and programmable toys. One of the interviewees for example claimed learning benefits for her son as a result of playing with an interactive toy intended to encourage reading stating that:

Before he didn't know how to spell it you see, but now he can sit with it. He can sit and spell words and what words start with.

Although some of the interviewees were confident about the results of ICT use for their children caution needs to be exercised over the levels of causality being ascribed to ICT use. It is possible that the use of ICT did contribute to children's increasing attainment in other areas such as literacy and numeracy, however it might also be the case that other variables such as maturation or parental instruction could have been just as instrumental in the developments reported. Those most opposed to the inclusion of ICT in young children's experiences could even argue that if progress in literacy or numeracy was real rather than apparent, it could still be in spite of ICT rather than because of it. On balance it seems likely that there may have been a small number of examples where the use of ICT had played some part in children's increasing knowledge and skills more widely but that its contribution needed to be seen in context and alongside other variables. ICT may have provided a stimulus for these activities to take place rather than being the active agent involved in children's learning.

Parents' remarks indicated that the children were constructing and developing their ideas about the uses of ICT more widely too. The area near to Tower school had recently witnessed the construction of a large supermarket that included the facility for self-service bar code scanning of purchases. Three of the interviewees from the school reported how visiting the store had led to discussions and real world activities with their children; giving one child for example the opportunity to: 'see their little computer screens'. These experiences were supplemented back in the home for one child by the technological affordances of certain toys such as a battery powered toy cash till featuring simulation bar code readers (Carr, 2000). A similar example was cited by one of the parents from Park school. She reported that her daughter had been fascinated by chip and pin transactions conducted whilst out shopping and that following a discussion back at home the child introduced the technology into her role play.

Parents' comments also suggested that ICT was providing opportunities at least for children to hone their metacognitive abilities and to practice what some researchers

referred to earlier in Chapter 3 have called super skills or learning dispositions. For one parent in Tower school playing with ICT games was useful because it made children: 'think about how to solve problems'. All six of the parents interviewed in the school remarked on their children's confidence, curiosity and self-management in relation to ICT. All interviewees were able to cite at least one example where their child had received little, if any, formal instruction before demonstrating basic competences with various forms of ICT. The interviewees suggested an innate exploratory imperative or fascination in their children that drew them to engage with the technologies, sometimes with mixed results. As one respondent commented: 'they're always touching the buttons. They were always pressing this and pressing that. In the end the TVs just gave up on us!' Another parent, commenting in general about both of her children, stated in relation to the television and video that in both cases they had shown an interest: 'basically from when they could stand and touch the TV'.

All the interviewees from Tower school reported that their children were able to operate various technologies as a result of watching and imitating others. 'I've never showed them how to use the DVD, it's them, watching me put them on for them and they've thought "Oh well, we'll just do it ourselves"', was just one example of the children's reported urge to imitate adults and operate ICT, however all of the Tower school transcripts contain remarks of this kind. Parents' accounts often featured their surprise at how quickly the children seemed to master operating the technology. One parent remarked about her child's ability to operate the television, video and DVD equipment: 'Really. I only showed her once...and she knew straight away how to do it'. Similarly another parent stated that her daughter: 'picks it up straight away what she's got to do' when describing how she had introduced CD-ROM materials to the child.

All four of the parents interviewed in Park school had also noted how little formal instruction their children had received before demonstrating basic competences with some ICT. One interviewee stated that she found that her child was: 'always wanting knowledge'. A second reported on how her son had: 'just took to it [CD-ROM game] straight away'. Another added: 'You only have to tell [name] something once and the

next time she comes to it....it's still there.....all programmed in'. She continued: 'If you're doing something she wants to be sat there watching you'. The interviewee then reiterated her earlier statement relating to the child's ability to remember simple operating sequences and procedures over time:

> *I felt shocked... I says "What have you done to the computer?" and she goes "I've turned it off." And at that point we'd not told her how.... she'd been watching us.*

Interviewees' comments also hinted at the possible promotion of other dispositions such as concentration, resilience and motivation. Children were reported to be highly motivated and keen to learn when ICT was involved. Parents reported examples of young children demonstrating their abilities to focus, concentrate and persevere when working with ICT and experiencing a sense of achievement. As one interviewee in Tower school commented: 'it gives them a sense of pride when they've done it'. A sense of achievement and success was also raised by two of the parents in Park school, who said:

> *'Quite surprising some of the things he can do sometimes.'*
>
> *'Oh yeah! She can do it all!'*

One mother in Tower school meanwhile remarked when discussing her son and his sibling's use of technologies such as the DVD, video or PC:

> *They are very focussed on what they're doing. I usually get told "Right you go away. We'll shout you if we need you."*

Another interviewee from Tower school had also observed the power of ICT to motivate and captivate her child's attention as she mastered the operation of the television and video in order to watch tapes of her extended family overseas. The levels of concentration and involvement reported by one interviewee in Park school however were such that her son had spent so long playing with his Gameboy when he first received it that the activity had given him headaches.

5.5 'We had a go as well': Peer and family learning

When the questionnaire data was organised to compare the incidence of support for children's encounters with ICT the patterns for the two schools diverged in certain areas. There was more reported intervention on the part of respondents from Tower school in relation to such things as television, video, CDs DVD players, mobile phones, scanners and games consoles. Some similarity between the schools reappeared with the data on digital cameras, PCs and printers yet overall the Foundation Stage children attending Tower school appeared to be receiving higher levels of adult interaction and support with ICT in the home (Appendix x). Differences in levels of adult support were also visible when the data was broken down by gender. Even allowing for the 3:2 disparity in the number of responses between the parents of boys and the parents of girls, questionnaire responses showed that boys, as a group, were experiencing higher levels of support involving video players, games consoles, digital cameras and scanners. The responses for computers, printers and DVDs showed similar proportions for both boys and girls. In one area, that of mobile phone technology, the girls were reported to get much more support than the boys. This begs the question of whether even at this early stage children were already being encouraged to form ideas about 'girls' ICT things and 'boys' ICT things?

As might have been predicted, higher levels of support for the use of some ICTs (e.g. computers, CD and DVD players) was reported for nursery children in comparison to their reception peers. However in other areas the older Foundation Stage children were receiving as much support in the home as their nursery peers. In the case of mobile phone technology meanwhile the incidence of adult support for the older children was double that for the nursery children. A similar pattern on a smaller scale was observed in relation to programmable white goods such as washing machines or microwaves. It is possible therefore that parents across both schools were operating with a model of age related appropriateness when it came to ICT. This suggestion appeared to receive some support from parental comments relating to mobile phones and televisions in children's bedrooms reported in 5.6.

Although interesting, the survey data raised additional questions. Respondents' definitions of the phrase 'with support' needed to be checked in some way. Equally, critics of the use of ICT with young children (Alliance for Childhood, 2000 and 2004) have expressed concern over, amongst other things, the potentially inimical effect that such ICT activities might have on young children's developing social skills and emotional well-being. The detail therefore of what social experiences these activities were affording young children needed to be explored in more depth. This was done as part of the parent interviews and the parents' accounts of their children's experiences with ICT suggested that pessimistic forecasts featuring ICT as a hindrance to children's socialisation may not be the whole story. Parents' comments supported the possibility, if not always the realisation, of opportunities for collaborative and social endeavour involving ICT in the home.

Parents across both schools reported a wide range of activities in which they or their partners had helped their children to develop their practical ICT capabilities. All of the parents in Tower school reported helping their children to learn about ICT at some point. One child was able to play with his father and his uncle on a games console during access visits. Another interviewee had established simple rules and routines with her child on the arrangements for calling for adult help and assistance when needed. All the interviewees had spent time assisting their children to navigate around a variety of CD-ROMS or internet sites. Similarly all six had at various times instructed their children in the basics of how to operate television, video and DVD equipment (e.g. playing, recording, fast forwarding, rewinding films). Two of the interviewees reported that they had engaged in similar instruction involving CD players with their daughters. Five of the six parents interviewed reported that their children answered phone calls in the home using landlines or cordless phones and four of the five also said that they allowed their children to make calls under supervision. Four of the children had also been supported in using digital cameras or digital video cameras to record family outings and events.

In Park school too, each of the parents interviewed reported that they had helped their child to learn about ICT at some point. In the only example of its kind one of the

interviewees described how both parents and an uncle had been involved in helping a nursery pupil to operate an MP3 player while practicing dance moves, stating: 'we had a go as well with her, and she thought it were hilarious'. All four parents confirmed that they or their partner had instructed their children in operating ICT such as televisions, DVDs or videos. One girl had received instruction relating to the family CD player. Three of the children were permitted to answer the phone and the fourth was only prevented by its location rather than any prohibition placed on the activity by parents. Two of the children meanwhile were reported to be allowed to telephone family members under supervision. Two of the children had also been helped to take digital photographs by one or both of their parents. In one case where the child seemed to get a great deal of parental support and encouragement in the use of ICT, the child's photographs were described as 'superb':

> *You know people say "Oh who did you stop to take that photograph?" And.... she's just standing there and she knows until she's got it right she doesn't click.*

In all the interviews therefore parental intervention and support with ICT, centring on the completion of early technical and navigational tasks before leaving children to play relatively autonomously, was routine. Adults from both schools reported navigating through software or the Internet in the early stages of an activity before allowing the children to play more independently with particular materials, for example, the interviewee from Tower school who stated: 'I just leave her in there and she knows what to click'. In another example, a parent from Park school mimicked her four year old daughter saying: 'Oh I've had enough of this one [CD-ROM]. Can I have the other game in'. Parents were mediating the activity by operating the hardware to facilitate the children's access to the software.

Some parents however reported engaging in much more sustained levels of support, often involving elements of learning through ICT as well as learning about ICT and the majority of these claims were made by interviewees from Tower school. One respondent from the school reported spending time with her daughter in front of the PC working with the child on a CD-ROM alphabet game. Another interviewee reported on her efforts to

support her child's developing literacy skills through the medium of ICT saying: 'I've been telling her C-L-O-S-E, close... because she knows her letters'. One interviewee reminisced about her son's learning during a family trip to an interactive science museum in which many of the exhibits incorporated ICT. A fourth described discussing other parts of the world with her five year old son, stimulated by his play with an interactive toy globe. Later in the interview this same parent also described working on the PC with her child using Clip-Art to produce labels for a pretend shop that they had set up. When it came to examples of more sustained interaction between parents and children involving ICT from Park school, only one parent reported encouraging her son to get his talking book, saying: 'we'll sit with it and we read through it and have a game on it'.

In many cases parents were not the only people supporting young children in their encounters with ICT. Older peers and siblings were said to be acting as teachers and role models by the majority of interviewees. All but one of the interviewees from Tower school commented on additional interactions between their child and siblings, cousins or friends during the use of ICT. One parent reported how her young daughter had been on the Internet with her older brother and how in her view it: 'helps having an older brother because they just copy them'. Another child had printed out line drawings from a children's website under the guidance and supervision of his older sister which he then took away to colour in. One parent noted how, when it came to ICT: 'one's always there to back up, just in case something goes wrong'. A fourth respondent commented that there were times when her younger child seemed to prefer to watch his older sister playing on the computer at home: 'He'd rather sit and watch [name] do it because she can get further'.

Similarly, all four interviewees from Park school identified additional interactions between children during the use of ICT. One mother remarked that after school her young son and his older sister regularly went: 'in the front room to do that [play with the PC] while I'm in the kitchen'. Another five year old had been permitted to play simple games on his older sister's mobile phone: 'She was showing him what to do and he could do it then'. The Internet, digital cameras, Play Stations and Gameboys had all been

encountered and played with at friends' houses. A second interviewee from Park school described for example how her daughter had encountered computer games while visiting her cousins: 'She's sitting there.... obviously they've got more advanced games. She's there with this Gameboy X, whatever it was first called'. A third child meanwhile had been inducted into the procedure for gaining access to digital television by an older sibling.

However, the remarks from parents also showed that young children's interactions with older siblings and peers when using ICT could sometimes be less than empowering. At other times older siblings and peers acted as gatekeepers rather than teachers, restricting and sometimes blocking access to the technology. One interviewee in Tower school recounted how her older daughter's friend's computer had 'crashed', reportedly as a result of the actions of her friend's younger brother. Consequently her own daughter sought to deny her younger brother access to the family PC: 'she doesn't let him touch the computer.... and she shouts if he does'. The younger child was relegated to watching his older sibling or had to use the PC while she was away or out. Such behaviour is hardly unique to situations involving ICT. It did mean though that some children might, on occasion, be having ICT experiences that were not as hands-on and interactive as they might at first appear.

5.6 'They want to know everything and you're trying to keep your eye on the ball': The role of the parent

All of the children's parents interviewed in Tower school made reference to the increasing incidence of ICT in their children's lives both at home and at school. One felt uneasy that using ICT equated with cheating or taking the easy option:

> *Everything nowadays is more geared towards that* [ICT] *than as we was at school.....I don't know, it's just the way forward really isn't it. ..... all kids know is the easy option, the easy way out of things isn't it? ..... "Oh we'll just do it on the computer."*

One parent from Park school meanwhile felt that neither she nor her partner were well placed to support their son with ICT at that time:

> *Me and my partner don't use it really because I don't work with computers ..... it's stuck in a bedroom, it doesn't get used .....we're not good at computers.*

For the remainder, two commented that their children's capabilities and experiences were 'frightening' and 'terrible really', but with broad smiles and they and the others accepted ICT as a useful, and in one case embraced it as an 'amazing', resource. In addition all the parents interviewed across both schools saw a role for themselves in relation to their child's access to ICT. Although the point(s) at which individual parents said they would, or had, intervened varied, some common themes did emerge from the interviews; these included risk management, monitoring and control and worthwhileness.

Three of the parents interviewed in Tower school commented on their concerns about their children's health and safety in relation to ICT use. Examples given included moving equipment to prevent accidents, concerns over mains electricity and fears about heat sources. One parent for example made a point of not allowing her child to turn the PC on and off due to her concerns that this might encourage the child to 'play around' with power sockets. Of the comments relating to risk management from the children's perspective almost all were made by parents from Tower school. Only one interviewee from Park school offered an example of ICT being potentially inimical to the health and safety of children when she recounted the story of her son's first encounter with his Gameboy which he had been bought as a Christmas present. The child had been playing with the device 'for ages' at which point he began to complain of headaches and sore thumbs. There were: 'Beads of sweat as well! Concentration!' At this point his parents revisited the instructions, swept aside in the child's initial excitement, and read the recommendation that children spend only 30 minutes maximum at any one time playing.

Interestingly, as a group, the interviewees from Tower school expressed greater concern for the risk their children posed to the technology. One parent was worried about a

recently purchased digital camera saying: 'I haven't trusted her with it on her own ... because I don't want her to break it'. As another interviewee made clear:

> *I don't let her touch it* [camcorder] *too much. No, she's a bit young. She holds it with my hand underneath. I know she could do more but I'm just ... not very relaxed when she's holding the camera.*

Another respondent reported that she and her partner had restricted their young son's access to some equipment because they were: 'frightened he'll drop it really'. A fourth said, in relation to both her children and the family PC: 'No I won't let either of them do that. I don't trust them yet'. Two of the parents felt torn between providing children with experience of ICT and safeguarding the technology itself, for example: 'I don't want to stop them doing things, but ... they've never...attempted to do it on their own'. One of the Park school interviewees stated that she had said to her daughter: '"Don't put your fingers on it!" and she knows not to touch'.

