

**Cranfield University**

**Eman Shafik Hassan Abdalla**

**INFORMATION AND COMMUNICATION  
TECHNOLOGY (ICT) IN THE EARLY YEARS OF  
EDUCATION**

**School of Applied Sciences**

**MSc by Research**

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Supervisor: Dr. Mark Lemon

Academic Year 2007-2008

This thesis is submitted in partial fulfilment of the requirements for the degree of  
Master of Science by Research

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## **ABSTRACT**

Information and communication technology (ICT) has become an important factor in the education field, especially for pupils with special educational needs. The aim of this research is to understand how ICT is perceived to affect the learning capability of primary age pupils, including those with special educational needs. The specific objectives are to: (i) Investigate the literature about the relationship between information and communication technology (ICT) and pupils with special educational needs; (ii) Identify some of the factors that affect the use of information and communication technology (ICT) for assisting pupils' learning (reading and writing) ability in three case studies school; (iii) Investigate the current use of ICT resources in three schools and the roles played by teachers and parents in these schools to help pupils learn in both classroom and home environments; (iv) Assess the perceived impact of ICT on pupils' learning through observation and interviews in the case study schools; (v) Communicate examples of best practice, for both teachers and parents, on more effective way of using ICT to improve pupils' learning.

The research has been carried out in three schools one of which is a special school for pupils with special educational needs. Data have been collected in three ways. Firstly, direct observation has been carried out in the classroom; secondly, interviews have been carried out with teachers; and finally a survey of 175 parents was carried out by questionnaire.

The key finding drawn from this research indicate that ICT is perceived to have a positive impact on pupils' learning regardless of their educational needs. The study also identified that ICT is perceived to improve the quality of teaching and ICT use by primary age children. A second issue raised the shortage of teacher training for ICT, especially staff development, and finally, teachers and parents needed time to become skilled with the new technologies before attempting to teach with them.

The study presents examples of best practice to distinguish between how teachers and parents might improve their support for pupils using ICT. These include the need for teachers to match learning needs, style and curricula and for parents to understand how their pupils learn and the nature of any learning problem.

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To my parents who were always there for me, particularly my father for his unconditional support and encouragement. Lastly, I owe great deal of gratitude to my brothers and sisters also for always being there for me. And to all friends (near and far) who have journeyed with me through the process, a sincere thank you for your loving support and encouragement.

*Eman Shafik Abdalla*

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## NOMENCLATURE

<b>SYMBOL</b>	<b>DEFINITION</b>
<b>ISTE</b>	International Society for Technology in Education
<b>CAL</b>	Computer Assisted Learning
<b>CRB</b>	Criminal Records Bureau
<b>ICT</b>	Information and Communication Technology
<b>KDI</b>	Knowledge and Distributed Intelligence
<b>SEN</b>	Special Educational Needs
<b>NETS-T</b>	National Educational Technology Standards for Teachers
<b>NGFL</b>	England the National Grid for Learning
<b>NICHCY</b>	National Information Centre for Adult and Youth with Disabilities
<b>NOF</b>	New Opportunities Fun
<b>ACLD</b>	National Association for Children and Adults with Learning Disabilities
<b>NSF</b>	National Science Foundation
<b>IEP</b>	Individualized Education Program
<b>DRS</b>	Division of Rehabilitation Services
<b>BECTA</b>	British Educational Communications and Technology Agency

# Chapter 1

## 1. INTRODUCTION

### 1.1. Research Background

Information and communication technology (ICT) plays a prominent role in our life. This thesis focuses specifically on the use of ICT to enable pupils with and without special educational needs to learn effectively. Its goal is to move beyond some of the hype and marketing rhetoric that sometimes characterises this field and to ask nuanced questions about the evidence that exists of the role of ICT in this area.

During the late seventies and early eighties new technology such as ICT became more affordable into primary education in the UK (Goodison, 2002). The end of the eighties and into the nineties was the period for the use of ICT communications and information access, especially with the popularity and accessibility of internet-based services such as e-mail and the World Wide Web. This allowed large amounts of information to become more focussed on the use of technology, such as the ICT, in the education field (Brooker, 2003 and Stead et al, 2005).

ICT plays a significant role in support teaching and learning through the use of new technology such as interactive whiteboards, television, facsimiles, and computers to replace the blackboards and chalk, pencils, books, and slide-rules (Abbott, 2007).

ICT literacy is a component of technology education, which is distinct, but not necessarily separate, from the use of technologies such as ICT systems for the support of learning and teaching processes. The latter is generally referred to as educational technology and is applied to a wide range of technologies (Abbott, 2007).

Since the beginning of the 1990s, educators have been particularly concerned the use of ICT in the education field. By the late 1990s, educators who use ICT in their learning activities have been involved in using it to improve pupils learning. In addition programme planners in educational institutions in general, and pupil learning programmes in particular have deemed ICT as a desirable component of innovative instruction (Paul, 2002).

The focus of the thesis is on users' growing use of information and communication technology in the school, and the perceived impact of home ICT use on the development of pupils learning. It also provides examples of ways that ICT assisted instruction can help pupils with and without special educational needs. In addition the research project concentrates on how ICT is perceived to affect pupils with special educational needs. In this thesis, the researcher will utilise both ICT and computer terminologies. ICT is the computing and communication facilities that support teaching, learning and arrange of activities in education. Computers include both hardware and software. They are a subset of ICT.

The use of ICT has changed the living conditions for many pupils during last few years. Primary pupils' access to advanced ICT and telecommunications technologies at school and at home is increasing at a rapid pace, but do we know the perceived impact of this ICT on pupils learning? This is the question we need to answer.

The use of ICT can help pupils enter new knowledge worlds' associated with the subject curriculum more powerfully than conventional classroom tools. In addition computer literacy needs to be taught from an early age (Wheeler, 2005). Moreover ICT solves many problems in the school not just for pupils with special educational needs. Parents and teachers play a crucial role in mediating the pupil use of ICT and in this context have a significant effect on their pupils learning (Murphy, 2006).

Pupils with special educational needs should be encouraged to use ICT as a learning facility in the right way and the right direction. ICT applications introduce new kinds of texts into the classroom and these demand different practices of pupils. In turn this suggests the need to re-think conceptions of literacy, learning to move beyond the narrow definition apparent in recent government policy to a broader definition that

realises the connections between learning and social practices in a multimodal digital area (Murphy, 2006).

The involvement of ICT in the school is focused on both learning (technology education) and teaching (educational technology). Today ICT in schools is both a focus of study in itself (technology education) and a support for learning and teaching (educational technology). Rationales can be presented for both ICT literacy and using ICT as part of educational technology. There is an obvious need to address the ICT role in educational institutions that will prepare pupils to function effectively within their learning.

### **1.1.1. Information and Communication Technology (ICT) and Learning**

There is a lack of research in understanding the pupils' perspective or the service provider's views which focuses on the benefits and barriers to the use of ICT (Bryant & Bryant, 1998). "ICT holds enormous promise for assisting individuals with special educational needs. However it is important that further research be conducted to address concerns about equity of access, barriers to the use of the ICT as a new technology, service provision, and the unique needs of this population in the use of ICT" Bryant & Bryant (1998).

There are many programs designed to help learners with special educational needs such as "Switch It" and "Maker 2" developed by Inclusive Technology, 2007. These programs change the text, images, movies and sounds into simple on-screen activities. The activities are automatically accessible using a mouse, interactive whiteboard, touch screen, keyboard or switches. They have been implemented both to address inequities in access and to improve pupils' achievement (Inclusive Technology, 2007).

It is accepted that the use of ICT is not a suitable approach for all learners or all learning experiences and that not all pupils enjoy using ICT, or indeed benefit from working with it (Ewing and Miller, 2002). In addition, learning with ICT may have a particular strength in providing a good chance for learners to promote personalised learning which in turn may help learners play their part more fully in successful



learning environments (Ewing and Miller, 2002). However, Higgins (2007) and Subrahmanyam et al., (2001) argue that ICT could improve pupils' learning because they spend more time working and practising on it than in a normal lesson interaction with their teacher. Furthermore some pupils enjoyed working with ICT more than practical activities such as playing with friends (Subrahmanyam et al., 2001).

### **1.1.2. Information and Communication Technology (ICT) and Teaching**

ICT is a very important learning tool which has become a part of the education system. Today's ICT can support teachers and pupils with opportunities for teaching and learning that were impossible in the past. Since technology is always evolving and in need of frequent revision, effective integration strategies will always be an important concern.

As ICT has been used in schools for many years, teachers need to be prepared to work with them. Teachers cannot be excluded from using ICT for Internet and other technology tools, as it has become a part of the new curriculum in the school. They have to understand the process of ICT literacy and the use of multimedia technology to improve their teaching (Sa'ari et al, 2005). The integration of technology in teaching and learning does not emphasise solely learning technology skills, it includes classroom models where teachers are actively using technology in lessons such as the interactive whiteboard and educational software. The use of ICT has become a part of everyone's life including schools, teachers, pupils, and parents as illustrated in Figure 1-1.