The monitoring and control dimension to the parents' role was universally recognised by all the respondents during interview. Parents reported that they might apparently withdraw while their children were engaged with ICT. One parent in Tower school recorded how she would sometimes take her child onto a children's website: 'then I've left them alone with it while I've nipped out of the room to do something'. One Park school interviewee stated: 'They go into the front room and do that [use the PC] while I'm in the kitchen'. However, this did not mean that parents were uninterested or uninformed about their children's activities, they reported that they were still chaperoning and 'keeping an eye' on the children.

Respondents also pointed out that they had introduced limits and restrictions on some forms of ICT where they feared the consequences of over use. An interviewee from Tower school, when commenting on her son's new games console, said that she thought: 'He would do it more than we would let him because it's very compulsive'. In response to being asked whether her child went on the family PC every day another parent from Tower school responded: 'Oh God no!' A third respondent wanted to make it clear that she had instituted strict controls in relation to the PC and the games console and that her

child was not allowed to spend more than an hour a day playing with either. Limits had also been imposed by her and her husband over how many days a week the child could use the PC; although when seeking clarification on this the restriction turned out to be: 'three or four times a week, plus time at weekends'. In practice therefore this meant up to six days out of seven.

Only one of the interviewees from Tower school allowed their child to have a television in his / her bedroom. The remainder of Tower school interviewees shared an age related concern about readiness and / or appropriateness akin to similar comments about mobile phones. The remarks included statements such as:

She's too young for that.

I think there's an age for that.

He's got nothing in his bedroom at all. He's totally supervised downstairs.

Two of the four interviewees from Park school allowed their children to have televisions, videos and / or DVDs in their bedrooms although the children were not allowed to use them after a certain time. One of the interviewees remarked that although she allowed her daughter to watch DVDs after nursery this was only permitted: 'where I can see her'. The fourth commented: 'she's not having that [TV/DVD 'combi' in her bedroom] for a couple of years yet'. This was interesting given common-sense assumptions on social trends which might lead one to expect a much higher incidence of children with their own television. It was always possible that interviewees were being economical with the truth as that is what they thought was the 'right' answer. However it seems more likely that the parents' remarks were genuine and that for most of them 4 and 5 years of age was too young. That said, 7 or 8 years of age might not be.

The issue of parents' age-related judgements about appropriateness emerged again when interviewees touched on telephone use. One parent from Park school stated that she was trying to keep her child away from: 'mobiles and texting'. Another from Tower school said that she thought her son was 'far too young yet' to be using a mobile phone. Children

from both schools were allowed to and were even supported in the use of land lines and or cordless phones yet this did not extend to the use of mobile phones even though the questionnaire data showed that the technology was present in over 90 per cent of the children's homes. While it was possible that parents may have had health concerns it was curious that not one interviewee from either school made any mention of reports into the possible health dangers from mobile phone signals. As with television the idea of 'readiness' appeared to be being applied by parents based on their appreciation of their children's cognitive, emotional and, possibly, moral well being.

Three of the interviewees from Tower school commented on the tensions and difficulties they sometimes experienced in deciding when and how to introduce ICT to their children. One stated: 'they want to know everything and you're trying to keep your eye on the ball'. Another said of her son's new Play Station:

> *We were very much in debate about electronic dummies and whether he should have one or not..... we did sort of agonise on it, we were in a moral dilemma.*

Two of the Park school respondents also made similar comments. The parents of the child who had experienced headaches as a result of over-using his new Gameboy for example had instituted new routines following that experience and all future episodes involving that particular toy had to take place downstairs to facilitate adult monitoring (albeit at arms length). What is more, his parents now intervened when they judged that the child had spent long enough on the toy even though he would get: 'really upset when you take it off him'. A second respondent in Park school spoke openly about her parental role to be a teacher when it came to ICT. Once she had acquired the skill of taking short videos with the digital camera then she would be able to teach that skill to her daughter.

The third theme to emerge in relation to the role of the adult was the notion of worthwhileness, a notion which seemed allied in part to their views on readiness. For some worthwhileness was defined by the acquisition of technical competences (learning about ICT). Others cited the contribution that ICT could make to children's learning in other areas such as literacy (learning through ICT). One interviewee from Park school

hinted that there might be differences of opinion between parents and carers over what was and was not worthwhile endeavour. She said of her child: 'I'd prefer him to go on the Internet on a CITV or Ceebeebies website than sit and play on Play Station for two hours personally. Now his dad would probably disagree'. A parent in Tower school remarked: 'I would rather they learned... I don't want them simply chucked in front of a Play Station and left to it because I don't agree with it'. All of the interviewees in Tower school were concerned that ICT activity should be worthwhile in some way, at least for part of the time.

Comments from parents at Tower school suggested a strong correlation between worthwhileness and educational in parents' minds. What is more, some parental comments suggested a clear division in the minds of the respondents that made them between playing and learning, for example:

There's two games which are actually learning.

It's not as though they play. Although they're games, they're learning games.

Similar concerns were not made explicit during the interviews with parents in Park school. One respondent was entirely relaxed about her child's penchant for 'fighting games', after all as his mother pointed out: 'He plays fighting games when he's outside as well so it's no different'. In contrast one parent in Tower school made it clear that her child's possession of a games console was contingent on his not playing games that involved any shooting and killing. The compromise solution of football had been the answer.

5.7 Summary

The questionnaire and subsequent interview data produced a picture characterised by a number of similarities across the two locations. Overall levels of ICT in the home showed broadly the same peaks and troughs when compared. Equally parents from both schools reported a very similar progression in terms of children's acquisition of basic ICT

operating skills starting with televisions and moving on to video and CD players, DVD players and then PCs and games consoles of various kinds. Parents from both schools also reported their belief that experience of ICT had afforded their children opportunities to learn through the technology and to hone generic learning dispositions and super skills.

In spite of the broad similarities between the responses from parents across both schools there were also some differences. The incidence of some technologies did vary according to location. DVD players and digital cameras were more often reported by parents from Tower school whilst the reverse was true for games consoles. Similarly, the levels of independent use of technologies like games consoles appeared higher in Park school. Examples of parental support in the use of ICT meanwhile were more frequent in the responses from parents in Tower school. This is not to say however that parents from Park school saw no role for themselves; they did. However, the policing and monitoring aspect of this role appeared to be accompanied by a higher degree of pedagogical and sustained involvement amongst the respondents from Tower school. Finally there was some evidence to suggest that in the case of technologies such as games consoles and mobile phones, children's use, both independent and supported, was different according to gender.

Chapter 6

Conclusions and contribution to the field

The research set out to investigate the technological dimension of early childhood, both in educational settings and beyond. In so doing it sought to paint a picture of young children's ICT experiences and capabilities in four nursery and reception classes from two schools in the maintained sector. This chapter draws together key elements from the previous chapters to set out the contribution of the research in terms of both methodology and professional knowledge. The following chapter outlines and makes recommendations on:

- the melding of beneficence with a phenomenological methodology to create a hybrid, collaborative approach to the research in which participants were potential beneficiaries of the process, not simply subjects or respondents;
- the children's experiences and capabilities with ICT in the case study settings;
- the usefulness of the existing early learning goals as a means of assessing and reporting on the children's attainment;
- the children's experiences and capabilities with ICT in the home and beyond.

6.1 Methodological contribution

The research was characterised throughout by a commitment to the principle that participants should be beneficiaries of the process too. An early example of this approach centred on the baseline survey. The data obtained not only enabled the formulation of the concept of the typical setting (albeit *fuzzily* so), but also provided the LEAs involved with a snapshot or benchmark on the incidence and use of ICT in their areas; potentially very useful for local policy makers and advisory teams alike. The collaborative approach also manifested itself in the work in the Middleham nurseries and classrooms. Both

curriculum development for children and staff development took place during the fieldwork as resources and training were introduced at various points. For some children this meant the emergence of a working floor robot where before there had only been a broken one. Others found the toy radios in the outdoor play area replaced by working walkie-talkies. In one setting the children's nativity stories in small world play could now be recorded using the digital camera. Staff meanwhile were supported in a variety of ways whether by having an additional adult in the classroom at certain times, or through additional resourcing with which to realise their teaching plans or through feedback on pupil attainment. One of the practitioners was even supported in running in-service training on her work with ICT at an event for early years practitioners across the LA. The relationship with parents too was seen through the lens of beneficence. The parent interviews were viewed as an exchange of information. Not only did parents have important things to say about their children's experiences with ICT in the home they also had a right to know about their children's experiences and achievements in the nursery / classroom.

Building such a trade off into the research design carried with it risks. Any intervention in the contexts would undermine the claim to be pursuing a phenomenological methodology and opened the research up to the criticism that the interventions had in effect changed the phenomena under scrutiny and so polluted the data; what was being researched had, in effect, ceased to correspond to the model of a 'typical' setting. Yet there were good reasons for taking these risks and utilising a hybridised methodology, nor were the interventions unfettered.

To begin with the *quid pro quo* nature of the relationships greatly improved the likelihood that access would be granted. Secondly the focus of the research should not be confused with the purpose of the baseline survey. The latter was an attempt to identify broad based criteria against which to gauge approximations to typicality. But this was simply a means of identifying potential samples; the research itself was concerned with much more. To make judgements on children's ICT capabilities and the usefulness of existing documentation, or to paint a picture of events that would resonate with early

years practitioners elsewhere required some of those new technologies to be *in situ* and in use; 'no opportunity' would mean no research. What is more, in all cases any ideas and equipment introduced had to fit into the practitioners' existing plans. Practitioners moreover retained, and used, the power of veto on what was and was not tried.

Thirdly there were also good ethical reasons for pursuing greater collaboration with research participants as part of a hybrid methodology. An underlying tenet of the research throughout was that those amongst whom the research was being conducted should also benefit from the process. The benefits accruing to researchers from being granted access to a particular context are clear but the advantage for those being researched may be less obvious. The benefits of the research ought to flow to all the participants if the relationship was not to be seen as essentially exploitative. Adopting a more participatory style was a means of contributing to professional development for staff, enhanced curriculum experiences for children and information for parents. The complexity and diversity of the contexts coupled with the youth of some of the participants meant that ethical principles such as autonomy, justice and confidentiality had to be constantly interpreted and reinterpreted. While non-malfeasance was a minimum requirement in this process of interpretation, beneficence was seen as fairer and more desirable.

6.2 Professional knowledge: Young children's experiences and capabilities with ICT in the case study settings

The children in this study demonstrated a wide range of ability and interest in relation to learning about ICT. Young children's experiences and capabilities with ICT in the case study settings showed considerable similarities. Most children had mastered a range of basic skills and many were enthused and excited by the opportunity to work with these new technologies. In spite of this diversity, it was possible to identify numerous instances which seemed to indicate that as well as learning about ICT, its inclusion in the early years curriculum offered new opportunities for most young children to learn through the technology. For a number of the pupils it appeared that ICT offered a new means for

exploring how the world works; for example it could be argued that some children were exploring the schema of transporting through exploratory play with floor robots, and the schemas of trajectory and rotation through teacher-initiated activities with drawing software. Equally there was however some evidence to suggest that the motivating power of ICT might be less than universal, with some young children reacting to its introduction with rather less enthusiasm than others. It was also noted that the high levels of excitement that could result from the introduction of new ICT into the classroom, risked producing an initial drop in the quality of children's play and work until such time as the novelty had worn off.

The introduction of ICT also offered new and different forums within which children had opportunities to demonstrate generic learning skills and dispositions. These included problem solving skills and exploring new outlets for inventiveness and creativity. Practitioners, for example, reported instances of children melding imagination with purpose as they invented original telephone conversations in response to imagined scenarios and problems (DfES, 2004). They also reported individual instances of problem solving, trial and error, high levels of motivation, concentration, resilience and perseverance.

In group or whole class activities involving electronic or interactive whiteboards, practitioners were able to use the technology to promote collaboration and communication. Group activities, meanwhile, such as working with floor robots or the digital video camera, also provided plenty of scope for children to work together rather than in isolation. ICT provided scope for social skills to be practiced and developed. While activities involving ICT could be individual, they frequently involved children in working with a partner or small group. Even apparently isolated tasks such as children working independently in a corner on the class PC, included moments of interaction and discussion between peers or between pupils and practitioners. At the same time the children's youth meant that their social skills were sometimes less developed than their technical capabilities. There were examples of group activity involving ICT being

defined more by the fact that a number of children were adjacent to one another rather than as a result of the activity constituting a truly collaborative learning experience.

While there was much that was potentially beneficial to children's experiences with ICT there were aspects that could be developed further. General improvements in the availability of equipment for example were not necessarily accompanied by developments in pedagogy. Pre-existing teaching and learning approaches sometimes proved resilient to change in spite of the introduction of ICT. In some cases there were structural impediments to any changes, for example the non-existence of digital video equipment or whiteboards mounted above the level of young children. In other cases the reasons were located in practitioners' perceptions of teaching and teachers; the day to day realities of trying to juggle a multitude of conflicting priorities; and a narrower interpretation of the term ICT itself. It also became clear in discussion with practitioners that some children were more enthused than others by the introduction of ICT. It may be that there are groups of children with whom practitioners will struggle to locate any excitement or interest in ICT and for whom they will need to adapt their teaching approaches.

Developing practice does not take place in a vacuum and constitutes a process rather than an event. The key to changes in teaching and learning lie in training rather than in additional documentation and even resources, both of which should be seen as co- rather than pre-requisite. Such training also needs to go far beyond the maintained sector. Set against the diversity of provision in the private and voluntary sectors, maintained early years settings appear almost uniform in comparison. The research conducted here involved just two schools from a possible total of 274 maintained settings in the LA. Yet the parallel private and voluntary sector was a huge provider of early years care and education. The under fives educated in the Authority's nearly 260 private and voluntary settings, was 40 per cent of the total at around 10,000 children in all. Every type and size of institution was represented in this sector from relatively large private fee paying nursery schools to very small local playgroups catering for 10 children or less. To date there is little or no research on the incidence or use of ICT in the private and voluntary

sector at all, although the suspicion must be that the resources of a small voluntary playgroup are unlikely to match those of a maintained school.

6.3 Professional knowledge: The usefulness of the existing early learning goals as a means of assessing and reporting on young children's attainment

The Curriculum guidance for the foundation stage and the Foundation Stage Profile were regarded as useful up to a point by practitioners (QCA, 2000b; QCA, 2003). They had certainly ensured that ICT was firmly on the early years curriculum map. However, when practitioners engaged with the detail of the statements they quickly identified a degree of ambiguity. Whilst some children's capabilities with, and comments on, ICT might be easy to locate within the documentation for the Foundation Stage, other assessments were harder to do using the model of progression contained in the existing guidance. Children's development of ICT skills, knowledge and understanding may be much more uneven and complicated than the picture offered by the QCA at present. For example, some children's ICT knowledge and awareness may prove to be well ahead of their practical capabilities.

Introducing such documentation nationally into contexts in which many practitioners were previously steeped in a Key Stage 1, National Curriculum culture was likely to result in many practitioners concentrating on the criterion-referenced early learning goals and their accompanying stepping stones at the expense of the underlying guiding principles of high quality early years provision that apply irrespective of the subject or area of learning (QCA, 2000b). Revised documentation, like increased equipment levels, was an important prerequisite for developing ICT in early years education but may prove to be insufficient on its own to support practitioners in developing their knowledge and understanding of the 'what' and 'how' of ICT in the early years. Somehow practitioners were being expected to make the connection between the guiding principles and the subsequent early learning goals largely unaided. Yet this expectation was unrealistic

given the inevitable ambiguity of any written documentation allied to the relative lack of ICT expertise and confidence amongst much of the population charged with implementing the guidance. To this could be added the day-to-day exigencies associated with being an early years practitioner. The sheer relentlessness of the role meant that time to reflect on learning and teaching involving ICT in the early years was in short supply.