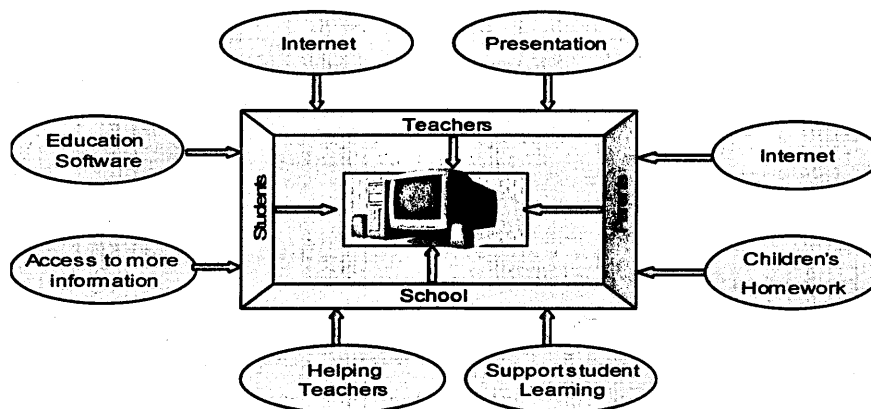


Figure 1-1: Computer as a Learning Tool for Everyone

## 1.2. Research Aim and Objectives

ICT are finding their way into every facet of life, include education. The importance of this study is that there is a need to perceive the significance of the ICT in pupils' homes and schools, in order to understand its relationship to their educational attainment and – of specific relevance to this study – the abilities of pupils with special educational needs.

The aim of this research is to understand how information and communication technology (ICT) is perceived to affect the learning capability of primary age pupils, including those with special educational needs

The specific objectives are to:

- (i) Investigate the literature about the relationship between information and communication technology (ICT) and pupils with special educational needs;
- (ii) Identify some of the factors that affect the use of information and communication technology (ICT) for assisting pupils' learning (reading and writing) ability in three case studies school;

- (iii) Investigate the current use of ICT resources in three schools and the roles played by teachers and parents in these schools to help pupils learn in both classroom and home environments;
- (iv) Assess the perceived impact of ICT on pupils' learning through observation and interviews in the case study schools;
- (i) Communicate examples of best practice, for both teachers and parents, on more effective way of using ICT to improve pupils' learning.

After the aim and objectives have been set, they are translated into the research questions which are described in the following Section.

### **1.2.1. Research Questions**

The current study addresses the following questions to contribute to the knowledge base related to pupils with special educational needs and the use of ICT:

*What is the perceived impact of ICT on the learning capability of pupils in early years of education?*

This research question in turn is translated into four sub-questions to be addressed through case study research. These are as follows:

1. How can pupils learning and special educational needs be defined?
2. How does ICT help pupils with and without special reading and writing needs?
3. How does the ICT change the teacher's role in the classroom?
4. What support is required by the parents of pupils with special educational needs?

### **1.2.2. Gaps in the literature**

The literature review reported in Chapters 2 and 3 identifies a number of research gaps relating to how pupils respond to technology over the long term and the impact of ICT on primary age children's activities. Further research is very important to find out the practical role of styles and strategies (Ortiz and Yates 2001). In particular there is a shortage of studies available in the area of learning styles and their relationship with special educational needs and ICT (Doyle and Humphrys, 1999).

### **1.3. Methodology**

The methodology and research strategy adopted for the study has been presented in Chapter 4. The first stage of the methodology was the use of a literature review to support conceptual recommendations for undertaking a qualitative and quantitative study of direct practical use. Throughout the study, data were gathered through questionnaires, interviews and observations.

The research applied an ethnographic method and a variety of techniques and strategies for the collection of data. The fieldwork involved observing and recording pupils' performance during classroom activities. Interviews with teachers were tape-recorded and written notes taken. The emphasis has also included qualitative analysis, based on generating and developing the final results. A triangulation approach (observation, interviews and questionnaire with pupils' parents) improved the validity of data collection strategies, the time periods available for data collection and theoretical schemes.

### **1.4. Thesis Structure**

The thesis structure follows closely the research approach and consists of eight Chapters as illustrated in Figure (1-2). The first Chapter sets the aim and objectives of this research and its focus. The review of previous work in various areas related to this research has been presented in Chapters 2 and 3. Chapter 2 provides the definition and understanding of learning and special educational needs and the various types of learning styles.

Chapter 3 presents the relationship between learning styles, special educational needs and information and communication technology. The Chapter also describes parent involvement which is very important for pupils learning, specifically those with special educational needs because parents are the first teachers.

Chapter 4 examines the methodology for the study and ensures that its design is appropriate to provide answers to the research questions. The Chapter is divided into several Sections, such as research strategy, data collection, research evaluation and

research methodology adopted. The research data were collected in three schools through classroom observation, interviews with teachers and a questionnaire for parents. This activity has been described in Chapters 5 and 6. Chapter 5 explains how the observations were developed and administered to collect information on the variables under study. The Chapter also describes how the researcher had difficulties in accessing the school for pupils with special educational needs.

Chapter 6 describes the questionnaire and the interview data collection and analysis, and how the data were managed. The Chapter is designed to explain how the author collected and designed the questionnaire, and held the interviews. Chapter 7 introduces the recommendations for both parents and teachers who play important roles in pupils' learning. Chapter 8 explains the findings of the research project in the conclusions and future work in order to answer the research questions. The Chapter describes the key findings of the research project and suggests future work.

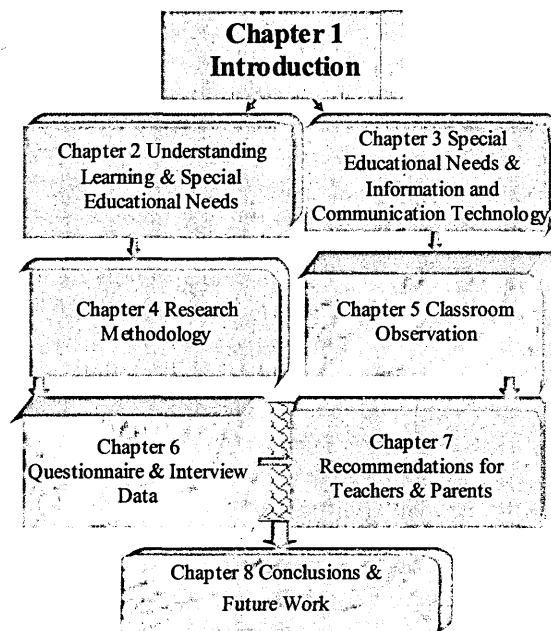


Figure 1-2: Thesis Structure

### **1.5. Summary**

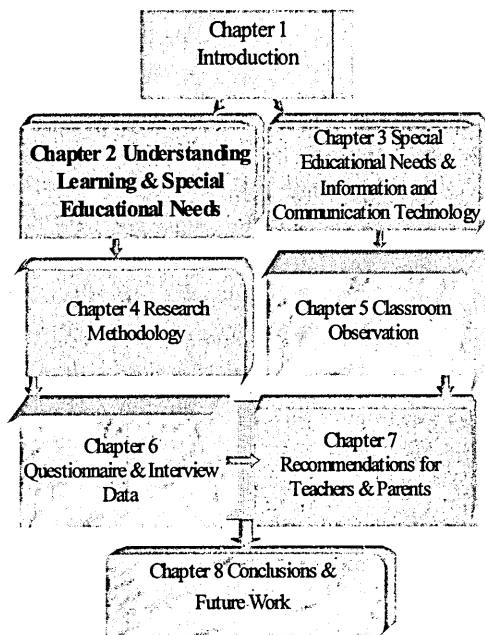
This Chapter begins by introducing the background of the research area to discover the gaps for this research project. The aim and objectives of the research project were set out. The importance of this research has been explained followed by the research questions. The use of ICT in schools and how that changes the teacher's role has also been explained.

Chapter 2 will discuss the literature review related to the effect of ICT in pupils' learning, including those with special educational needs. There have been many research studies regarding the use of ICT for pupils with and without special educational needs. In addition there has been little research in the area of the relationship between special educational needs, learning styles, and ICT.

# CHAPTER 2

## 2. UNDERSTANDING LEARNING AND SPECIAL EDUCATIONAL NEEDS

### 2.1. Introduction



Children are born to learn no matter how different they are. They deserve a safe, nurturing learning environment in an atmosphere of patience, respect, gentleness, and trust, not one of threats, force, and cynicism (Hunt, 2007). The purpose of this Chapter is to review the literature on research related to the effects of the ICT on pupil's learning.

The ability to learn is an important yet relatively unexplored topic for both normal and special educational needs (SEN) learners in the field of the relationship between learning styles and ICT. The inclusion of pupils with special educational needs in primary schools is a focus of debate in education systems across the world. Within the UK, successive governments have affirmed a commitment to reducing the numbers of pupils educated in segregated special schools for SEN pupils

and to moving more of these pupils into mainstream education (Richard, 2001). Moreover special educational needs are the second largest category of special education (Winters, 1997).

This Chapter provides an understanding of learning and SEN. The definitions of special educational needs (reading and writing) are described in Section 2.2. The various types of learning styles are explained in Section 2.3 followed by Section 2.4 which identifies the relationship between learning styles and special educational needs. The relationship between learning styles and ICT is then discussed in Section 2.5 and the role played by parents in their children's education in Section 2.6. The Chapter concludes with a summary in Section 2.7. Figure 2-1 illustrates the Literature Review which has been described in Chapter 2 and 3.