The existing documentation for ICT in the early years therefore seems only partly useful as a means of guiding practitioners in planning and stage managing good quality, appropriate, ICT experiences; or in assessing and reporting on young children's attainment.

6.4 Professional knowledge: Young children's experiences and capabilities with ICT in the home and beyond

The young children involved in this research across both settings were learning about and through ICT in the home environment and some of the themes emerging from the school and nursery based data were also evident in data from the home. Parents reported that their children were acquiring ICT experiences in the home with some technologies that they also used in school (e.g. PCs) as well as others that they did not (e.g. telephones, digital video cameras, remote operated toys). There were some technologies that the children were only encountering at school such as interactive whiteboards. However in many respects young children in the home were using a wider range of equipment, with greater levels of autonomy at earlier ages than was the case in school and nursery. In one sense it almost seemed as though the largest digital divide was that between children's experiences in school and those at home. This is not necessarily surprising given that they had to share less and that their time was largely their own and their parents.

Respondents also claimed that ICT had contributed to their children's learning more widely. While it was hard to gauge the validity of claims for specific outcomes such as learning 'to count to a hundred' due to other potential variables such as maturation, there

was data that lent support to the proposition that engaging with ICT could provide another medium for the development of certain super skills and learning dispositions. The majority of parent interviewees believed that ICT was motivating, and promoted concentration, perseverance and a sense of pride and achievement in children. All the participants claimed to have worked alongside their child at some point on activities involving ICT, although the levels and extent of the 'support' varied. Respondents also pointed to the impact, both supportive and inhibiting, that siblings, other family and friends could have in relation to social and collaborative learning. A number of the young children involved did find their ICT experiences in the home mediated on occasion by older siblings, delegated in turn by their parents. These experiences could be double edged socially and pedagogically where on occasion support morphed into a struggle for hegemony over the technology.

The interviewees, without exception, saw a role for parents in mediating between children and the technology in some way. Whilst three of the interviewees expressed concern about children's physical safety at some point during their interviews, the majority were more worried about the safety of the equipment. All of the respondents saw an element of monitoring and control as central to their role as parents, although different respondents argued for more or less liberal environments. Respondents were also unanimous in making age-related judgements about children's readiness for different manifestations of ICT, prime examples being unsupervised access to TV, DVD and videos in children's bedrooms or the use of mobile phone technologies. Younger children appeared to be receiving higher levels of support and guidance with technologies such as DVD and video players while their slightly older peers were experiencing higher levels of mediated experiences related to games, mobile phones and programmable white goods. When it came to gender meanwhile boys qualified regularly for higher levels of adult engagement across both schools, the only exceptions involving computer related activities where there was a rough parity and mobile phone use where girls appeared to be in receipt of more adult input than the boys.

Parents' remarks meanwhile suggested a hierarchy of input and involvement between themselves and the children, ranging from policing to 'teaching'. Some of the respondents, particularly from Tower school, articulated the view that they ought to play a pedagogic role in teaching children about and through ICT. The concept of worthwhileness was also present in the thinking of many of the respondents, calculated in part at least by the perceived educational value of the hard- or software. Respondents from Tower school reported consistently higher levels of parental involvement with the exception of PC related activity where there was a rough parity. The reasons why this might have been the case were beyond the scope of this thesis, however research elsewhere suggests that the root of any digital divide would depend primarily on income or education. Other variables such as household size and type, age, gender, racial and linguistic backgrounds and geographical location could also have been contributory factors (OECD, 2001d). When set against the fact that half the world's population has never even made a telephone call, the differences in the children's home experiences noted in this research hardly seem worthy of the term digital divide (OECD, 2001d). Certainly any differences present were not always clear cut or easy to explain. However, although the differences in terms of access and opportunity were not as extreme as the one cited above the fact remains that even a relatively small difference could confer a potential advantage on one group or another.

In neither context was there any evidence of organised or ongoing partnership arrangements between home and school concerning ICT of the kind, for example, to be found relating to communication language and literacy. Written guidance for parents on the part ICT played in their children's school and nursery experiences was restricted to, at the most, the briefest of statements in parental handbooks. If communication or dialogue was taking place between home and school relating to ICT it was clearly infrequent, informal and oral. Given the centrality of the concept of partnership in high quality early years provision, there could well be an untapped resource here for practitioners. Equally, practitioners could do much to help parents identify ways in which they could support their own children.

6.5 Recommendations

New technologies present practitioners with pedagogical challenges. The constantly changing nature of ICT will result in a corresponding need for regular or continuous updating of skills and knowledge relating to the operation of the technology. However, whilst speculating about what forms future ICT in schools may take seems unlikely to produce many accurate predictions, it is possible to make recommendations relating to the original aims of the research which were concerned with:

- young children's experiences and capabilities with ICT in maintained nursery / reception settings;
- the usefulness of the existing early learning goals as a means of gauging young children's ICT capabilities;
- young children's experiences and capabilities with ICT in the home and beyond.

The research has also thrown up additional questions relating to young children and ICT which would be worthy of further study. This final section therefore addresses:

1. The role of the practitioner in learning and teaching with ICT in the early years;
2. Curriculum documentation;
3. Partnerships with parents;
4. Further research.

1. The role of the practitioner in learning and teaching with ICT in the early years

Whilst research evidence might build up steadily over time, early years practitioners are charged with improving young children's experiences of ICT now. Planning and stage managing the introduction of new technologies into all aspects of the early learning environment would be a start and this process would be made all the more easy for those practitioners who were clear that ICT involves much more than just the PC and the

indoor area. In addition to the provision of equipment that is transparent and easy to operate, teachers must teach (Siraj-Blatchford and Siraj-Blatchford, 2002). Participatory interaction and assisted performance will help to make the most of the technology and the learning opportunities inherent in imaginative and exploratory play with ICT (Meade, 2000). Practitioners already routinely get involved and scaffold children's learning in the role play area, during outdoor play or at the writing and mark making table. The same involvement with ICT needs to take place to assist children in showing an interest in ICT, operating equipment, performing simple functions, recognising everyday uses of ICT and incorporating ICT to support their learning (QCA, 2000).

2. Documentation

The four tiers of attainment with their apparently increasingly more demanding descriptions of attainment are in need of review (QCA, 2000b). Research into the field of ICT in early years education has increased since the publication of the original early learning goals in 2000. The statements for ICT could be revisited and possibly redrafted with a view to trying to craft updated and improved statements that do greater justice to young children's ICT knowledge, understanding and skills and that are clearer for practitioners. While it is tempting to suggest revision as the answer, revising documentation should be seen as a contributory factor in improvements to provision rather than as a magic bullet. Reviewing the current Curriculum guidance and other documentation would be a national project and is not an option open to practitioners locally.

Relying solely on devising improved or ideal national criteria misses the point that no matter how good the eventual criteria are, they will always be open to interpretation and will be applied by practitioners who are far from uniform in their views on ICT or the contexts within which they work (Knight, 2001). Replacing one criterion-referenced model with another, no matter how carefully crafted, would still expose practitioners to the tension inherent in any criterion-referenced system between clarity and manageability. To borrow from Hargreaves, perhaps you do not change what

practitioners are achieving by subjecting them to more of the same either (Hargreaves, 2003, p.12). The answer may lie not so much in yet more criteria but in enhancing practitioners' capacity for learning in order to be able to adapt and respond quickly and flexibly to change. Calls for early years practitioners to be knowledgeable about the curriculum, to be in partnership with parents and to engage in high quality and sustained involvement with young children to foster reflection and autonomy are not new (Sylva et al, 2003). At a national level therefore updating or reworking the early learning goals may or may not take place but the issue of good practice needs to be approached from another direction too by supporting and training local practitioners in knowing about and implementing good practice with ICT in the early years.

3. Partnership with parents

Partnerships with parents are a key component of the underlying principles of the existing Curriculum guidance for the foundation stage (QCA, 2000b). Effective partnership can help parents to exert a positive influence on their child's progress through their attitudes towards education and the support they give. The potential gains for children and their teachers include motivation, the acquisition of skills and knowledge and positive relations. Parents may also constitute a motivated and interested potential reservoir of ICT skills and knowledge that practitioners could benefit from. Practitioners should therefore offer parents strategies and ideas for how they can support their children's learning about and through ICT in ways that do not necessarily assume access to expensive computer technology in the home. Practitioners ought also to reinforce the message for parents that ICT is as well as, not instead of, the many other activities that can benefit children. Spending time with, playing with and showing an interest in the child during activities involving ICT is a start and offers a good way of developing children's practical ICT skills. This can involve:

- pointing out and, or using ICT in the home giving children the chance, with supervision where appropriate, to switch things On and Off, change channels,

play, rewind, fast forward and record, change CDs or DVDs, using the mouse, clicking and double clicking;

- playing with the child for example using programmable or remote controlled toys, computer games, musical keyboards, or taping and playing back the child's own songs;
- drawing children's attention to the use of ICT in the world around them for example in pelican crossings, bar code readers in the local library or chip and pin systems in shops.

4. Further research

The suggestion that ICT might provide a new medium through which children can practice and develop generic learning skills and attitudes as well as finding out about the world needs to be explored further. Perhaps those children observed engaging in self-initiated repetitive actions using 'Fresco' were just being disobedient. Perhaps the children experimenting with the Pixie were simply 'messing about'. But equally perhaps their actions were a manifestation of something more, possibly associated with schema, an innate drive to learn about the world and how it works. Similarly there were tantalising glimpses of children displaying creativity, inventiveness, problem solving, social skills, resilience and other learning dispositions. If, as suggested, efforts to create a knowledge society should be aimed at developing a population's capacity for learning, then the potential of ICT to support this in the early years by promoting young children's learning dispositions or super skills should be investigated.

There remains however the issue of those children left unmoved by new technologies. Not all children like books; not all children like outdoor play; it seems strange therefore to expect that, uniquely, ICT could have universal appeal. Some of the data gathered in this research, coupled with common sense, would suggest this is not the case. Who these children might be, why they are un- or less interested and what, if anything, should be done as a result are all potential areas for future research. Research may also be needed in the private and voluntary early years sector. Little or no research into ICT practice and

provision currently exists here yet this extraordinarily diverse sector constitutes a substantial percentage of early years providers across the country.

Finally there may be issues related to social justice that need investigating. Class, gender, race and disability did not form part of the original focus for this study and the study has carefully sought to avoid making any unsubstantiated claims in this area. However, some of the data gathered has suggested that children's experiences could be influenced by factors such as gender and / or location. Furthermore, the characteristics of both the settings involved here meant that potential issues relating to race or disability were unlikely to emerge at all. As a result further research might usefully investigate:

- the impact of social class on young children's ICT experiences;
- the ICT experiences of young girls;
- ICT and young children with disabilities;
- the use of ICT in multi-ethnic settings or with young children for whom English is an additional language.

In conclusion, for most young children in the UK today ICT forms a part of their everyday first hand experiences in and out of nursery / school. This does not mean that practitioners and parents should throw caution and professional judgement to the wind, rather that they should acknowledge that ICT offers tools that have the potential to extend and enhance existing early years provision. It is for practitioners and parents, in the light of examples of good practice, and ideally in collaboration, to exercise their judgement about what to use, what not to use, when to use it and how to use it, in order to realise that potential.

References

Ager, R. and Kendall, M. (2003), Getting it Right From the Start: A Case Study of the Development of a Foundation Stage Learning and ICT Strategy in Northamptonshire, UK, http://crpit.com/confpapers/CRPITV34Ager.pdf

Alliance for Childhood (2000), Fools Gold: A critical Look at Computers and Childhood, www.allianceforchildhood.org

Alliance for Childhood (2004), Tech Tonic: Towards a New Literacy of Technology. www.allianceforchildhood.net/projects/computers/pdf_files/tech_tonic.pdf

Anderson G. T. (2000), Computers in a Developmentally Appropriate Curriculum, Young Children, March, pp. 90-93

Appleyard D. (1997), Switched-on kids, Parents, April

Arksey H. and Knight P. (1999), Interviewing for Social Scientists: An introductory Resource with Examples, London, SAGE Publications

Arnold C (1999), Child Development and Learning 2-5 years: Georgia's Story, London, Hodder and Stoughton

Athey C (1990), Extending Thought in Young Children: A Parent-Teacher Partnership, London, Chapman

Aubrey C., David T., Godfrey R. and Thompson L. (2000), Early Childhood Educational Research: Issues in Methodology and Ethics, London, Routledge Falmer

Bailey R. and Farrow S. (1998), Play and problem-solving in a new light, International Journal of Early Years Education, Vol. 6, No. 3

Baker P. (1999), If this was the computer we could hear the lion go roar – Information and Communications Technology in Early Years Education, in Abbott L. and Moylett H. (Eds), Early Education Transformed, London, Falmer Press

Bassey M. (1995), Creating Education Through Research: A Global Perspective of Educational Research for the 21st Century, Newark, Kirklington Moor Press / British Educational Research Association

Bassey M. (1998), Fuzzy Generalisation: an approach to building educational theory, Paper presented at the British Educational Research Association Annual Conference, The Queen's University of Belfast, Northern Ireland, 27-30 August, www.leeds.ac.uk/educol/documents

Bassey M. (1999), Case Study Research in Educational Settings, Buckingham, Open University Press

Bell J. (1987), Doing your research project, Milton Keynes, Open University Press

Benjamin J. (2000), It makes you think, Nursery World, March

Bertram, T. and Pascal, C. (2002). Effective Early Learning Programme: Child Involvement Scale. www.eddept.wa.edu.au/lc/pdfs/involvementworkshop.pdf

Blenkin G. and Kelly V., (2000), The Concept of Infancy – A Case for Reconstruction, Early Years, Vol. 20, No. 2, pp. 30-38

Bonnett M. (1994), Children's Thinking: Promoting understanding in primary schools, London and New York, Cassell

Brierley J. (1994, 2nd Edition), Give me a child until he is seven: Brain Studies and Early Childhood Education, London, The Falmer Press

British Broadcasting Corporation (2002), Teacher training on computers 'poor', http://news.bbc.co.uk/1/hi/education/1921381.stm

British Educational Communications and Technology Agency (BECTA) (2000), Early Years Education and ICT, www.becta.org.uk

British Educational Communications and Technology Agency (BECTA) (2002), Young People and ICT, www.becta.org.uk/youngpeopleict

Broadfoot P. (2000), Comparative Education for the 21st Century: Retrospect and Prospect, Comparative Education, Vol. 36, No. 3, pp. 357-371

Bruce T. (1997, 2nd Edition), Early Childhood Education, London, Hodder and Stoughton

Burnett C., Dickinson P., Merchant G. and Myers J. (2004), New portals for digikids: reflections on writing on screen, paper delivered at Annual Research Conference, School of Education, Sheffield Hallam University, 17th March

Carr M. (2000), Technological affordance, social practice and learning narratives in an early childhood setting, International Journal of Technology and Design Education, Vol.10, pp.61-79