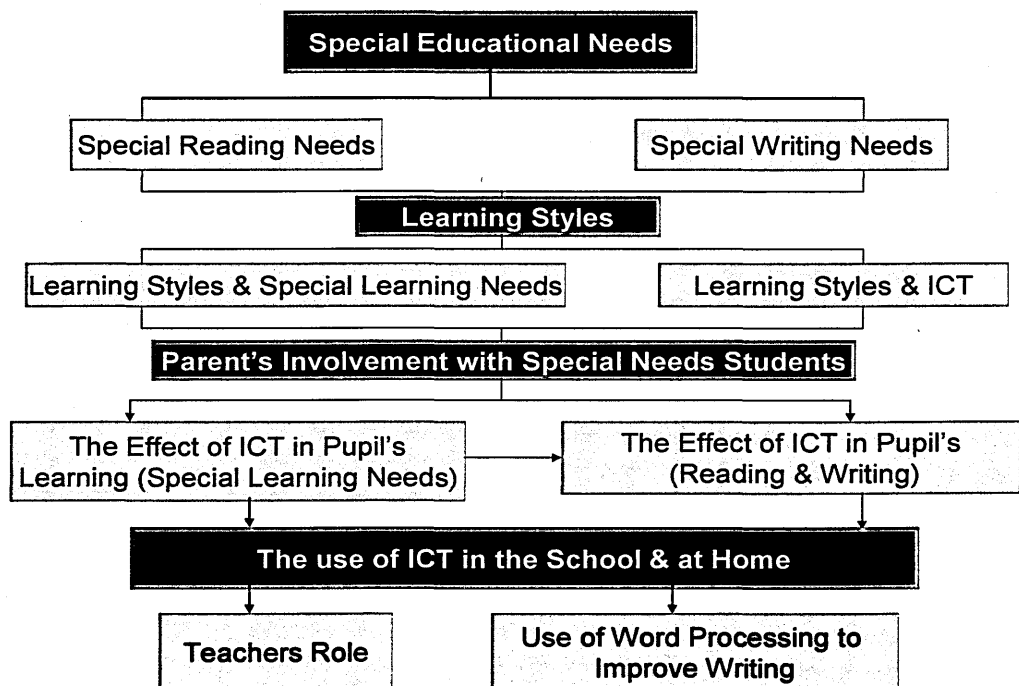


Figure 2-1: Literature Review



## **2.2. Special educational needs – Definition and Background**

For many years, researchers have faced difficulties in identifying the meaning of special educational needs Hunt (2007) and Hammill (1981). They were not able to determine a clear definition of these issues. In this Section an attempt has been made to describe the different views in the literature about the definition of special educational needs. However, the author did not find any significant difference between them. The author's view about learning is that pupil can learn if he/she has the right teacher with support from parents to understand their needs.

Learning occurs when the learner understands the information and assimilates and remembers it as an individual. He/she can describe this information in different ways (Doyle and Humphrys, 1999). The causes of special educational needs have not yet been determined, yet SEN have been explained by many researchers (Murphy, 2006; Stevens, 1996; Baum, 1990; Niedecken et al., 2003; Kenyon, 2000; Gay, 2000) as the ineffective use of learning strategies.

Harwell (2001) describes the meaning of SEN as a group of conditions that interfere with a parent's learning and consequently his/her functioning throughout life. Special educational needs are disorders in a different part of the brain which affect the learner to see and hear. This disorder makes it difficult for the person to link information together from different parts of the brain. This difficulty can manifest itself in many ways such as spoken difficulty and/or writing difficulty or in concentration. It can extend to schoolwork and the ability to read and write and calculate social competence and emotional maturation (NIMH, 2007; Murphy, 2006; Stevens, 1996; Hammill, 1981; Hay et al., 2006; Price and Samuels, 2000; NICHCY, 2004 and Kenyon, 2000). Niedecken et al., (2003) adopt a similar view, arguing that pupils with special educational needs are damaged by the negative messages parents receive when they were born. These are then transferred to the infant by the parents.

Baum (1990), and Holt and Division (2004) explain how special educational needs can exhibit remarkable talents or strengths in some areas and disabling weaknesses in others. In their view SEN are reproduced as a heterogeneously group of disorders due to an identifiable or inferred central nervous system dysfunction. These disorders can

affect the learner through everything including classroom space and are influenced by the wider societal representation of special educational needs which circulates through the classroom.

The following model of special educational needs was established in the late 1960s and distinguishes four stages of information processing used in learning: input, integration, memory and output. Input is when some learners have difficulty in recognising the position and shape of what they see. Input is the process of recording in the brain information that comes from the senses. Integration is the process of interpreting this information. The learner may become confused with different meanings of the same word used in different ways. Memory is the storage of information for later retrieval. The special educational needs learner needs many more repetitions than usual to retain information. Output of information is achieved through language or motor (muscular) activity. SEN can be classified by their effects at one or more of these stages and each child has individual strengths and weaknesses at the various stages (Larry and Silver, 2004).

According to Larry and Silver (2004) and Plowman and Stephen (2003), the important fact for the child to have special educational needs seems to be that their brains are "wired". That mean something affected the brain during pregnancy or during birth. It is the case that difficulty in different areas, such as learning difficulty, makes the child slightly different from the average child. Additionally the meaning of SEN are a disorder in one or more of the basic psychological processes involved in special understanding or in using language (spoken or written), which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell or to do mathematical calculations. This includes directional confusion, sequencing needs, and short-term memory retention problems. Schools and families should be aware and consider the possibility of special educational needs before assuming that a child who has been doing poorly in school is lazy or emotionally disturbed.

### **2.2.1. Special Reading Needs**

Researchers (Jenkins and O'Connor, 2006; Olson, 2007; Holt and Division, 2004; Murphy, 2006; Pearson et al., 2005) suggest that reading is an important tool for understanding our humanity, making skilled readers, and building knowledge. Moreover, reading is the aid for making sense of our world, advancing the democratic idea, and generating personal and national prosperity.

The ability to read allows us to achieve three significant goals which are: building knowledge; acquiring information for accomplishing tasks; and deriving pleasure and feeding our interests (Jenkins and O'Connor, 2006). Special reading needs means having a weakness in one or more of the foundation skills. Reading, language skills, knowledge, and word reading ability are all mutually dependent and reciprocally related. A weakness in any one of these foundation skills can create problems for the others and for reading development.

There have been numerous attempts to measure the dynamic processing and storage functions of poor readers over a period of nearly 30 years. Reading comprises of two parts as described by Torgeson (2000). A similar view, supported by Kitson (2001) described that the first part involves recognising the words on the page; the other involves understanding those words once they have been recognised. This is called the Simple View of reading whereby from the earliest stages of reading children destined to become poor readers have a more difficult time learning to easily recognise words by sight (Skinner and Preece 2005),.

Kitson (2001) and Vail (2004) state that reading is built on when the learner understands the phonology or sound of the word and he/she can translate this sound to skills. Moreover, when the pupil understands the sound of language at an early age and can recognise rhyming words, such as hat and bat have the same ending e.g. if the pupil understand that h-a-t is made of h plus at, which together make up the known word. That mean pupils at an early age, who can understand words and that those words are made of letters have the early learning skills such a, good listening and sound processing skills. Those pupils are well equipped with pre-reading abilities even before school, and are the ones who are likely to become good readers

(Venezky, 2004). Moreover if the pupil did not reach a reasonable level of reading ability this might mean they have special reading needs.

Pupils sometimes struggle with sound and cannot understand it at the early age. Pupils who lack these skills are likely to always struggle with reading and spelling and in return may have a special educational needs. Jenkins and O'Connor (2006) support this view and suggest that special reading needs is a weakness in processing phonological information which cause reading problems in young age. This weakness also includes difficulty in developing phonological awareness and extends to accessing phonological name codes as evidenced in slower naming speeds for known stimuli like numbers and letters. These phonological processing problems surface in the earliest stages of learning to read, where pupils experience particular needs in developing alphabetic reading skills. As we know, knowing the alphabet is an important reading skill and probably plays a prominent role in the development of orthographic (sight word) reading skill, which in turn affects the development of fluency and comprehension (Jenkins and O'Connor, 2006).

In similar research Kitson (2001) concludes that pupils who have good listening and sound processing skills, i.e. they have an ability to read before school, are likely to become good readers. They understand letter sounds and words and that words are made up of letter/sound combinations very early. Pupils with early special reading needs who 'recover' are those who, with or without help, manage to learn the phonological skills that they need.

Researchers Savage et al., (2007) and Torgersen, (2000) argue that pupils with special reading needs struggle in complicated process tasks such as language encoding - the retrieval of phonological knowledge built in long-term memory, word decoding and letter naming and letter/sound information. Special reading needs are the most common type of special educational needs with pupils having problems identifying letters and words and remembering what they mean. They also have difficulty in realising and understanding the sounds and letter groups that make up words. Because of these problems pupils with special reading needs often cannot understand the meaning of the materials they read (Torgersen, 2000).