Christensen P. and James A. (2000), Childhood Diversity and Commonality: Some Methodological Insights, in Christensen P. and James A. (Eds), Research with Children: Perspectives and Practices, London, Routledge Falmer

Clark A. (2004), The mosaic approach and research with young children – commentary, in Lewis V., Kellett M., Robinson C, Fraser S. and Ding S. (Eds), The reality of research with children and young people, Thousand Oaks and London, Sage

Clark A., McQuail S. and Moss P. (2003), Exploring the Field of Listening to and Consulting with Young Children, DfES, Research Report RR445

Cohen L., Manion L. and Morrison K. (2000, 5th Edition), Research Methods in Education, London, Routledge Falmer

Commission of the European Communities (2001), Report from the Commission: The Concrete Future Objectives of Education Systems, European Commission, Brussels

Cooper B. and Brna P. (2002), Hidden Curriculum, hidden feelings: Emotions, relationships and learning with ICT and the whole child, Conference Paper, English and Welsh Educational Research Association

Corsaro W. A. and Molinari L. (2000), Entering and Observing in Children's Worlds: A Reflection on a Longitudinal Ethnography of Early Education in Italy, in Christensen P. and James A. (Eds), Research with Children: Perspectives and Practices, London, Routledge Falmer

Craft A. (1999), Creative development in the early years: some implications of policy for practice, The Curriculum Journal, Vol.10, No.1, 135-150

Cresswell J. W. (2003, 2nd Edition), Research Design: Qualitative, quantitative and mixed methods approaches, Thousand Oaks and London, Sage

Cross M. (2006), Breaking down class barriers: The government is putting millions into IT for schools. But will suppliers benefit more than the pupils?, Thursday January 19th, www.guardian.co.uk/Archive

Crossley M. (2000), Bridging Cultures and Traditions in the Reconceptualisation of Comparative and International Education, Comparative Education, Vol. 36, No. 3, pp.319-332

David M., Edwards R. and Alldred P. (2001), Children and School-based Research: 'informed consent' or 'educated consent'?, British Educational Research Journal, Vol.27, No.3, pp.347-365

David T. (Ed) (1998), Researching Early Childhood Education: European Perspectives, Paul Chapman Publishing Ltd., London

Dawes L. (1999), Chalk and the interactive whiteboard: media representations of teachers and technology, Conference paper, British Educational Research Association

Denscombe M. (2002), Ground Rules for Good Research: A 10 Point Guide for Social Researchers, Maidenhead, Open University Press

Department for Education and Children's Services South Australia (1996), Curriculum Framework for Early Childhood Settings: Foundation Areas of Learning, Adelaide, DECS

Department for Education and Employment (1997a), Excellence in Schools, www.dfee.gov.uk/

Department for Education and Employment (1997b), Starting With Quality. The 1990 Report of the Committee of Inquiry into the Quality of the Educational Experience offered to 3- to 4-year olds, chaired by Mrs. Angela Rumbold CBE MP, HMSO

Department for Education and Employment, (1997c), Connecting the Learning Society, DfEE, London

Department for Education and Employment (1998), Circular Number 4/98. Teaching: High Status, High Standards, DfEE, London

Department for Education and Skills (2001), Towards Full Employment in a Modern Society, www.dfee.gov.uk/

Department for Education and Employment (2004) Report of the National Advisory Committee on Creative and Cultural Education, DCMS/DfEE, 1999. DfES

Department for Trade and Industry / Department for Education and Employment (2001), Opportunity for all in a world of change, www.dti.gov.uk/

Developmentally Appropriate Technology in Early Childhood (DATEC) Project (2001), www.ioe.ac.uk/cdl/DATEC

Donaldson M. (1978), Children's Minds, Fontana Press, London

Drake J. (2001), Planning Children's Play and Learning in the Foundation Stage, London, David Fulton

Edgington M. (1998, 2nd Edition), The Nursery Teacher in Action: Teaching 3, 4 and 5-Year Olds, London, Paul Chapman Publishing

Edgington M. (2002), The Great Outdoors: Developing children's learning through outdoor provision, London, The British Association for Early Childhood Education

Edwards A. and Knight P. (1994), Effective Early Years Education: Teaching Young Children, Buckingham, Open University Press

Elkind D. (1996), Young Children and Technology: A Cautionary Note, Young Children, Vol. 51, No. 6, pp. 22-23

EURYDICE (Information Network on Education in Europe) (2000), Information and communication technology in education systems in Europe, 4th Edition, Office for Official Publications of the European Communities, www.eurydice.org/

Field J. (2000), Researching Lifelong Learning Through Focus Groups, Journal of Further and Higher Education, Vol.24, No.3, pp.323-335

Fink A. (1995a), How to design surveys, Thousand Oaks, Sage Publications

Fink A. (1995b), How to ask survey questions, Thousand Oaks, Sage Publications

Fontana A. and Frey J. H. (1998), Interviewing: The art of science, in Denzin N. K. and Lincoln Y. S., (Eds), Collecting and Interpreting Qualitative Materials, Sage Publications, London

Freedman T. (2001), Primary effects, The Guardian, 12th June

Gardner J., Lewis A. and Pring R. (2004), Revised Ethical Guidelines for Educational Research (2004), British Educational Research Association, Nottingham

Gillam B. (2000a), Case Study Research Methods, Continuum, London and New York

Gillam B. (2000b), Developing a Questionnaire, Continuum, London and New York

Goodwin W. L. and Goodwin L. D. (1996), Understanding Quantitative and Qualitative Research in Early Childhood Education, New York, Teachers College Press

Gorard S. (2003), Understanding probabilities and reconsidering traditional research training, Sociological Research Online, Vol.8, No.1, www.socresonline.org.uk/8/1/gorard

Greig A. and Taylor J. (1999), Doing Research with Children, London, Sage Publications

Grenier J. (1999), Screen Watch, Nursery World, 25th March

Guba E. G. and Lincoln Y. S. (1998), Competing Paradigms in Qualitative Research, in Denzin N. K. and Lincoln Y. S., (Eds), The Landscape of Qualitative Research, London, Sage Publications

Hall K. (2004), Changing perspectives on knowledge: implications for doctoral research and professional roles, Key note speech, Doctoral day for research students in education, Sheffield Hallam University, 8th May

Hargreaves A. (2003), Teaching in the Knowledge Society: Education in the age of insecurity, Maidenhead, Open University Press

Haughton E. (2000), Hurdles for screen stars, The Guardian, Tuesday 15th February www.guardian.co.uk/Archive

HMI, (1989), Information Technology from 5 to 16: Curriculum Matters 15, Department of Education and Science, London

HMI, (1992), The education of children under five, Department of Education and Science, London

Hodge M. (1999a), Time for a fresh game plan, The Guardian, 16th March www.guardian.co.uk/Archive

Hodge M. (1999b), Goals are vital in early learning, The Observer, 3rd October, www.guardian.co.uk/Archive

Holmes R. M. (1998), Fieldwork with children, Thousand Oaks California, Sage Publications

Hyson M. C. (1994), The Emotional Development of Young Children: Building an Emotion Centered Curriculum, New York, Teachers College Press

Isaacs S. (1951, Abridged Edition), Social Development in Young Children, London, Routledge Kegan Paul

Jones P. W. (1998), Globalisation and Internationalism: Democratic Prospects for World Education, Comparative Education, Vol. 34, No.2, pp. 143-155

Keenan T. (2002), An Introduction to Child Development, London, Sage Publications

Kelly K. (2000), False Promise, US News Online, 9th February, www.usnews.com/

Kenny J. (2001), Ofsted critical of £230m training, Times Educational Supplement, 8th June, www.tes.co.uk/

Kerawalla L. and Crook C. (2002), Children's Computer Use at Home and at School: context and continuity, British Educational Research Journal, Vol.28, No.6, pp.751-771

Keyes C. R., (2000), The early childhood teacher's voice in the research community, International Journal of Early Years Education, Vol. 8, No. 1

Kienbaum J. and Trommsdorff G. (1999), Social development of young children in different cultural systems', International Journal of Early Years Education, Vol. 7, No. 3

Knight P. (2001), Assessment Series No.7 A Briefing on Key Concepts: Formative and summative, criterion and norm-referenced assessment, Learning and Teaching Support Network

Lawton D. (1989), The National Curriculum, in Lawton D. (Ed), The Education Reform Act: Choice and Control, London, Hodder and Stoughton

Levin B. (2001), Reforming Education: From Origins to Outcomes, London, Routledge Falmer

Litosseliti L. (2003), Using Focus Groups in Research, London, Continuum

Lochrie M., (1999), Time to play as you learn, The Guardian, 23rd March, www.guardian.co.uk/Archive

Loveless A. (2003), The Role of ICT, London, Continuum

MacNaughton G., (1998), Who's got the power? Rethinking gender equity strategies in early childhood, International Journal of Early Years Education, Vol. 5, No. 1

Markopoulos P. and Bekker M. (2003), Interaction design and children, Interacting with Computers, Vol. 15, No. 2 pp.141-149

Marshall C. and Rossman G. B. (1999, 3rd Edition), Designing Qualitative Research, Thousand Oaks, Sage Publications

Mason J. and Steadman B. (1996), The significance of the conceptualisation of childhood for promoting children's contributions to child protection policy, www.aifs.org.au/external/institute/afrcpapers/mason.html

Matthews J. and Jessel J., (1993), Very young children and electronic paint: The beginning of drawing with traditional media and computer paintbox, Early Years, Vol. 13, No. 2, pp. 15-22

Mayall B. (1999), Children and Childhood, in Hood S., Mayall B. and Oliver S (Eds), Critical Issues in Social Research: Power and Prejudice, Buckingham, Open University Press

Mayall B. (2000), Conversations with Children, in Christensen P. and James A. (Eds), Research with Children: Perspectives and Practices, London, Routledge Falmer

McNair S. (2000), The Emerging Policy Agenda, in OECD, Schooling for Tomorrow: Learning to Bridge the Digital Divide, www.oecd.org/

McVeigh T. and Paton Walsh N. (2000), Computers kill pupils' creativity, The Observer, 24th September

Meade A. (2000), If you say it three times, is it true? Critical use of research in early childhood education, International Journal of Early Years Education, Vol. 8, No. 1

Meltz B. F. (1998), Computers: software can harm emotional, social development, Boston Globe, 10th January, www.boston.com/globe/columns/meltz

Monteith M. (1998), A new golden age? New technologies and learning, in Cashdan A. and Overall L. (Ed), Teaching in Primary Schools, London, Cassell

Moran-Ellis J. and Cooper G. (2000), Making connections: Children, Technology and the National Grid for Learning, Sociological Research Online, Vol. 5, No. 3, www.socresonline.org.uk/5/3/moran-ellis.html

Moustakas C (1994), Phenomenological Research Methods, London, Sage Publications

National Association for the Education of Young Children, (1996), NAEYC Position Statement: Technology and Young Children – Ages Three through Eight, Young Children, Vol. 51, No. 6, pp. 11-16

National Association of Advisers for Computers in Education and British Educational Communications and Technology Agency, (2001), Key Characteristics of Good Quality Teaching and Learning with ICT: A discussion Document, Nottingham, NAACE / BECTa

National Curriculum Council (1990), Curriculum Guidance 3: The Whole Curriculum, York, NCC

Office for Standards in Education (1995), Information Technology: A review of Inspection Findings 1993/4, London, Ofsted

Office for Standards in Education (2000), Annual Report of Her Majesty's Chief Inspector of Schools 1998-99, www.official-documents.co.uk

O'Hara M. (2004), ICT in the Early Years, London, Continuum

Oppenheimer T. (1997), The Computer Delusion, The Atlantic Online, www.theatlantic.com/

Organisation for Economic Co-operation and Development (2000a), Early Childhood Education and Care Policy in the United Kingdom, www.oecd.org/

Organisation for Economic Co-operation and Development (2000b), Schooling for Tomorrow: Learning to Bridge the Digital Divide, www.oecd.org/

Organisation for Economic Co-operation and Development (2001a), Learning to change: ICT in schools, www.oecd.org/

Organisation for Economic Co-operation and Development (2001b), E-Learning: The Partnership Challenge, www.oecd.org/

Organisation for Economic Co-operation and Development (2001c), ICT: School innovation and the quality of learning – progress and pitfalls, www.oecd.org/

Organisation for Economic Co-operation and Development (2001d), Understanding the Digital Divide, www.oecd.org/

Paige-Smith A. (2002), Parent partnership and inclusion in the early years, in Miller L., Drury R. and Campbell R, Exploring Early Years Education and Care, London, David Fulton

Papert S. (1993, 2nd Edition), Mindstorms: Children, Computers and Powerful Ideas, Cambridge Massachusetts, Perseus Books

Passey, D., Rogers C., Machell J. and McHugh G. (2004). The Motivational Effect of ICT on Pupils. University of Lancaster, DfES Research Report No.523

Passig D. and Levin H. (2000), Gender preferences for multimedia interfaces, Journal of Computer Assisted Learning, Vol.16, No.1, pp.64-71

Philips A. (2000), Making play pay, The Guardian, 17th May

Pierce P. L. (1994), Technology Integration into Early Childhood Curricula: Where We've Been, Where We Are, Where We Should Go, ERIC / EECE Publications Digests, www.ericeece.org

Pinnell H. (2004), Making a friend of the computer, Report, London ATL

Plowman L. and Stephen C. (2003), INTERPLAY: Play, Learning and ICT in Pre-School Education, www.tlrp.org/proj/phase111/Scot_extc.html

Poland B.D. (2003), Transcription Quality, in Holstein J. A. and Gubrium J. F.(Eds), Inside interviewing: new lenses, new concerns, London, SAGE

Prentice R. (2000), Creativity: a reaffirmation of its place in early childhood education, The Curriculum Journal, Vol.11, No.2, pp145-158

Qualifications and Curriculum Authority (1998), Curriculum for under-fives: Conference Report. The Review of the Desirable Outcomes for children's learning on entering compulsory education, www.qca.org.uk/edunder5.

Qualifications and Curriculum Authority (1999), The National Curriculum: Handbook for Primary Teachers in England, London, QCA

Qualifications and Curriculum Authority (2000a), A Curriculum for the Foundation Stage, London, QCA

Qualifications and Curriculum Authority (2000b), Curriculum guidance for the Foundation Stage, London, QCA

Qualifications and Curriculum Authority (2003), Foundation Stage Profile Handbook, www.qca.org.uk/ca/foundation/

Reidy H., (1992), No sticky fingers, please, Child Education, July

Reinharz S. and Chase S. E. (2003), Interviewing Women, in Holstein J. A. and Gubrium J. F.(Eds), Inside interviewing: new lenses, new concerns, London, SAGE

Revell P., (2001a), State of the nation, The Guardian, 12th June, www.guardian.co.uk/Archive

Revell P., (2001b), A long way to go yet, The Guardian, 12th June, www.guardian.co.uk/Archive

Ring K. (2000), Young children talking about their drawings: methodological dilemmas, Paper presented at the British Educational Research Association Annual Conference, Cardiff University, 7-10 September

Robertson J. (2002), The ambiguous embrace: twenty years of IT (ICT) in UK primary schools, British Journal of Educational Technology, Vol.33, No.4, pp.403-409

Robson C. (1993), Real World Research, Oxford, Blackwell

Roffey S. and O'Reirdan T. (2001) Young Children and Classroom Behaviour: Needs, Perspectives and Strategies, London, David Fulton

Sarama J. (2003), Technology in Early Childhood Mathematics: *Building Blocks* as an Innovative Technology Based Curriculum, Buffalo and Wayne State, State University of New York

Savage D. (2004), Is everyone keeping up?, Report, London, ATL

Sayeed Z. and Guerin E. (2000), 'Early Years Play', London, David Fulton Publishers

School Curriculum and Assessment Authority (1996), Nursery Education: Desirable Outcomes for Children's Learning on Entering Compulsory Education, London, SCAA

School Curriculum and Assessment Authority (1997), Looking at Children's Learning: Desirable Outcomes for Children's Learning on Entering Compulsory Education, London, SCAA

Select Committee on Education and Employment, (2000), Memorandum from the Qualifications and Curriculum Authority (EY 83), www.publications.parliament.uk/

Selwyn N. and Bullon K. (2000), Primary school children's use of ICT, British Journal of Educational Technology, Vol.31, No.4, pp.321-332

Selwyn N. (2003), Increased use of electronic learning resources will not overcome the key issues of social exclusion and the digital divide, Opening talk at ALT-C 10th Annual Conference, 'Conference Debate', Sheffield

Sharp J., Potter J., Allen J. and Loveless A. (2000), Primary ICT: Knowledge, Understanding and Practice, Exeter, Learning Matters Ltd.

Sharman C., Cross W. and Vennis D. (1995), Observing Children: A Practical Guide, London, Cassell

Sheffield Hallam University (2000), Research Ethics, Policies and Procedures 1: Research Involving Human Participants, SHU

Siraj-Blatchford J. and Siraj-Blatchford I., (2002), Guidance for Practitioners on Appropriate Technology Education in Early Childhood, www.ioe.ac.uk/cdl/datec

Smidt S. (2002, 2nd Edition), A Guide to Early Years Practice, London, Routledge Falmer

Smithers R., (2000), Blunkett attacks leftwingers who 'sneer' at change, The Guardian, 12th May, www.guardian.co.uk/Archive

SMSR Ltd. (June 1999), Review of Desirable Learning Outcomes Consultation Report, SMSR Ltd., www.smsr.co.uk

Soler J. and Miller L. (2003), The Struggle for Early Childhood Curricula: a comparison of the English Foundation Stage Curriculum, Te Whariki and Reggio Emilia, International Journal of Early Years Education, Vol.11, No.1, pp.57-67

Strahan H. (1994), You feel like you belong: Establishing partnership between parents and educators, in Abbott L. and Rodger R. (Eds), Quality Education in the Early Years, Buckingham, Open University Press

Sumsion J. (2000), Negotiating *Otherness*: a male early childhood educator's gender positioning, International Journal of Early Years Education, Vol. 8, No.2

Sweeting A. (1996), The Globalization of Learning: Paradigm or Paradox?, International Journal of Educational Development, Vol. 16, No.4, pp. 379-391

Sylva K., Melhuish E., Sammons P., Siraj-Blatchford I., Taggart B. and Elliot K. (2003), The Effective Provision of Pre-School Education (EPPE) Project: Findings from the Pre-school Period, London, Institute of Education

The Stevenson Report, (1997), ICT in School Commission 1996/7, www.ultraweb.anglia.ac.uk

Turbill J. (2001), A researcher goes to school: Using technology in the kindergarten literacy curriculum, Journal of Early Childhood Literacy, Vol. 1, No.3, pp.255-278

Vandevelde M. (1999), Planetary influences, in Abbott L. and Moylett H. (Eds), Early Education Transformed, London, Falmer Press

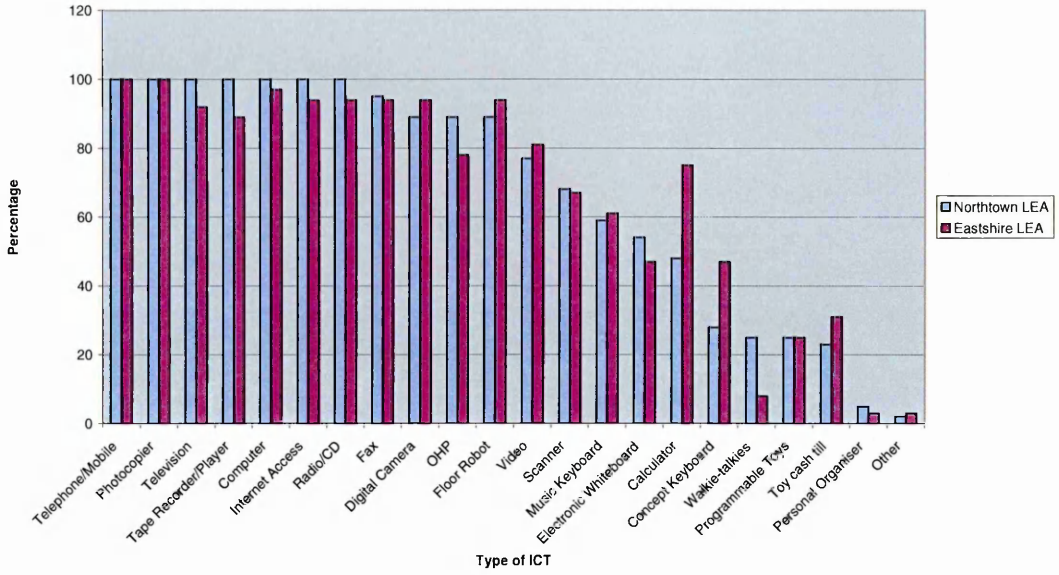
Wellington J. (2001), Exploring the Secret Garden: the growing importance of ICT in the home, British Journal of Educational Technology, Vol.32, No.2, pp.233-244

Wood D. (1998, 2nd Edition), How children think and learn, Oxford, Blackwell

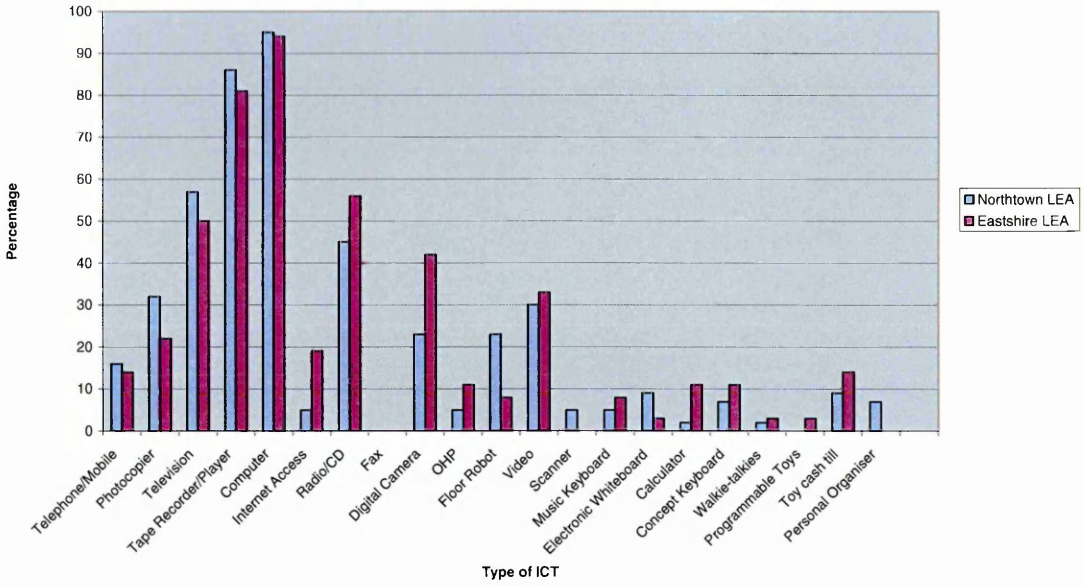
Communication, language and literacy (QCA, 2000, pp.62-63)	What does the practitioner need to do?
Know that information can be retrieved from books and computers	Use books, other reference materials and computers with the children to answer their questions and provide instructions
Show an understanding of .... how information can be found in non-fiction texts to answer questions about where, who, why and how	Encourage children to add to their first-hand experience of the world through the use of books, other texts and information and communication technology (ICT)
Mathematical development (QCA, 2000, pp. 80-81)	**What does the practitioner need to do?**
Instruct a programmable toy	*(No additional examples given)*

Knowledge and understanding of the world (QCA, 2000, pp.92-93)	What does the practitioner need to do?
Show an interest in ICT	Give opportunities to control a programmable toy, e.g. a floor robot. Help children to become aware of technology around them in the setting, local environment and home, e.g. washing machines, street lights, telephones, cash registers and burglar alarms. Stimulate all children's interest in ICT and other technology.
Know how to operate simple equipment	Teach simple skills of using equipment, e.g. switching on and off. Help children understand how things work by giving them opportunities to take apart and reassemble, e.g. telephones and radios. Build on ICT skills children develop at home.
Complete a simple program on the computer and / or perform simple functions on ICT apparatus	Teach and encourage use of ICT in the setting, e.g. tape recorder and headphones, programmable toys and clicking on different icons to cause different things to happen on a paint program. Provide opportunities in role play areas to use ICT. Introduce the correct language in conversations, e.g. the names of technological equipment and the operations performed on them, such as 'eject', 'double click', 'rewind' and 'crash'.
Find out about and identify the uses of everyday technology and use information and communication technology and programmable toys to support learning	Give opportunities for the use of ICT to develop skills across the areas of learning, e.g. a talking word processor to develop language and communication, vocabulary and writing, talking books for early reading, a paint program to develop early mark making, a telephone for speaking and listening, CD-ROMs, video and television and musical tapes to find things out. Encourage children to observe and talk about the use of ICT in the environment on local walks, e.g. traffic lights, telephones, street lights, barcode scanners to identify prices in shops. Encourage children to show each other how to use ICT equipment.

Availability of ICT resources



ICT resources used weekly or more often



Month / Year	Nursery / classroom observations	Parents' questionnaire	Parent interviews	Practitioner interviews
Sept. 2004	Negotiating access and remit / making preliminary observations.			
Oct. 2004	Observations ongoing (see schedule below for dates). Observation protocol replaced by naturalistic notes.	Questionnaire distributed.		Staff remarks recorded using naturalistic notes.
Nov. 2004		Questionnaires collected.		
Dec. 2004		Data input into Excel.		
Jan. 2005			Interview volunteers at Tower School contacted and interview dates arranged.	
Feb. 2005				
Mar. 2005			Interviews at Tower School completed.	
Apr. 2005				
May 2005			Interview volunteers at Park School contacted and interviews conducted.	
June 2005				
July 2005				Group interview with practitioners at Tower School conducted.

Nursery / Classroom Observations	
Setting	Date
PARK SCHOOL	20/10/04
TOWER SCHOOL	21/10/04
PARK SCHOOL	4/11/04
TOWER SCHOOL	10/11/04
PARK SCHOOL	15/11/04
TOWER SCHOOL	22/11/04
PARK SCHOOL	29/11/04
TOWER SCHOOL	2/12/04
PARK SCHOOL	6/12/04
TOWER SCHOOL	8/12/04

TOWER SCHOOL	13/1/05
TOWER SCHOOL	19/1/05
PARK SCHOOL	20/1/05
TOWER SCHOOL	26/1/05
PARK SCHOOL	4/2/05
TOWER SCHOOL	7/2/05
TOWER SCHOOL	28/2/05
TOWER SCHOOL	2/3/05
PARK SCHOOL	16/3/05
TOWER SCHOOL	17/3/05
TOWER SCHOOL	18/3/05
TOWER SCHOOL	6/4/05
TOWER SCHOOL	8/4/05
TOWER SCHOOL	14/4/05
PARK SCHOOL	21/4/05
PARK SCHOOL	27/4/05
TOWER SCHOOL	4/5/05
PARK SCHOOL	10/5/05
PARK SCHOOL	12/5/05
PARK SCHOOL	25/5/05
PARK SCHOOL	7/6/05
TOWER SCHOOL	16/6/05

Parent Interviews	
Setting	Date
TOWER SCHOOL	28/2/05
TOWER SCHOOL	17/3/05
TOWER SCHOOL	18/3/05
TOWER SCHOOL	18/3/05
TOWER SCHOOL	6/4/05
TOWER SCHOOL	14/4/05
PARK SCHOOL	12/5/05
PARK SCHOOL	12/5/05
PARK SCHOOL	7/6/05
PARK SCHOOL	7/6/05

Staff Group Interview	
Setting	Date
TOWER SCHOOL	18/7/05

Date..... Time.....
Location.....

Participant(s)					
	years	months		years	months
	years	months		years	months
	years	months		years	months

Description	Comment

Appendix v - Sample transcripts of contemporaneous notes

**** - Using PC in nursery
Good mouse control, v. careful and precise.
Starts with a line of dots followed by horizontal lines followed by circles.
Knows which is the print icon and can print her work.
Picks up a software box, turns it over and points to an icon on the packaging, *'That takes you home, you click on that to go out of it.'*
'I've got a computer at home but it's bigger than this one and it's a different colour. I go on Ceebeebies.'
'It's a magic computer cos when it prints the thing moves by itself.'

****** – Using PC in nursery
Good mouse control, quite fluid
'I'm going to draw my family'
Researcher – *'I thought Mrs ***** wanted you to draw some patterns?'*
'It's going to be a pattern family.'
Draws a horizontal line of dots
'I'm drawing my doggy.'
Researcher – *'What's his name?'*
'Spike. That's his lead. I'm drawing him bad. He's got one of those things to stop him licking his bottom cos he's got a sore bottom.'
Draws a series of left to right lines.
'That's the wind.' Waves her hand to emphasise / illustrate the movement of the wind.

******, ***** and **** - Using a floor robot
****** holds **** finger as he inputs instructions using the buttons.
She helps him to input a simple sequence and explains her thinking i.e. where the Pixie will go (visualising the route in her mind?)
Pixie starts. When it doesn't go where ****** planned they move the brick obstacles to match the route the robot actually takes.
***** *'It's like a taxi!'*
**** puts his own commands in randomly and starts the Pixie. He then watches to see what happens. He repeats this on numerous occasions in collaboration with ***** (trial & error).
****** leaves ***** & **** to work with a second Pixie independently.

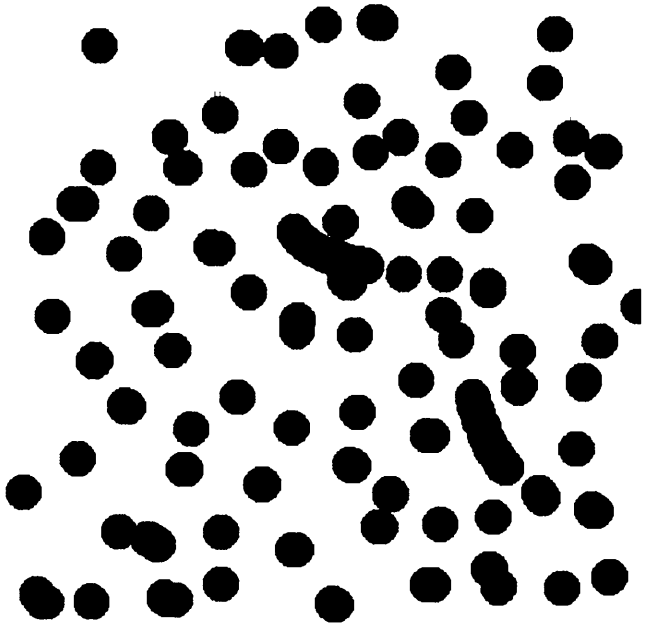
***** – Using PC in ICT suite
Excellent mouse control, very confident, keen to experiment with tools and options.
Points to a tool icon – *'That bucket is for filling in.'*
Takes over previous child's drawing and uses the fill tool to fill in numerous white spaces.
Researcher – *'Would you like to make the pen smaller?'*
'I don't want it smaller I want it big, let me show you.'