### **2.2.2. Special Writing Needs**

The ability to write is an important yet relatively unclear topic for both normal and atypical learners and the reasons for experiencing difficulty with written expression are unknown (Murphy, 2006). Different manifestations of the disorder may have various causes and pupils with special writing needs often have problems with the basic skills of writing such as spelling, punctuation and grammar. They also often have one other type of learning disorder e.g. with mathematics (MacArthur, 1998).

Pupils with special educational needs in expressive writing skills have significant difficulty completing school work involving writing and using writing in everyday situations. They may have little difficulty with actually producing letters and words on paper, but they cannot use words to express organised and complete thoughts in writing. They may also have special educational needs with basic writing and word usage (Logsdon, 2007) which affect the ability to write words with the correct spelling and make appropriate word choices. Pupils with SEN in simple writing often do not understand the relationship between the representation of letters and their sounds as spoken by their teacher. They cannot distinguish between the correct and the incorrect written word. It is essential for pupils to have adequate writing skills because it is the primary basis for assessing their work and learning.

Murphy (2006) investigates the difference between pupils diagnosed with reading defects and pupils developing normally in their writing at the discourse, sentence, and word level. In addition there is a significant difference in diagnostic performance between pupils with special reading needs and those developing normally. The former scored significantly lower on most discourse, sentence and word measuring development (Murphy, 2006).

### **2.3. Definition of Learning Styles**

Research (Doyle and Humphrys, 1999; Marks, 2006; Cassidy, 2004) suggests that there is no specific way to describe the construct of learning styles as each theorist defines learning style with respect to his or her theory. In addition, learning styles are described by Hilberg and Tharp (2002) as habitual patterns or preferred ways of doing something that are consistent over long periods and across a variety of activities.

Furthermore, Brickell (1993) states that learning style as an individual's repertoire of learning strategies (the ways in which learning tasks are habitually responded to) combines with cognitive style (the way information is organised and represented). Learning style is a biologically and developmentally imposed set of personal characteristics that make the same teaching/learning strategy effective for some and ineffective for others. It refers to "the way people absorb process and retain information" (Brickell, 1993).

Educational researchers (Ortiz and Yates, 2001) have identified a number of factors that account for some of the differences in how pupils learn. These factors include cognitive style, preferred or habitual patterns of mental functioning; patterns of attitudes and interests that affect what an individual will pay most attention to in a learning situation; a tendency to seek situations compatible with one's own learning patterns; and a tendency to use certain learning strategies and avoid others.

Reid (1987) describes learning styles as preferences that often differ significantly from those native speakers and non-native speakers of English. Pupils from different ethnic backgrounds sometimes differ from one to another in their learning style preferences. However, variables such as gender, length of time studying English language, and student learning styles may change in academic environments and experiences.

### **2.3.1. Various Types of Learning Styles**

There are many characterisations of learning style preference. Three preferred styles of learning can be applied to assist pupils to learn and to help teachers to teach (Chih Wu et al., 1998). Additionally, there are a number of different languages used to describe learning styles. All of these languages demonstrate the same personality characteristics.

The most widely used language referring to the different learning styles is a system which divides all learning styles into three basic categories: Visual Learners, Auditory Learners, and Kinesthetic Learners (Doyle and Humphrys, 1999; Thomas et al., 2002; Paeglis, 1997). However, as there is no right or wrong learning style, the critical

question should not be, “Which is the best theory?” but rather, “Which theory is the most effective to foster learning?” Figure 2-2 illustrates the three types of learning styles.

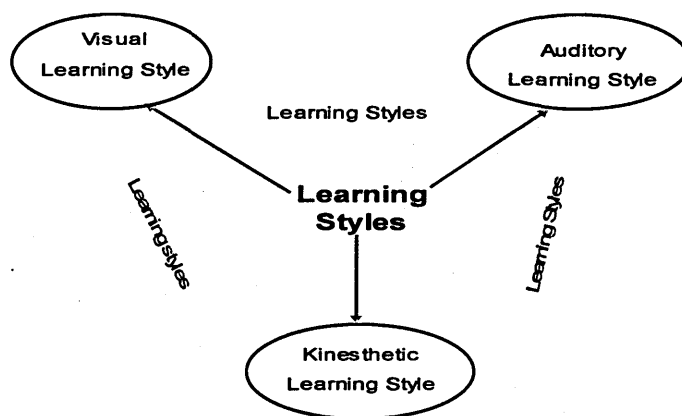


Figure 2-2: Learning Styles

There are techniques of learning which are appropriate for a child’s own preferred learning style. Educational Psychology determines that every person is an individual who will think and act differently from other individuals, hence it is clear that individuals must learn in different ways (Doyle and Humphrys, 1999). Furthermore, the learner’s learning style needs to be known and ‘matched’ with the suitable methodology. The next item that needs to be considered is ICT software which will hopefully create an effective learning environment.

Teachers have to decide the best learning style for pupils through comfortable conversation and enjoyable meaning to process for the learner. Pupils preferentially absorb and process information in different ways: seeing and hearing; reflecting and acting; reasoning logically and intuitively; and analysing and visualising. Some instructors lecture, others demonstrate or lead pupils to self-discovery; some focus on principles and others on applications; some emphasise memory and others understanding. More details of the different learning styles are set out in the following Sections (Thomas et al., 2002).

### **2.3.1.1. Visual Learning Style**

Visual learning style involves the use of seen or observed things, including pictures, diagrams, demonstrations, displays, handouts, films, flip-charts, etc. Pupils who learn from lists, written directions and instructions are categorised as visual learners. They are effectively able to perform a new task after reading the instructions or watching others. It is important for visual learner to sit in the front rows of a classroom, boardroom, or auditorium which could help them to absorb the information even further and not be distracted by pupils' heads or other activities going on. In addition visual learners usually benefit greatly from taking detailed notes. They often believe that the auditory and kinesthetic learners are not really paying attention.

### **2.3.1.1 Auditory learning style**

An auditory learning style involves the transfer of information through listening to the spoken word from self or others, of sounds and noises. It can profit greatly from the use of a sound recorder. Pupils within this category are happy being given spoken instructions over the telephone, and can remember all the words using a 'songs' style. Usually, auditory learners interpret the speaker's meaning by focusing on their tones of voice, speed and other nuances of speech.

Auditory learners concentrate and improve more by reading the text aloud since written information without spoken and heard language does not have meaning for them. They are often thinking that individuals with other learning styles are not really listening. They did not worry about writing information (Doyle and Humphrys, 1999; Thomas et al., 2002; Paeglis, 1997).

### **2.3.1.2. Kinesthetic Learning**

Kinesthetic Learning involves physical experience - touching, feeling, holding and doing practical hands-on experiences. Pupils of this style are able to perform a new task by trying it out and learning as they proceed. They prefer to experiment, hands-on, and never give attention to the instructions first. Kinesthetic learners, also called tactile learners, need the hands-on approach, touching things, trying them out, and moving around while discussing an issue.



These are all ways that kinesthetic learners are able to actively explore the subject at hand and discover its meaning. Kinesthetic learners may have a hard time sitting still for long periods of time and simply listening to teachers. They are likely to relate experiences with strong feelings and know that they have truly grasped something once they feel it inside. They may also feel that other learners are insensitive (Doyle and Humphrys, 1999; Thomas et al., 2002).

### **2.3.2 The Effect of Learning Styles in Pupils Learning**

The effect of learning styles on a learner has been identified by Doyle and Humphrys (1999) as follows:

- Pupils will learn better when using preferences in which they are successful.
- Pupils will be successful learners when they receive the information by the way they prefer and a suitable learning style.
- When teaching accommodates various preferences, more pupils will be successful.
- Teachers can construct activities that include specific (and multiple) learning preferences.

### **2.4. Learning Styles and Special Educational Needs**

In this Section, the author will describe the relationship between learning styles and how each is related to pupils with special educational needs. Marks (2006) explains how everyone with and without SEN processes information differently. In addition, human biology is such that people's individual learning styles tend to cluster into specific categories. While each person's learning-style is unique and should be treated differently, pupils are more global and need strategies to help them organise and understand materials.

Vera et al., (2005) support this view and suggested that people with learning difficulty show deficits in attention, perception, memory and a lack of interest in educational content. They have special educational needs coping with abstract concepts and to generalise and apply acquired knowledge in other environments. They may also have a different cognitive style, with differences in their cognitive processes and strategies,

such as poor personal language and special educational needs when thinking for, and about, themselves.

SEN learners also process information from different and/or multiple perspectives which often cause problems when they are asked to think or work in a "traditional" manner. This means those pupils with special educational needs have different learning styles, which come with sets of characteristic strengths and weaknesses, to 'normal' pupils. The learning strategy of SEN pupils could create difficulties with basic skills such as reading and writing (CACLD, 1981).

Other special educational needs persons may not have special learning needs but only learn effectively in certain formats or environments. In these situations, the problem is not inability, but one of stylistic differences. Often the strategies that cause these special educational needs with basic skills also create aptitudes in other disciplines such as music, engineering or art. Many researchers argue that such successes are not in spite of, but due to special educational needs. A learning styles approach can help with planning for individuals and groups. An initial diagnostic assessment should inform an individual learning plan and help learners to begin to explore their strengths and weaknesses. When drawing up individual learning plans and session plans a learners' style preferences can be taken into account (CACLD, 1981).

Learners can be effectively involved in evaluating and monitoring learning. Exploring preferences for spelling strategies, such as highlighting words within words, can help learners understand that there are different ways of learning, and enable them to share strategies with one another. Similarly, exploring a range of strategies for remembering basic maths facts, times tables and number bonds will help learners to build a strong foundation for number skills development. Learners will gain confidence in their own ability to learn if they are taught in a way which suits them. A learning style approach also helps them become independent learners by exploring how they learn best. It is an effective way of creating a successful learning experience and counteracting previous failure. Offering learners opportunities to learn in the way that they learn best, is the essence of inclusive learning (CACLD, 1981).

## **2.5. The Relationship between Learning Styles and ICT**

Doyle and Humphrys (1999) suggest that individuals think and act differently in every situation. So it is obvious to say that individuals must learn in different ways. In their study they investigated the relation between learning style models and different components of Computer-Assisted Learning (CAL). They studied two different male groups; one, the Test Group experienced a series of topics by way of ICT based software. The second, Control Group was exposed to the same topics by way of traditional teaching techniques.

A Modality Learning Style Test was used to obtain dominant learning style scores. Results indicated that learning outcomes differed significantly based on subjects' learning style. In the secondary analysis, overall there was no significant difference between the ICT-based approach and the traditional 'chalk and talk' approaches (Doyle and Humphrys, 1999), indicating that learning outcomes differ according to the subjects' learning style. Furthermore it should be stated that ICT may not suit all types of learners. As identified earlier, every learner is different in the way they accept learning material.

Learning styles should be presented as a potential variable that influences learning outcomes and preferences. Seung and Sonnenwald (2002) investigated how a workshop on collaboration and ICT was perceived by participants with different learning style preferences. Multiple types of learning outcomes were measured using valid and reliable instruments. Their investigation employed cluster analysis and two groups, or categories, of learning style preference among the participants emerged. Group 1 showed a strong preference for the cooperative learning style and Group 2 adopted both depending up on the stable competitive and cooperative learning styles. Group 1 rated the workshop more positively than Group 2. However, Group 2 reported a larger increase in self-efficacy compared to those in Group 1. Both groups provided different suggestions regarding the content of the workshop: Group 1 suggested adding more discussions and group exercises, whereas Group 2 suggested adding explicit theory or rules to govern behaviour. These findings indicate that learning styles should be considered as a potential variable that influences learning outcomes and preferences.

Felder (2002) supports this view and added that when mismatches exist between the learning styles of most pupils in a class and the teaching style of the professor, the pupils may become bored and inattentive. In addition, they perform poorly on tests, get discouraged about the courses, the curriculum, and themselves, and in some cases change to other curricula or drop out of school. Professors, confronted by low test grades, unresponsive or hostile classes, poor attendance and dropouts, know something is not working. They may become overly critical of their pupils (making things even worse) or begin to wonder if they are in the right profession. Most seriously, society loses potentially excellent professionals. To overcome these problems, professors should strive for a balance of instructional methods as opposed to trying to teach each student exclusively according to his or her preferences (Felder, 2002).

If a balance is achieved, all pupils will be taught partly in a manner they prefer, which leads to an increased comfort level and willingness to learn, and partly in a less preferred manner. This provides practice and feedback in ways of thinking and solving problems which they may not initially be comfortable with (Felder and Brent, 2005).

The use of ICT facilities for primary age pupils with kinesthetic learning styles will improve their learning by using the drag and drop facility of the board. It also allows them to engage with the abstract concepts of number and letter sounds. They can, for instance, drag three objects into an area of the board with the number '3' on it, reinforcing an exercise in numeral identification visually, kinesthetically and auditorily (BECTA, 2007).

Figure 2-2 represents the relationship between special educational needs, learning styles and the ICT which is described in Sections 2.4 and 2.5.

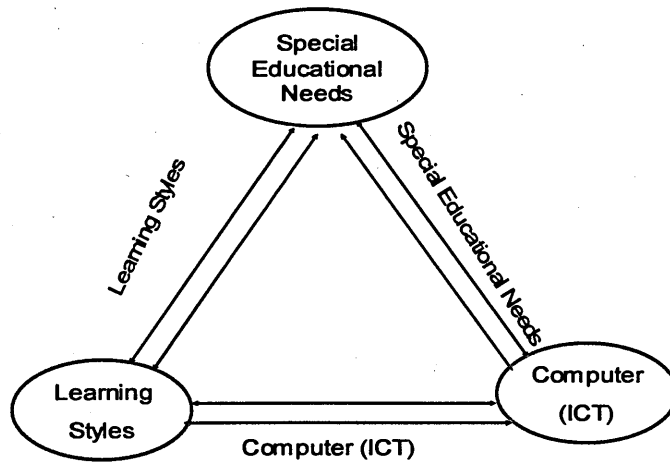


Figure 2-3: The Relationship between Learning Styles, Special Educational Needs and ICT

## 2.6. Parent Involvement with Special Educational Needs Pupils

A number of researchers (Redding, 2006; Austin, 2000; Lunts, 2007; Cotton and Reed Wikeland, 1989; Qiuyun, 2003) identify that learning is a natural part of life, everyone has to do it and enjoy it. Parents play a significant role in enhancing children's learning. They are the first and most powerful teachers and in a position to provide a supportive environment to their children. Parents should familiarise children with special educational needs with the available services which could be the rights mandated to their needs to become successful learners. School can work with the family to improve the curriculum of the home.

Parents who have children with special educational needs have to be good listeners to their children's conversation and to have more fun that affects children's learning. Parents can encourage their children and give them confidence in their activities, such as visiting museums and famous places which are related to their education. Parents also can provide the important affectionate contact with their children at times when the child may be afraid or worried, i.e. when leaving home for school in the morning and when going to sleep at night, the latter especially with young children. It is also

very important for parents to communicate with their children's teachers to help them understand the standards and examples they are setting for their children and guideline them (Redding, 2006).

In similar research described by Cotton and Reed Wikelund (1989) and Lunts (2007), parents have to be more involved in their children's schooling and functions, and respond to school obligations in many different ways such as, parents-teacher association conferences and volunteering at school. They can also become more involved in helping their children improve their schoolwork. Furthermore it is important to provide encouragement, arranging for appropriate study time and space, modelling desired behaviour (such as reading for pleasure), monitoring homework, and actively tutoring their children at home.

Where parents are actively involved in their children's learning this can have a positive effect on school performance including higher academic achievement (Qiuyun, 2003; Lunts, 2007). School and home are very important environments, so both have to work together and teachers can examines how? How parents can be involved in a positive way to help their children become successful learners.

Qiuyun (2003) studied the relationship between different practices of parent involvement and kindergarten children's early literacy. The study involved five parents in three different dimension groups. Group (1) is involved at home including home literacy environment and home cognitive stimulation. Group (2) is involved at school. Group (3) is involved outside the home, including extracurricular activities and uses community resources. The results suggest that there is a stronger relationship between school involvement and home resources, and early literacy. Furthermore the relationship between parental involvement and early literacy for all three groups of parents involves composites; school involvement was a specific associated with early literacy (reading, maths, and general knowledge) for almost all children (Qiuyun, 2003). Figure 2-3 illustrates the important interactions that affect pupils' learning.

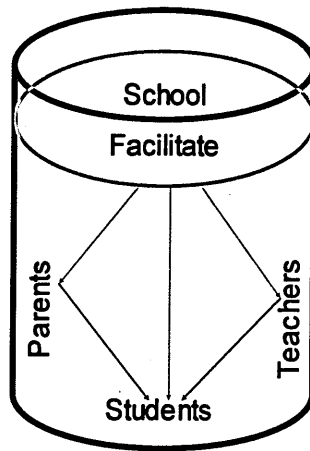


Figure 2-4: The important interactions that affect pupils' learning

### 2.6.1. Strategies to Support Parents

It is important for parents and family with a special educational needs child to understand that the child has to be provided with training to promote and enhance effective coping and problem-solving strategies. Additionally, schools should recognise that parents with SEN child represent a heterogeneous group of individuals. More than envisioning them as having similar skills and needs, an individualised assessment that would identify the strengths and weaknesses of each parent and the family system is required. This would enhance service providers and programmes to target the individual needs of parents to enable the appropriate support that each parent and family requires.

Parents who have children with special educational needs must be assisted with financial resources, professionals and agency personnel to guide them in understanding how to deal with their child's problem. The best way for these parents to be made aware of their children's SEN is to teach them how to collect information relating to their children's problem. However, parents and families struggled with what question to ask when requesting information and/or services for their child from

community service agencies. For this reason they have to know how to communicate with community service agencies to be able to help their children. This should improve parents' abilities to advocate for their children and increase their participation in transitional programming. Furthermore, professionals need to communicate with parents in a manner that respects their style of communication and respects them as individuals (Austin, 2000).

## **2.7. Summary**

Special Educational needs are hard to define, e.g. it could be special reading needs, writing or both. Many researchers suggest that learning accrues when the learner understands the information and can repeat the meaning of it. Pupils are different from one another in a wide variety of ways, including the types of instruction to which they respond best (learning styles), the ways they approach their studies (orientations to studying and approaches to learning), and their attitudes about the nature of knowledge and their role in constructing it (levels of intellectual development). Learning style can change the teaching approaches from concentrating on the pupil's weakness to a focus on which kind of learning styles he/she is most responsive to.