Selects pen options and starts to experiment – *'Hey look at that!'* (To other children) *'Watch this. Look at that. Good isn't it.'*
(To Researcher) – *'How do you clear it off?'* Researcher demonstrates and ****** then remembers and clears the screen. He then repeats this numerous times independently. Doesn't actually get a print out because he erases every time.

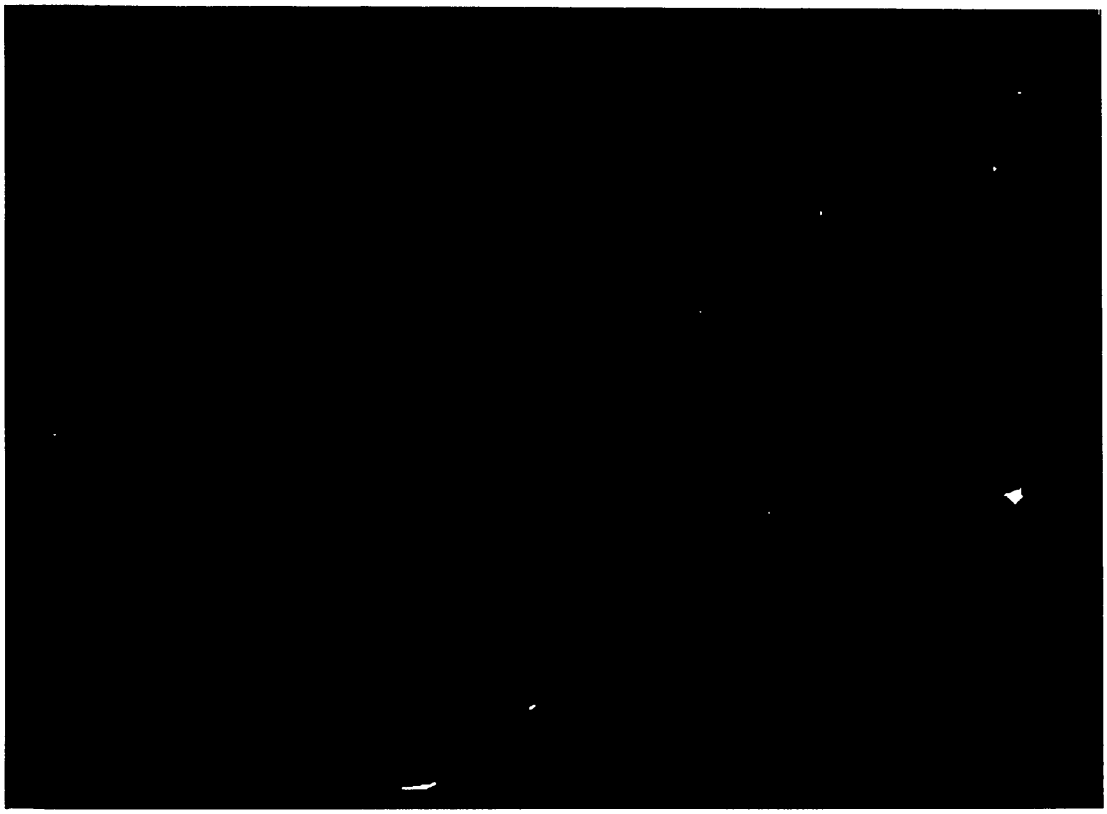
***** & *** - Tidying up time in the nursery.
Two girls slip away from tidying up to play with the computer while staff are busy clearing away with the rest of the children.
Researcher to ***** - *'Have you got a computer at home?'*
'Yes but it's broken. I have to go on mummy's lap top.'
Draws a picture for her dog and dedicates / signs it using the mouse!
*** takes over and uses a spiralling technique to locate the cursor over particular locations.
Very determined, shows considerable concentration and perseverance.
When asked if she would like help at one point she replied – *'I'll do it.'*

Title	Explanation	Examples
Enveloping / enclosure	* Going round /through boundaries * Containing / wrapping / covering	Covering self with face cloth Wrapping 'presents' Covering dolls / teddies in blankets Dressing up in hats, scarves, cloaks etc. Putting things in bags / boxes / other containers
Rotation	* Dynamic circular / rotation * Semi-circularity * Radial (i.e. fascination with wheels, spokes) * Orientation (i.e. looking at things from different viewpoints e.g. upside down)	Observing washing machines Interest in trucks / cars / other vehicles with wheels Helicopters Repeatedly drawing circles Enthusiasm for toys / games with rotating parts e.g. tops / kaleidoscopes / Lego wheels
Trajectory	* Dynamic: - vertical / up and down lines - horizontal / back and forth / side to side lines * Trajectory (travelling / moving) * Diagonality (i.e. curiosity about diagonal lines)	Deliberately dropping things Playing with running tap water Climbing up / jumping off furniture / apparatus Drawing / painting lines Playing with toy vehicles Making 'trains' i.e. lining up objects bricks / chalks / stickers / figures Throwing and catching balls Engaging in certain household chores e.g. mopping / sweeping
Transporting	* Climbing over / under / on top of objects * Taking objects from one place to another * Positioning objects in specific / particular places	Role play involving moving people or objects Becoming drivers / pilots taking other children on a journey Moving / carrying play materials and other equipment in the indoor and outdoor areas
Connection	* Joining things * Dismantling things	Using string / cord to tie things together. Undoing shoe laces Fascination with zips, buttons, velcro, glue, staplers, sticky tape and other means of joining things together Playing with construction kits i.e. Lego
Others	* Orientation * Ordering * Transforming * Correspondence	Changing position to look at things from different perspectives. Turning things around. Sequencing things by height, width etc Changing colours / shapes / properties using malleable materials, paints or foodstuffs Matching objects i.e. 1 cube in each pot

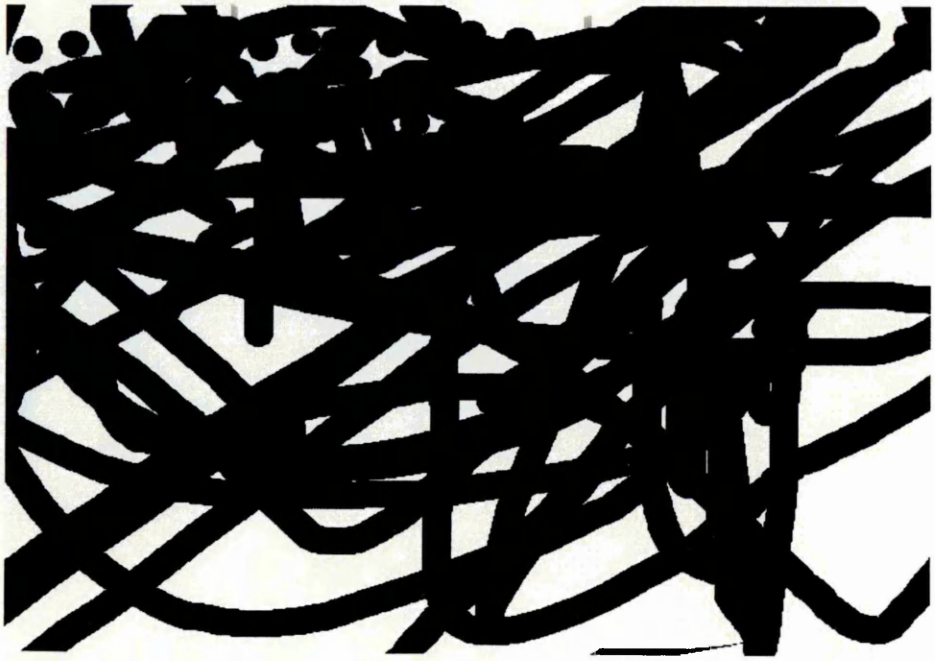
Polka dot pattern



'Dark palace'



'That's the wind'



'Mummy'

Levels of Involvement	The Child Involvement Signals
Level 1. Low Activity Simple, stereotypic, repetitive & passive. Child is 'absent'; displays no energy. An absence of cognitive demand.	**Concentration** - Child's attention is directed toward the activity. Nothing can distract the child from his/her deep concentration.
Level 2. Frequently Interrupted Activity Child is engaged in activity but half of the observed period includes moments of non-activity, (i.e. not concentrating / staring into space).	**Energy** - Child displays effort and is eager and stimulated. E.g. loud talking, or pressing down hard on the paper. Mental energy can be deduced from facial expressions which reveal 'hard' thinking.
	Facial Expression and Posture - Distinguish between 'dreamy empty' eyes and 'intense' eyes. Posture revealing high concentration or boredom.
Level 3. Mainly Continuous Activity Child is busy at an activity but at a routine level and the real signals for Involvement are missing, e.g. some progress but energy is lacking and concentration is at a routine level. Child can be easily distracted.	**Complexity and Creativity** - Child freely mobilises his/her cognitive skills and other capabilities in more than routine behaviour. Child involved cannot show more competence - he/she is at his/her very 'best'. Child exhibits an individual touch and what she/he does furthers his/her creative development. Child is at the very edge of his/her capabilities.
Level 4. Continuous Activity with Intense Moments Child's activity has intense moments & this level of activity is resumed after any interruptions. Stimuli from the surrounding environment, however attractive, cannot seduce child away from the activity.	**Persistence** - The duration of the concentration at the activity, e.g. he/she will not let go of the activity easily & wants to continue with the satisfaction / intensity it gives him/her. Prepared to put in effort to prolong it. Not easily distracted. Duration / persistence can be dependent on age / development of the child.
Level 5. Sustained Intense Activity Child shows continuous and intense activity. Not all signals for Involvement need be there, but the essential ones must be present: concentration, creativity, energy and persistence. This intensity must be present for almost all the observation period.	**Satisfaction** - Child displays sense of pride / achievement.
	Precision - Child shows special care for his/her work and are attentive to detail.
	Reaction time - Child is alert, reacts quickly to any stimuli introduced e.g. child 'flies' to activity and shows prolonged motivation and keenness.
	Language - Child shows activity has been important to him/her by their comments e.g. ask for activity to be repeated / state that they enjoyed it.

(Bertram and Pascal, 2002).

Information and communications technology project

Parents' questionnaire

This research is trying to find out just how much young children know about information and communications technology (ICT).

ICT can include a wide range of technologies such as computers, mobile phones, programmable washing machines, games consoles, digital cameras, television, video, DVD players, programmable toys and many others.

We would be grateful if you could take 5 minutes to complete this simple questionnaire.

1. Is your child a girl or a boy? *(Please tick the appropriate box)* **Girl** ☐ **Boy** ☐

2. What is your child's date of birth? **Day** ☐☐ : **Month** ☐☐ : **Year** ☐☐

3. What sorts of ICT do you have at home? *(Please tick the boxes that apply)*

Television	☐	Programmable washing machine	☐
Video player	☐	Burglar alarm	☐
CD-player	☐	Digital camera	☐
Radio	☐	Digital video camera	☐
DVD player	☐	Computer	☐
Mobile phone	☐	Printer	☐
I-pod	☐	Scanner	☐
Programmable toys	☐		
Games console	☐		

Any others *(Please list)*:

i. .....

ii. .....

iii. .....

4. What sorts of ICT does your child use ***without*** any help? *(Please tick the boxes that apply)*

Television ☐

Video player ☐

CD-player ☐

Radio ☐

DVD player ☐

Mobile phone ☐

I-pod ☐

Programmable toys ☐

Games console ☐

Programmable washing machine ☐

Burglar alarm ☐

Digital camera ☐

Digital video camera ☐

Computer ☐

Printer ☐

Scanner ☐

Any others *(Please list)*:

i. .....

ii. .....

iii. .....

5. What sorts of ICT does your child use ***with*** help? *(Please tick the boxes that apply)*

Television ☐

Video player ☐

CD-player ☐

Radio ☐

DVD player ☐

Mobile phone ☐

I-pod ☐

Programmable toys ☐

Games console ☐

Programmable washing machine ☐

Burglar alarm ☐

Digital camera ☐

Digital video camera ☐

Computer ☐

Printer ☐

Scanner ☐

Any others *(Please list)*:

i. .....

ii. .....

iii. .....

Thank you for taking the time to complete this questionnaire.

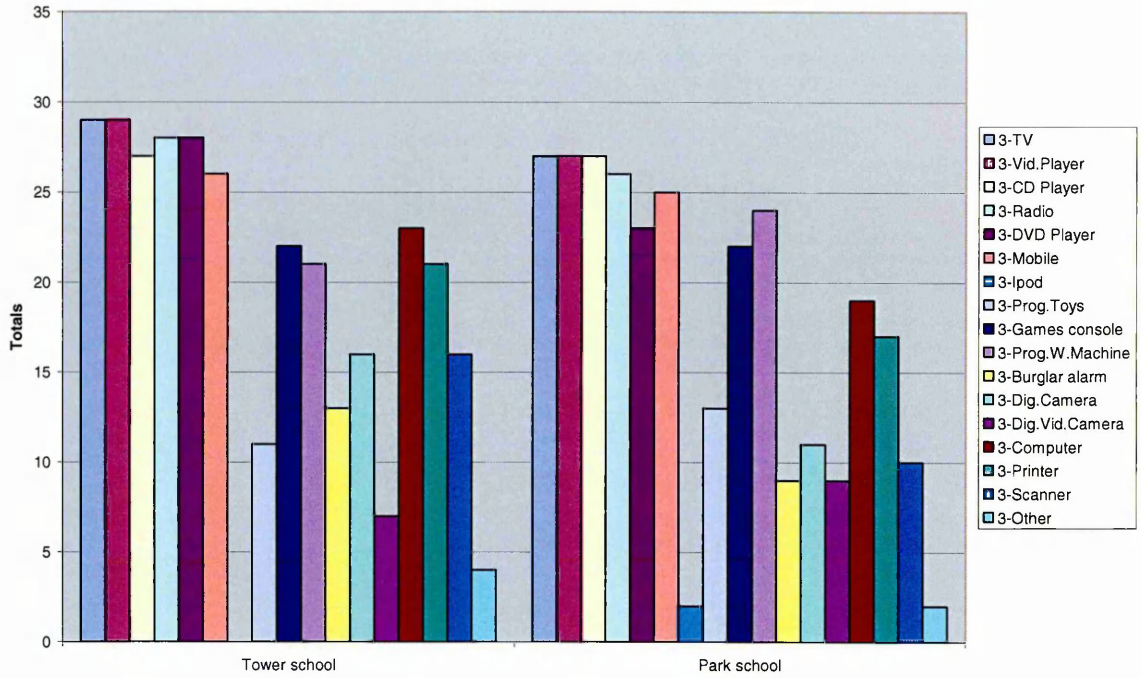
We would also like to meet with some parents in school in (*month*) 2005 to talk about children and ICT. The interviews will be during the day at a time to suit individual parents.

If you would like to take part in a short individual interview (15-20 minutes) to talk about your child's experiences with ICT please put your name below.

Mrs. / Ms. / Mr. .....