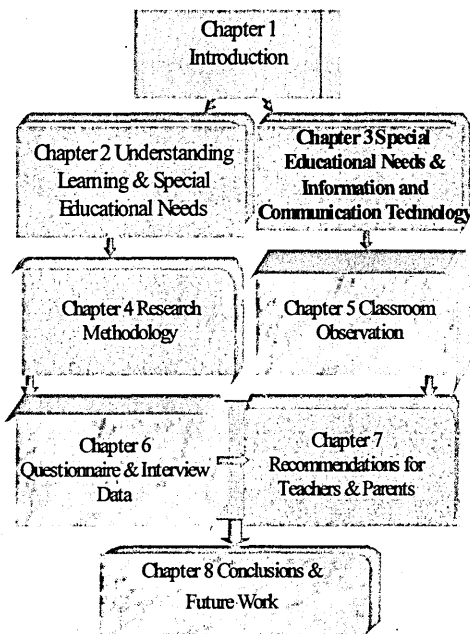
Chapter 3 will continue the literature review to consider the relationship between special educational needs and information communication and technology (ICT).



# CHAPTER 3

## 3. SPECIAL EDUCATIONAL NEEDS AND INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

### 3.1. Introduction



This Chapter continues the literature review to present the relationship between special educational needs (SEN) and Information and Communication Technology (ICT). The first step in encouraging learners to learn about and to utilise technology is to provide support services and technological equipment that is accessible to them. The idea of using ICT as an empowering tool to give pupil control over their learning is widely accepted. The use of ICT can be a most valuable tools in education for

all pupils not only those who have special educational needs (Harris and Boyd 1998).

ICT allow the kind of knowledge building experiences that are not available in the real world, but are important for learning. The use of ICT helps pupils with special educational needs to work creatively, enjoyably and to use advanced tools that improve their learning and solve real problems. In addition technology-enhanced curricular approaches improve the success of all types of learner and may enhance the performance of 'at risk' pupils (Youngblut, 1998; Dede, 2000). Also Taylor and Corrigan (2007) argue that all pupils should be confident, creative and productive users of new technologies, particularly information and communication technologies, and understand the impact of those technologies on society.

The relationship between special educational needs and ICT is described in Section 3.2. The use of ICT can help pupils to learn and the teacher to teach, and their use in the school is explained in Section 3.3. Section 3.4 then identifies the importance of teachers' training and experiences. Moreover, as parents play a significant role in a child's life, the effects of home computing on pupil's learning is discussed in Section 3.5. Section 3.6 explains the difference between writing on the computer and the use of paper and pencil. Section 3.7 provides a summary of the main findings of this Chapter.

### **3.2. The Effect of ICT on Pupils Learning**

There is no simple message from the literature that ICT will make a difference simply by being used, although a number of authors (Convertino, 2006; John and Sutherland, 2004; Brodin and Lindstrand, 2003; Yelland, 2001; Haugland, 2000) suggest that the use of ICT can improve pupils' learning. However, there are a number of issues that need to be considered for such technology to make a difference in pupil's learning. These issues relate to a number of factors such as characteristics of the student population, the teacher's role, software design, subject area and the available technology.

The effect of ICT on primary school pupils was studied by Cárwright and Hammond (2007). They designed a case study of a primary school which was seen as using ICT effectively to support teaching and learning. Their research was carried out over two years (2003-2005). They found that 'fitting ICT in', rather than 'effective use of ICT',

provided a more accurate description of the complex decisions and actions that were made regarding ICT use in the school.

There is a positive impact of the use of ICT on young children who are developing normally and those with special educational needs as suggested by Judge (2006) and McLinden et al. (2002). They describe how the use of frequent encounters with ICT for young SEN pupils will improve their reading and writing. Appropriate technology applications and adaptations can change the lives of many pupils with special educational needs and open the door to an array of learning opportunities that was previously unavailable to them.

In a similar type of research presented by Bialo and Sivin-Kachala (1996), the use of ICT are seen to have a positive effect in all pupils with and without special educational needs from the early years through to higher education. In addition, the use of ICT facilities such as interactive video could have a positive effect on a visual learner. Furthermore, the use of online telecommunications for collaboration across classrooms in different geographic locations has also been shown to improve academic skills. The report also describes the positive learning effects of using ICT on young and special educational needs pupils.

The ICT Test Bed project (2002-06) was initiated by the Department for Education and Skills (DfES) to explore how ICT can be used to support the Government's wider agenda for education reform. The project took a holistic approach to ICT implementation in three ICT Test Bed areas of relative socio-economic deprivation. A total of £34 million was invested over four years, which provided the 28 ICT Test Bed schools and three FE colleges access to very high levels of ICT hardware and appropriate software. The funding provided for investment in staffing release and training support to make the most effective use of this investment. ICT Test Bed work focused on using ICT to:

- raise standards and performance, especially in the areas of school and college improvement, student attainment, and raising the quality of teaching and learning;
- help teachers to concentrate their time on their core task of teaching;

- enable more effective collaboration between schools and their local colleges;
- provide wider learning opportunities to students, their families and the wider community in a home environment (Somekh et al, 2007).

All three ICT Test Bed local authorities have high concentrations of deprivation compared to the national average, though manifest in different ways. The three school clusters had slightly different compositions. The Greater London cluster comprised three secondary schools, each with one of their junior and infant feeder schools. The inner-city cluster in the Midlands comprised a secondary school with seven of its feeder primary schools. The rural cluster in the North of England comprised a secondary school with nine of its feeder primary schools.

The key finding is that the use of ICT on attainment levels was greater for primary schools than for secondary schools. Effective use of presentation technologies led to greater interaction between teachers and learners. Effective use of ICT personalised learning by enabling greater learner choice within the curriculum, improved assessment for learning and more learner-directed teaching. Technology facilitated more effective assessment for learning by making it easier for learners to be more involved in target-setting and for teachers to give individualised feedback (Somekh et al, 2007).

The effect of ICT facilities such as interactive whiteboard with primary school pupils was examined by Wall et al, (2005). The pupils' views of the use of interactive whiteboard as learning and teaching tools were reported. All the comments from the pupils were positive referring to the ways that different elements of software and hardware can motivate, aid concentration, and keep attention. On the negative side, pupils candidly describe their frustration with some technical difficulties when they desire to use the board themselves.

Mioduser et al. (2000) examined the impact of ICT in early reading skills. They designed a study which contains three groups with each group receiving different materials to examine their phonological awareness, word recognition and letter recognition. The study was examine the unique contribution of computer-based

instruction when compared with more conventional modes (i.e. teacher instruction with textbooks) to early reading skills acquisition, as well as the effects of specific features of computers on early reading skills performance. Their study suggests that pupils' received computer materials have been improved in the area of phonological awareness, word recognition, and letter naming skills when compared with their peers who received a reading intervention programme without computer help.

ICT is more than tool for bringing efficiency to traditional teaching approaches; they also open new and unforeseen avenues for learning. The use of ICT encourage pupils' knowledge explicitly to build their integrated/concrete knowledge. Therefore the use of practice software between ten and fifteen minutes a day could increase pupil's achievement tests. Rauterberg (2004) explains that the use of technology, especially ICT facilities, in the education field has to be designed to have a positive impact on the user to be improved if it is to succeed. Furthermore, the content and context of these services have to be more important than their actual use.

Hartley (2006) looked at the effects of ICT teaching and learning by considering examples of pupils carried out with five kinds of teaching in five contexts. The teaching situations are direct instruction, adjunct instruction, facilitating the skills of learning, facilitating social skills and widening learners' horizons. The five contexts are primary schools, secondary schools, higher education, special education and out of school. The aim of his study was primarily to inform teachers about current work in these different areas. Hartley shows dramatically how the use of ICT as a new technology can and will infiltrate the home and the educational system, and that pupils are much more relaxed than adults in using ICT. This infiltration of new technology into schools in the UK is illustrated in Table 3-1.

	Primary School	Secondary School	Special School
1985	105	60	
1990	40	18	
1995	15	9	4
2000	13	8	4
2004	8	5	3
2006	3	2	2

Table 3-1 Computers in UK Schools from 1985 to 2004 (Adopted from Hartely, 2006)

Convertino (2006) argues that ICT use has grown the fastest for pupils between the ages of 5 and 10. However, there is no doubt that the use of ICT as new technology is actually changing the life of other groups such as teenagers. There is a great confusion in the current “scientific” discussion about the influence of using ICT on children’s health. Science provides several reasons and specific examples where ICT appears to hamper children’s physical, emotional, social or intellectual development (Convertino, 2006). Children need stronger personal bonds with adults, and this is essential for a healthy development. In addition the current emphasis on technology has diverted adult’s attention from the urgent social and educational needs of children. He also argues that such a generalised critique of technology misdirects attention from the important political and pedagogical concerns and impedes the future progress of research and practice that can promote appropriate and beneficial use of ICT (Convertino, 2006).