Please return this questionnaire to your child's class teacher

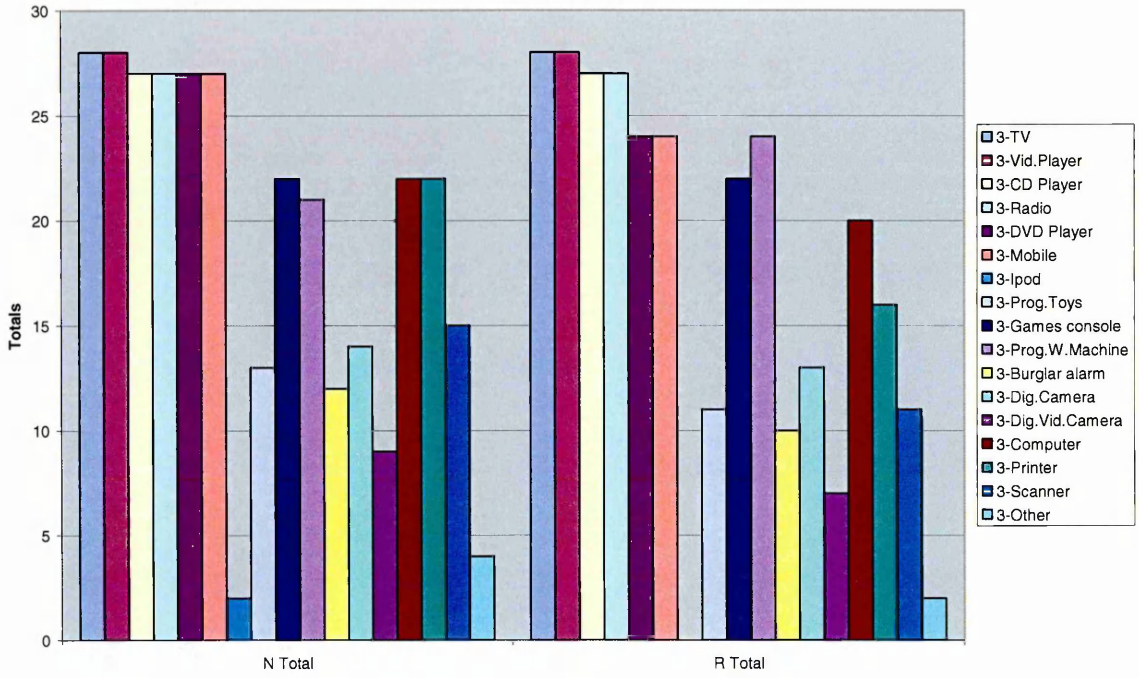
1. ICT availability in the home by setting



DIFFERENCES IN AVAILABILITY BY SETTING	**Tower school** (Nurs/Rec) **Total - 29** (11/18)		**Park school** (Nurs/Rec) **Total - 27** (17/10)	
	Actual	**Percentage**	**Actual**	**Percentage**
Television	**29** (11/18)	**100%**	**27** (17/10)	**100%**
DVD	**28** (11/17)	**97%**	**23** (16/7)	**85%**
Digital cameras	**16** (7/9)	**54%**	**11** (7/4)	**40%**
Mobiles	**26** (11/15)	**90%**	**25** (16/9)	**93%**
Games consoles	**22** (7/15)	**75%**	**22** (15/7)	**81%**
Computers	**23** (7/14)	**79%**	**19** (13/6)	**70%**

2. ICT availability in the home by age range

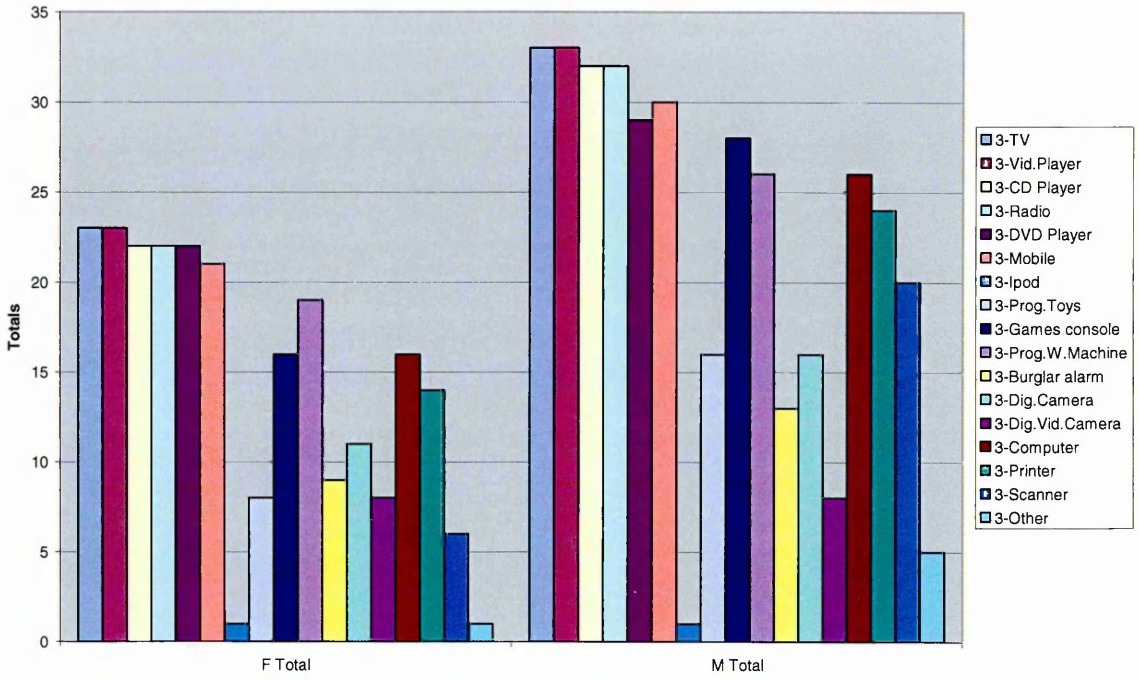
N: Nursery
R: Reception



DIFFERENCES IN AVAILABILITY BY AGE	**Nursery pupils** (Tower / Park) **Total - 28** (11/17)		**Reception pupils** (Tower / Park) **Total - 28** (18/10)	
	Actual	**Percentage**	**Actual**	**Percentage**
DVD	**27** (11/16)	**96%**	**24** (17/7)	**86%**
Digital cameras	**14** (7/7)	**50%**	**13** (9/4)	**46%**
Mobile phones	**27** (11/16)	**96%**	**24** (15/9)	**86%**
Games consoles	**22** (7/15)	**79%**	**22** (15/7)	**79%**
Computers	**22** (9/13)	**78%**	**20** (14/6)	**71%**
Printers	**22** (9/13)	**78%**	**16** (12/4)	**57%**
Scanners	**15** (7/8)	**53%**	**11** (9/2)	**39%**

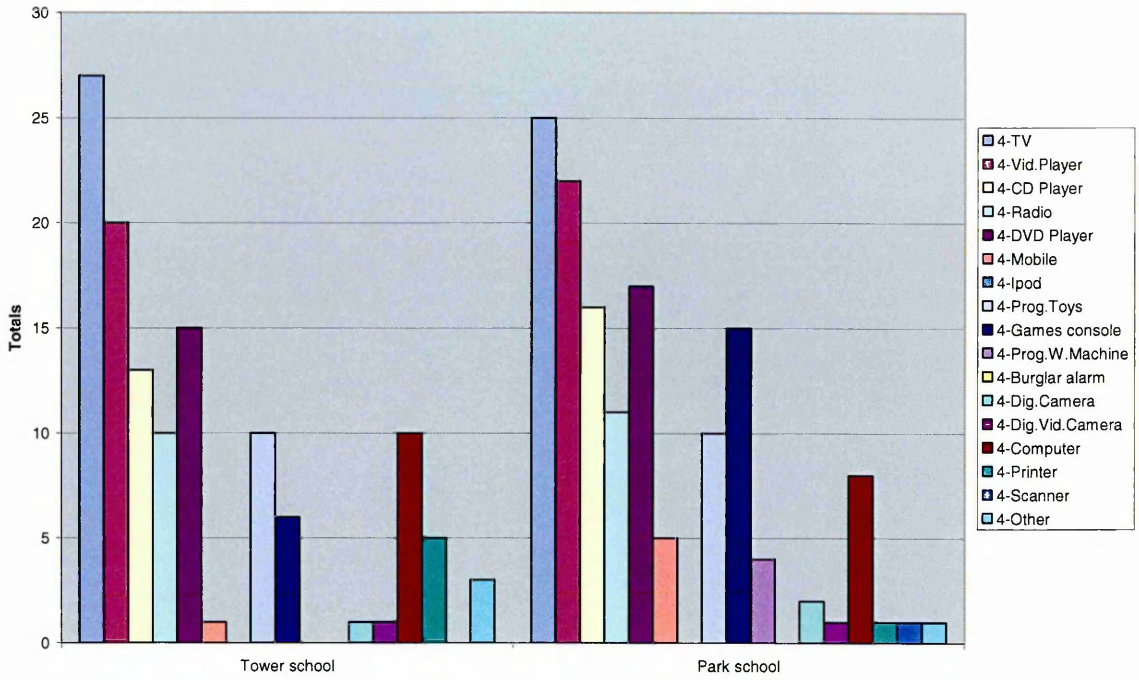
3. ICT availability in the home by gender

F: Female
M: Male



DIFFERENCES IN AVAILABILITY BY GENDER	**Female pupils** (Tower / Park) **Total - 23** (11/12)		**Male pupils** (Tower / Park) **Total - 33** (18/15)	
	Actual	**Percentage**	**Actual**	**Percentage**
Video player	**23** (11/12)	**100%**	**33** (18/15)	**100%**
CD player	**22** (10/12)	**96%**	**32** (17/15)	**97%**
DVD	**22** (11/11)	**96%**	**29** (17/12)	**88%**
Programmable toys	**8** (3/5)	**34%**	**16** (8/8)	**48%**
Games consoles	**16** (8/8)	**69%**	**28** (14/14)	**84%**
Mobile phones	**21** (11/10)	**91%**	**30** (15/15)	**91%**
Digital cameras	**11** (6/5)	**48%**	**16** (10/6)	**48%**
Scanners	**6** (3/3)	**26%**	**20** (9/11)	**60%**
PCs	**16** (8/8)	**69%**	**26** (11/15)	**78%**

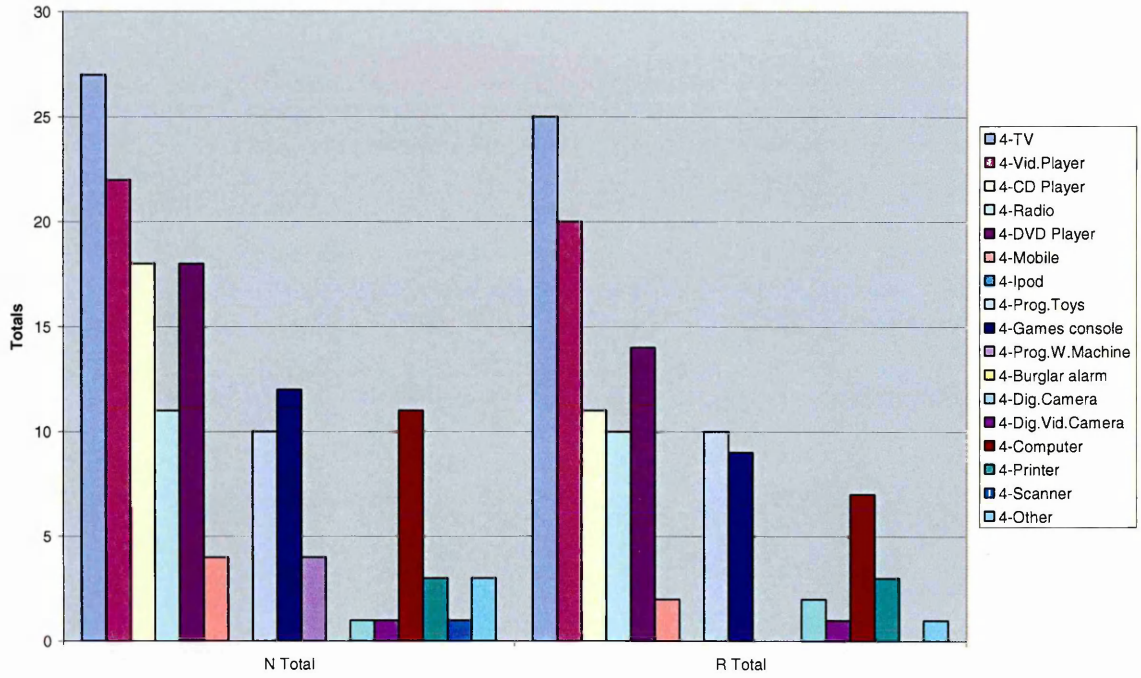
4. Independent use of ICT by setting



INDEPENDENT USE BY SETTING	**Tower school** (Nurs/Rec) **Total - 29** (11/18)		**Park school** (Nurs/Rec) **Total - 27** (17/10)	
	Actual	**Percentage**	**Actual**	**Percentage**
Video players	**20** (7/13)	**69%**	**22** (14/8)	**81%**
DVDs	**15** (6/9)	**51%**	**17** (12/5)	**63%**
Games consoles	**6** (1/5)	**20%**	**15** (11/4)	**56%**
Mobile phones	**1** (0/1)	**3%**	**5** (4/1)	**19%**
Computers	**10** (4/6)	**34%**	**8** (7/1)	**30%**

5. Independent use of ICT by age range

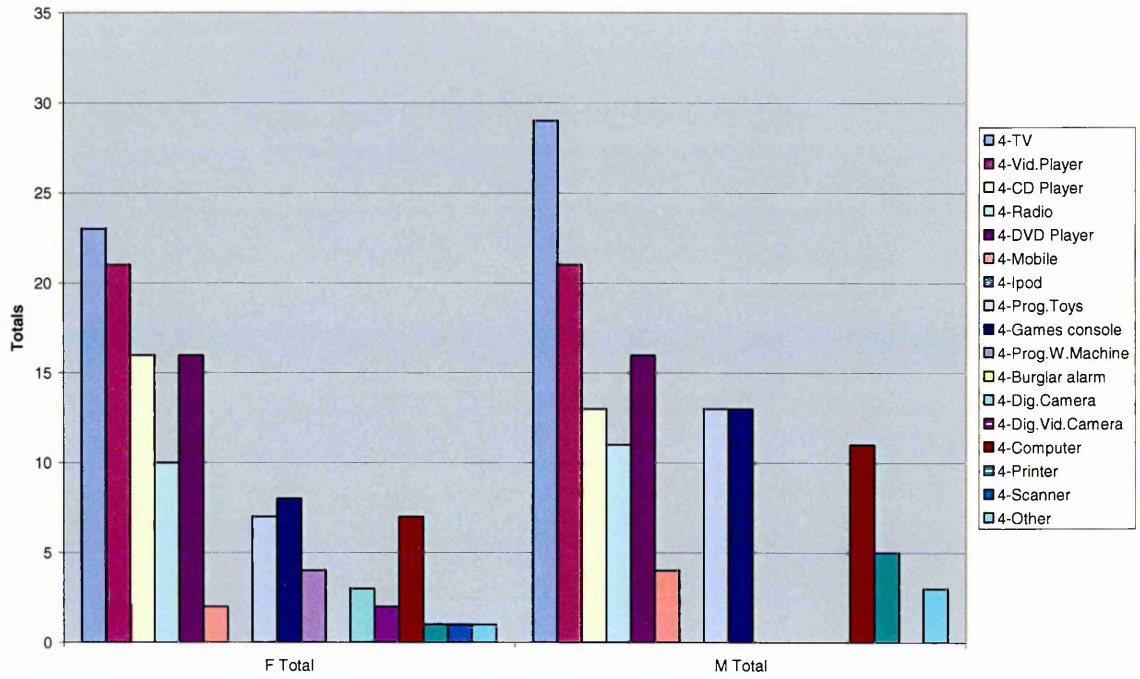
N: Nursery
R: Reception



INDEPENDENT USE BY AGE	Nursery pupils (Tower / Park) **Total - 28** (11/17)		Reception pupils (Tower / Park) **Total - 28** (18/10)	
	Actual	**Percentage**	**Actual**	**Percentage**
CDs	**18** (4/14)	**64%**	**11** (9/2)	**39%**
DVDs	**18** (6/12)	**64%**	**14** (9/5)	**50%**
Computers	**11** (4/7)	**39%**	**7** (6/1)	**25%**
Programmable toys	**10** (4/6)	**36%**	**10** (6/4)	**36%**
Games consoles	**12** (1/11)	**43%**	**9** (5/4)	**32%**

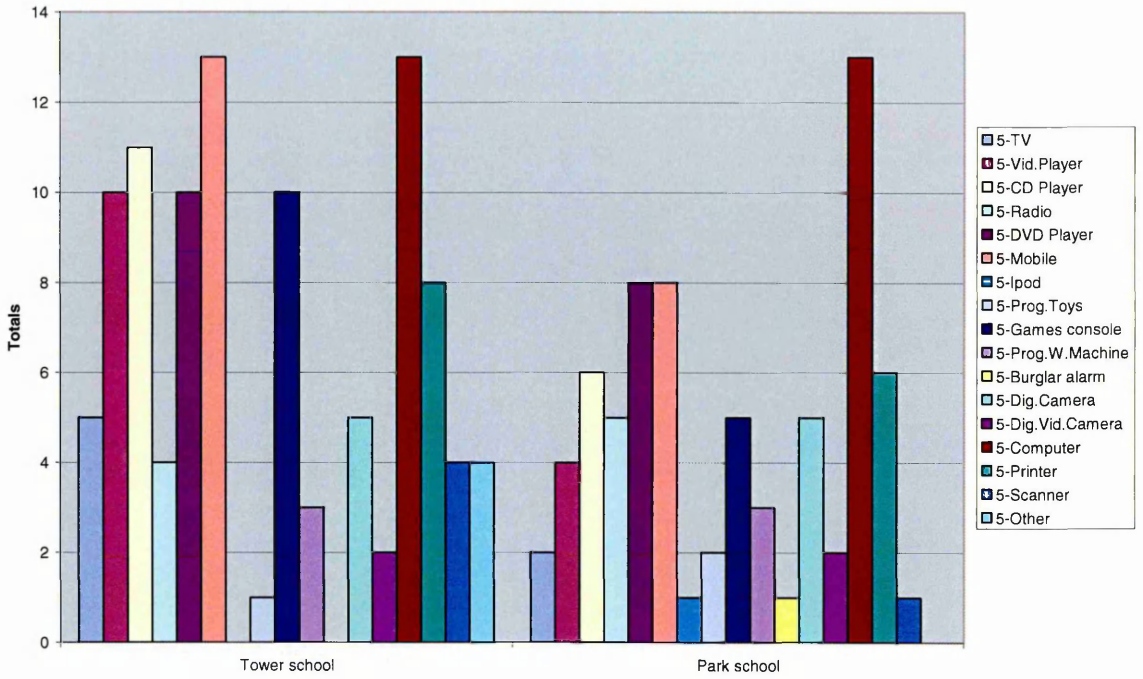
6. Independent use of ICT by gender

F: Female
M: Male



INDEPENDENT USE BY GENDER	**Female pupils** (Tower / Park) **Total - 23** (11/12)		**Male pupils** (Tower / Park) **Total - 33** (18/15)	
	Actual	**Percentage**	**Actual**	**Percentage**
Video players	21 (10/11)	**90%**	21 (10/11)	**63%**
CDs	16 (6/10)	**69%**	13 (7/6)	**39%**
DVDs	16 (8/8)	**69%**	16 (7/9)	**48%**
Programmable toys	7 (3/4)	**30%**	13 (7/6)	**39%**
Games consoles	8 (1/7)	**34%**	13 (8/5)	**39%**
Mobile phones	2 (0/2)	**9%**	4 (1/3)	**12%**
Computers	7 (2/5)	**30%**	11 (8/3)	**33%**

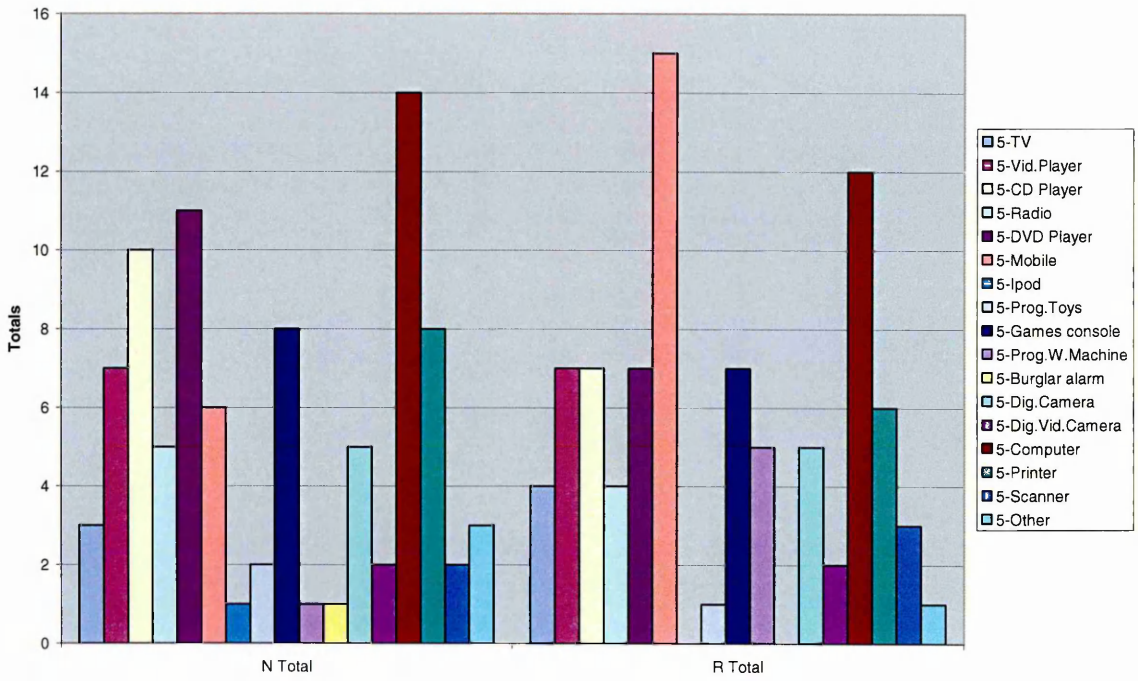
7. Supported use of ICT by setting



USE WITH SUPPORT BY SETTING	**Tower school** (Nurs/Rec) **Total - 29** (11/18)		**Park school** (Nurs/Rec) **Total - 27** (17/10)	
	Actual	**Percentage**	**Actual**	**Percentage**
Video players	**10** (5/5)	**34%**	**4** (2/2)	**15%**
CDs	**11** (6/5)	**37%**	**6** (4/2)	**22%**
DVDs	**10** (6/4)	**34%**	**8** (5/3)	**27%**
Mobile phones	**13** (3/10)	**44%**	**8** (3/5)	**27%**
Games consoles	**10** (5/5)	**34%**	**5** (3/2)	**19%**
Scanners	**4** (1/3)	**14%**	**1** (1/0)	**4%**
Digital cameras	**5** (3/2)	**17%**	**5** (2/3)	**19%**
Computers	**13** (7/6)	**44%**	**13** (7/6)	**48%**
Printers	**8** (5/3)	**27%**	**6** (5/1)	**22%**

8. Supported use of ICT by age range

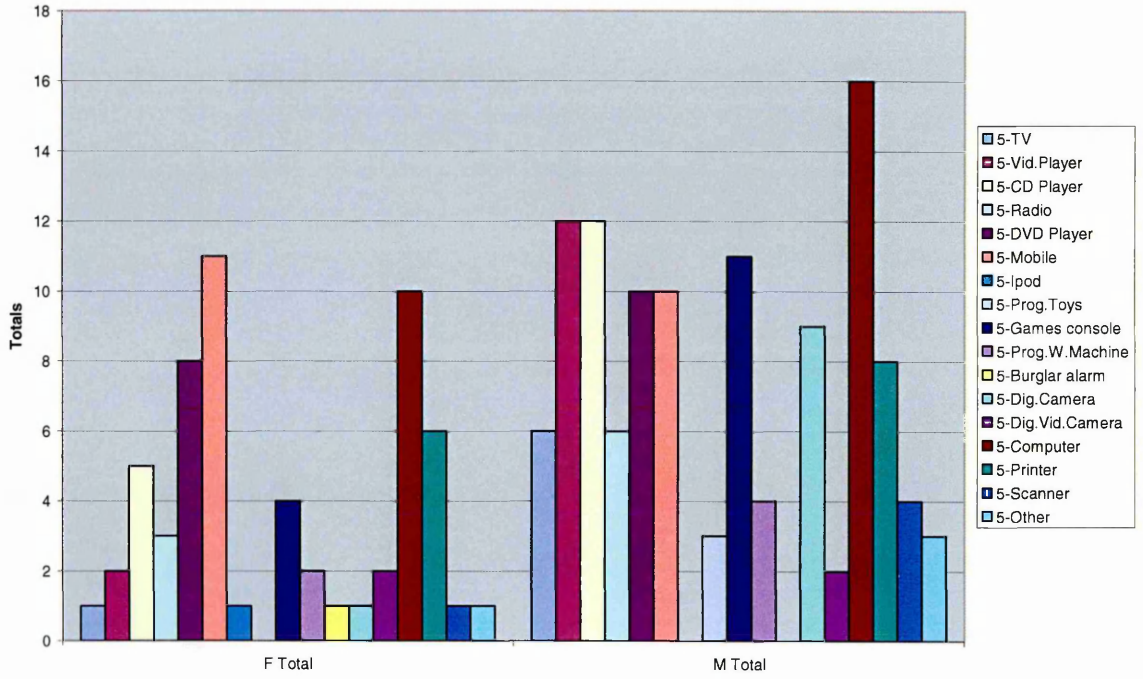
N: Nursery
R: Reception



USE WITH SUPPORT BY AGE	Nursery pupils (Tower / Park) **Total - 28** (11/17)		Reception pupils (Tower / Park) **Total - 28** (18/10)	
	Actual	**Percentage**	**Actual**	**Percentage**
CDs	**10** (6/4)	**36%**	**7** (5/2)	**25%**
DVDs	**11** (6/5)	**39%**	**7** (4/3)	**25%**
Computers	**14** (7/7)	**50%**	**12** (6/6)	**43%**
Mobile phones	**6** (3/3)	**21%**	**15** (10/5)	**53%**
Games consoles	**8** (5/3)	**29%**	**7** (5/2)	**25%**

9. Supported use of ICT by gender

F: Female
M: Male



USE WITH SUPPORT BY GENDER	Female pupils (Tower / Park) **Total - 23** (11/12)		Male pupils (Tower / Park) **Total - 33** (18/15)	
	Actual	**Percentage**	**Actual**	**Percentage**
Video players	**2** (2/0)	**9%**	**12** (8/4)	**36%**
Games consoles	**4** (3/1)	**17%**	**11** (7/4)	**33%**
Digital cameras	**1** (1/1)	**4%**	**9** (6/3)	**27%**
Scanners	**1** (1/0)	**4%**	**4** (3/1)	**12%**
DVDs	**8** (5/3)	**34%**	**10** (5/5)	**30%**
Computers	**10** (5/5)	**43%**	**16** (8/8)	**48%**
Printers	**6** (3/3)	**26%**	**8** (5/3)	**24%**
Mobile phones	**11** (7/4)	**47%**	**10** (6/4)	**30%**

Parent interview schedule

- Introduction
- Nature / purpose of research i.e. how much do young children know about ICT (broadest sense)

- Area 1 - Your thoughts about ICT
    - ICT seems to be everywhere these days what do you think about this?

- Area 1 - Child initiated / directed activity
    - You mentioned in the questionnaire that ..... routinely uses ..... at home without needing help / support / guidance / supervision.
    - Prompts - Since when? When did the child first show an interest? Progression in child's skills?

- Area 2 - Supported activity
    - You mentioned in the questionnaire that ..... also uses ..... at home with help / support / guidance/ supervision?
    - Prompts - Say a bit more? i.e. Who is helping / supporting / guiding / supervising? When? How?

- Area 3 - Activity outside the home
    - Last one quite hard but can you recall any other instances of ..... demonstrating interest in / knowledge of ICT outside the home i.e. on journeys, shopping, visits?

Name, setting, date, time

I = interviewer R = respondent

- **Pause = .. for less than 1 second, ... for 1 second, ... for 1 and a half seconds, *pause* for 2-3 seconds, *long pause* for 4 or more seconds**
- **Laughing, coughing etc = *(put event in parenthesis)***
- **Interruptions & overlapping speech = hyphen (-) at end of 'sentence' & put (overlapping) at start of response**
- **Garbled / unintelligible speech – use X's to denote missing words i.e. 3 words = XXX**
- **Emphasis = use capitals**

Interview began with brief introduction of the interviewer, an explanation of the purpose of the research and an outline of the areas for discussion. The interviewee was asked if this was all right. Interviewee confirmed that it was.

I	OK. Right. And so in terms of what he's doing with television for example is it mainly the Ceebeebies stuff that he watches?
R	Yes. Yeah, -
I	(overlapping) Right.
R	- yeah.
I	So..
R	Yeah in terms of the television it's yeah Ceebeebies, sometimes urm Channel 5 -
I	(overlapping) Right.
R	- Milkshake in the mornings, but it tend, it's tended to be Ceebeebies that he's looked but he er he likes watching urm DVDs and he likes particularly Michael Palin -
I	(overlapping) Right.
R	- Round the world in 80 days! *(smiles)*
I	Right -
(Interview interrupted briefly at this point by member of staff wishing to consult with respondent about spelling homework).	
R	There we go. So in actually fact then urm you've got him down here *(indicates questionnaire)* as using the television -
I	(overlapping) Yeah.
R	- er kind of unaided, but he's also able to use the DVD -
I	(overlapping) Yeah.
R	- unaided as well really. -
I	(overlapping) Yeah he can press the eject button, put a DVD in and then press play, I mean that's all you have to do -
R	(overlapping) Sure.
I	- press play, but he can do that. Yeah.
R	Right. And so has, I mean does he have his own DVDs or -
I	(overlapping) No!
R	- or do you -
I	(overlapping) Yeah he does, I mean he's got some children's DVDs -
R	(overlapping) Right.
I	- like High Five? The children's programme?
R	*(Shakes head to indicate not familiar with particular programme)* Right.
I	Urm High Five is er a Channel 4, Channel 5 sorry children's programme and it's, it has a wealth of commercial things that you can buy -
R	(overlapping) Right.