Condie et al. (2007) indicated that the use of ICT is most effective in enhancing the learning experience. Teachers are able to integrate a number of technologies such as laptops, interactive whiteboards and the internet in their teaching subjects. Such combinations of hardware, software and connectivity allow them to develop innovative approaches to learning and teaching. In addition teachers’ confidence and skills levels have improved significantly in recent years, in part due to the provision of more relevant and appropriate staff development opportunities.

### **3.2.1. The Effect of ICT on Special educational needs**

An international conference was held in Missillac, France in July 1993, which investigated the importance of using ICT in pupil's learning needs. The participants agreed that the use of ICT would enhance the quality of life for pupils with special educational needs. Price and Samuels (2000) describe that technology itself as a compensatory approach can not fix or solve the learning problem but it can increase strengths and minimise the learner's weaknesses. This technology can allow individuals with special educational needs to reach their target deficit areas in an attempt to solve their learning problem.

The effect of using ICT for SEN pupils is described by Harris and Boyd (1998) who designed multiple case studies involving twelve pupils from three geographic areas. The pupils had been provided with computers to assist their learning. At the beginning of the study pupils from 4 years to 11 years old attended a childhood education centre; except the 5 year olds who attended primary school. All pupils were described as having high or very high needs. On average the pupils spent eight hours a week using computer with members of their family for the first year of the study, 1997. It was different in the following year during which pupils spent less hours using computers at home. They became more confident about their personal skills and had enough technical support through the study. In both years nearly all the educators reported that pupils enjoyed working with computers but this varied depending on the activity undertaken.

The use of ICT can help improve pupil's mobility and their sense of control over their learning needs (Clements, 1998). Not all the researchers agree that pupils can use ICT at a young age. However Rauterberg, 2004 indicated broad agreement that adults and children (normal, impaired and special educational needs) need to become competent users to be prepared for life and work in the future. The use of ICT could be seen to contribute to possible harm and improved quality of learning, well-being and positive development (Rauterberg, 2004).

### **3.2.2. The Effect of ICT on Pupils' Writing**

Writing opens up a lifetime of learning and delight to school age pupils especially those with special educational needs. Price and Samuels (2000) investigated the application and effectiveness of ICT for improving the written language performance of pupils with SEN. They found that the use of ICT shows promise for this population, particularly for pupils with special educational needs in written language. They also suggested that the use of ICT will improve the written language for SEN pupils and the quality of their work.

A similar view for English studies has been reported by Torgerson and Zhu (2003). In their review paper they describe that the effects of computer-based techniques are positive for the teaching of writing. However, the effect of the computer is much more mixed positive than negative for teaching reading and spelling. That means the use of computer could improve the quality of teaching pupils to read.

Cunningham and Stanovich (1990) suggest a different view of learning. They suggest that pupils learn words by rote learning. Rote learning is learning word by repeating a word that has been spoken and written for the learner, writing the word while pronouncing the name of each letter, and then repeating the whole word again.

Despite the high percentage of pupils with special educational needs related to the written language there has been a lack of empirical research into the effectiveness of specific technologies to compensate for particular SEN areas. Therefore, while ICT is one type of assistive technology that is widely used and the general assumption is that the ICT is "helping", little is known about exactly how it is helping or what specific programs might best address particular written language concerns. Significant differences between normal and special reading needs pupils were found at the discourse, sentence, and word levels, with those pupils performing significantly worse than normally developing pupils on most of the measures analysed (Murphy, 2006).



### **3.2.3. The Effect of ICT on Pupils' Reading**

The use of ICT tools and learning environments to enhance reading has been discussed by Pearson et al. (2005) and Elkind (1998). In addition a major improvement is that the use of ICT, as a reading machine, can enhance the reading rate. Furthermore ICT can both increase the length of time that reading can be sustained and have a positive effect on the quality of the synthesised speech and facilities for enhancing the learning of those with special educational needs. This means ICT can help SEN pupils to learn to read quicker by the use of special software by rebating the program more than one time.

According to Tillman (2006) there has been a positive relationship between computer-assisted and reading instruction achievement. The benefits of providing computers in kindergartens occur when the computer provides concrete experiences; pupils have free access and control the learning experience, pupils and teachers learn together; teachers encourage peer tutoring; and teachers use computers to teach powerful ideas. There is a different view from Torgerson and Elbourne, (2002) who found that the evidence base for the teaching of spelling by using computers was very weak.

Howell et al., (2000) identify the impact of ICT-based balanced reading instruction approach on the early reading abilities of first-grade pupils. The pupils identified as having great special learning needs to read, and/or educational special needs, by their school system were often referred for special education placement when they did not make expected progress in the remedial programmes provided by reading specialists. Additionally their study revealed that ICT systems help pupils who have the most difficult time learning to read and write.

### **3.2.4. The Relationship between ICT and Literacy**

The value of the relationship between literacy and ICT is crucial. Literacy and ICT are two words that seem to be increasingly paired in today's world. People often describe the need to become ICT literate as one of the important technological contributions in most schools. The use of ICT can improve literacy acquisition and instruction. It is a part of a practice field or community of practice; we cannot separate this technology

from the cultural context of which it is a part. The use of ICT is seen as part of the learning environment (Bertram 2006).

The National Educational Technology Standards for instance have been developed to ensure that pupils are learning through technology. Also the use of digital tools to acquire knowledge in content areas is very real in the policy and practices of today's schools. The International Reading Association suggested the following learner's rights in 2001 in its position statement on literacy and ICT:

- Teachers who are skilled in the effective use of Information and Communications Technology (ICT) for teaching and learning.
- A literacy curriculum that integrates the new literacy of (ICT) instructional programs.
- Instruction that develops the critical literacy essential for effective information use.
- Assessment practices in literacy that include reading on the internet and writing use word processing software.
- Opportunities to learn safe and responsible use of information and communication technologies.
- Equal access to ICT (Pearson et al., 2005).

Hoffman and Blake (2003) explain that pupils' access to ICT occurs in two ways: formally through school programmes and informally at home or elsewhere. Pupils use ICT to share what interests them. It is essential for lifelong learning and we cannot underestimate the role that technology has played in the development of Information Literacy. Hoffman and Blake (2003) also found little evidence of benefit for the use of the ICT in spelling or reading. Moreover the use of word processing helped weaker writers to improve the quality of their writing.

A different view, advocated by Torgerson (2006) in his review, and reported in the use of word-processing instructional adaptations for specific features of word processors, hypothesised that the small gains found for the use of word-processing could possibly be enlarged with the addition of both this feature and explicit prompts

to guide higher order thinking. Generally the quality of reporting of meta-analyses in the field of computer-based instruction in literacy learning was high, with all reviews reporting the justification for the review, the methods and results.

### **3.3. The Use of ICT in the School**

The use of ICT in the school helps both teachers and pupils to update their knowledge and have access to new skills in the education field (Al-Ghamdi et al., 2004). The use of ICT-related technology has to be used equally and regularly by teachers and pupils. The International Society for Technology in Education (ISTE) and the National Educational Technology Standards for Teachers (NETS-T), created a union to categorise the standards of using technology including ICT in education and to determine the necessary skills for pupils at different levels. They found that the use of technology, including ICT, in the education field will help pupils be successful learners. One of the important goals of the ISTE is to prepare pupils to be constant learners who can make informed decisions about the role of technology in their lives. Pupils must be able to use technology efficiently in order to succeed in their educational life.

The way that schools employ ICT in their pupils' learning is different from one to another but equally successful (Haugland 2000). Haugland (2000) explains that pupils in the young age group who usually use ICT with supporting activities reinforce the major objectives of the programs. They have the highest score compared with their peers without ICT experiences in the same classroom in different areas of knowledge such as, intelligence, nonverbal skills, long-term memory, conceptual skills, structural knowledge, verbal skills, problem solving, abstraction, and manual dexterity.

Pupils who were educated using ICT in special schools for pupils with severe special educational needs improve quicker than those in normal schools without access to ICT (McLinden et al., 2002). The use of ICT could motivate pupils, enhance instruction for pupils with special educational needs, improve pupils' attitudes towards learning, and motivate teachers and free them from some routine instructional tasks. The effectiveness of ICT in schools presented by The Software Publishers

Associations, 1990 led to a number of pupils on the use of ICT as a learning tool. The outcome of the studies suggested that ICT has a positive impact on pupils learning in many areas such as, the pupils' attitudes, interaction with the teachers, and their achievement (QCA, 2000).

### **3.3.1. Effect of ICT in the School**

The importance of information and communication technology extends to the government who created three national surveys to collect information on the ways teachers and pupils used ICT in the classroom. The results of the survey provide evidence related to the use of ICT and new technology as an important part of everyday experiences for pupils and teachers within and outside school. The survey was undertaken as five case studies: two primaries, two secondaries and one special school. Its results show that ICT has a positive effect on both teaching and learning within the school. The use of ICT in the school not only improves learning and teaching but will also improve other areas of the curriculum. Additionally it will encourage critical reflection on the effectiveness of the learning and teaching process and this has led to the transference of skills developed within language (Scottish Executive Report, 2005).

The effect of ICT in teaching described by BECTA (2004), the body responsible for advising ICT policy, that good teaching was seen in over 60% of lessons involving ICT, compared with 54% of all lessons in primary schools. In addition there is evidence of the steadily increasing impact of ICT on the quality of teaching across the range of subjects of the curriculum in secondary schools. Moreover the use of ICT has helped to address workloads for teachers. It also offers more efficient management, storage and maintenance of teaching and administration, with time savings (after initial time investment).

Bowen (1999) suggested that information and communication technology should be used to aid the school to develop the medium term planning in relation to the use of design and technology in the school. According to Youngblut (1998), teachers report their role in the classroom as changing. Instead of being a teacher with all the answers they have found themselves acting as facilitators who support pupils in their discovery

of the world and in their building of ideas based on information gained from technology.

Abbott et al, (2004) suggest that cultural awareness developed as far as cognition allowed, when pupils in schools became aware of similarities as well as differences. Those pupils with sufficient keyboard ability benefited from computer conferencing and ICT competence, but the much preferred medium for collaborative, inter-school work was videoconferencing. All but the most dependent pupils could participate, and valuable, transferable social and communication skills were acquired.

### **3.3.2. The Effect of ICT in the Classroom**

Some writers (Kehr and Greyrose, 1998; Hasselbring and Williams, 2000) argue that technology can play an especially important role in improving the quality of learning and teaching for SEN pupils.. The use of ICT facilitates a broader range of educational activities to meet a variety of needs for those pupils, but adaptive technology now exists that can enable even those pupils with special educational needs to become active learners in the classroom alongside their peers who do not have special needs. ICT activities help pupils with and without special educational needs to demonstrate significantly increased socialisation and turn-taking skills when engaged in free play centred the ICT. Furthermore, ICT activities improve the communications and friendships between normal pupils and SEN pupils compared with non-ICT activities. In addition, ICT can play a significant role in helping pupils with special educational needs to improve their learning within the mainstream classroom (Hasselbring and Williams, 2000).

The use of ICT within the classroom offers opportunities for new approaches to teaching and learning. These opportunities extend to the learning environment beyond the classroom and allow pupils to communicate with adults, other than their teachers and family members, such as new friends. The use of ICT in the classroom is important as it serves to emphasise the multimodal character of pedagogy. ICT applications introduce new kinds of text into the classroom and these demand different practices by pupils, such as the use of presentation (Jewitt, 2003). Talk is not always the primary mode in school and the same seems to hold true for the English classroom. The availability of software controls how and when pupils learn.

The multimodal character of teaching and learning means that each pupil is involved in making personal sense of the combination of modes as they are organised in the classroom. The task before the pupil is to know what signs from this multimodal ensemble, or their experiences in the classroom, to include and what to exclude from their accounts in order to construct an appropriate response (or text) to learn. The use of ICT mediated learning brings these issues to the fore. First, in the move from page to screen a range of representational modes (including image, movement, gesture, music, sound effects, and voice quality) are available as meaning-making resources and these are newly conFigured on the screen.

In his article, Loveless (2003) suggest that ICT can play a significant role in 'creating spaces' in the primary curriculum, in which they can be seen as both a tool and a medium for pupil's higher order engagement with creative processes. The view of ICT capability in the English National Curriculum focuses on the purpose of the activities which can be carried out right across the curriculum, not restricted to specific subject areas. There are five main 'strands' in the primary and secondary Key Stages 1-4:

- finding things out;
- developing ideas and making things happen;
- exchanging and sharing information;
- reviewing, modifying and evaluating work as it progresses;
- a breadth of study in which pupils are taught knowledge, skills and understanding (Loveless, 2003).

The effect of using ICT in the school does not concentrate on the quality of learning outcomes only but it predisposes pupils to engage with the learning ideas and offers new and dynamic ways of learning that were not possible without the use of ICT (Yelland, 2001). It is evident that the use of ICT has to be an integral part of classroom life.

### 3.3.3. ICT in the Classroom

There are many different ways which ICT can be involved to improve pupil's learning in the classroom. Many examples have been highlighted to suggest ways of involving ICT-based applications to improve how and what pupils learn in the classroom. The success of using ICT is supported by four fundamental characteristics of learning: (1) participation in groups, (2) frequent interaction and feedback, (3) active engagement, and (4) connections to real-world contexts (Venezky, 2004). In addition ICT helps pupils to understand core concepts and expand in many subjects such as science, maths, and literacy. Moreover ICT is a very effective learning tool which takes place when embedded in a broader education reform movement that includes improvements in curriculum, pupils' assessment, teacher training, and a school's capacity for change (Venezky, 2004).

Judge (2006) supports this view and suggests that there are some factors that affect the use of ICT in classrooms such as, (a) the availability of technology, (b) teacher training, (c) the physical and social arrangement, and (d) quality of the software. The impact of ICT on pupils with special educational needs who are having frequent encounters with ICT is very positive in their reading and writing. The ICT-based learning has a positive effect on young pupils with and without SEN (Judge, 2006).

The use of ICT in the classroom supports learning and the conditions required for successful implementation. The use of educational technology was found to increase understanding, whereas others proved less effective such as the use of the interactive whiteboard to replace the blackboard. More specifically, ICT-based applications encouraged pupils to reason more deeply whereas applications that attempted to make repetitive skill practice more entertaining for pupils actually seemed to decrease performance. That means ICT can have positive effects on pupils' achievements while other uses of ICT, such as simulations and enrichment applications, were found to have only minimal effects. Also the use of ICT supported by good software will improve the role of pupils in the classroom (Roschelle et al., 2000; Penuel et al., 2002).

### **3.4. Teacher Roles**

There is little doubt that ICT has the power to transform the way teachers teach (Wheeler, 2005). In addition its use affords endless possibility for the enhancement of pupil's learning. Teachers need to ask whether or not the power of information and communication technology is being harnessed effectively. They also need to consider the multitude of ways in which ICT can be successfully deployed in the primary classroom. It is important for the teacher to recognise the positive and negative responses from the use of ICT on how it changes the teaching process and particularly the role of the teacher, who can take on a more facilitatory role (DfES, 2001).

It is widely accepted that information and communication technology (ICT) is playing an increasingly important role in education. Teachers are also expected to take up their new role as a learning facilitator and develop in pupils the skills to critically and intelligently select, analyse, absorb and present the abundance of information obtained through the use of ICT. The definition of teachers' training described by Brünemann et al., (2002) is broad and not only means courses and lectures, but also peer consultancy and networks of teachers, because teachers learn most in practice, working with colleagues.

Children were born to learn no matter how different they are. They also have the ability to learn – we just need to find the right tool. These tools include the right educational environment e.g. ICT and the right teacher. Teachers have a responsibility to help parents in understanding their children better and to be aware of their educational needs. Teachers and principals should take the necessary time with each parent to explain their child's learning styles to increase his/her study time and decrease special educational needs. They also need to help the parents to understand that while their child may need to study in a non-traditional way, they are capable of not only learning in that way, the odds improve that s/he will learn even more by studying in that manner (Martin and Potter, 1998).

Selwood and Pilkington (2005) designed a survey and interviewed staff at 32 schools (primary, secondary and special), and came to tentative conclusions regarding the potential benefits for teachers from using ICT. They found that by the end of the one-



year study, the teachers generally felt more positive about the potential of ICT for helping to reduce their workload. They suggested, for example, ICT could help them to monitor pupil attendance, progress and performance, and create reusable teaching materials.

Martin and Potter (1998) expect that schools could improve achievement levels by providing programmes that give parents concrete information about parenting styles, teaching methods, and the school curriculum. Also educators have a responsibility to the pupils and their families by helping them understand and meet the pupil's learning needs. There is evidence that ICT helps primary school teachers to be more effective in their teaching, especially if they are well resourced (Cox et al, 2003).

#### **3.4.1. The Interests of using Computer for Pupils with Special educational needs as a Reading Machine**

The use of ICT can make reading easier for pupils with special reading needs by using different forms of support and help with reading such as ICT programmes, audiotapes, choral reading, and partner reading. These ways include:

- Experimentation with texts of various levels of special educational needs;.
- Motivating pupils to read more by taking into account their interests, the variety of reading materials available to them, and the personal, linguistic, and cultural relevance of texts. Consult with the school librarian or someone knowledgeable about pupils and literature;
- Developing areas of interest and teaching pupils to feed those interests through reading;
- Experimenting with supplements to text reading such as word and subword study, word lists, and the proportion of time devoted to text- and word-level practice;
- Measuring pupils' text fluency regularly to inform instructional decision making (Jenkins, 2006).

The learner should have teachers whose are experienced and trained in using ICT as a learning and teaching tool.

### **3.4.2. Teachers' Training (Teachers' subject knowledge) for the use of ICT**

Teaching pupils to read is difficult and complex and technology can not replace qualified teachers. However, the use of ICT facilities can help and support teachers to be more successful with all types of pupils. Helping pupils to read can require insight into pupil's cognitive abilities and emotional needs, and is dependent upon the types of reinforcement, guidance, and support that can only be provided by caring, knowledgeable teachers (Sherman et al., 2004).

Researchers (Haugland, 2000; Yelland, 2001; Blackhurst and Edyburn, 2000; Judge, 2006) agree that teachers must have ICT training in order to prepare teachers who will be both knowledgeable and skilled in using ICT in teaching and learning. Pupils with special educational needs should have special educators/teachers rather than normal teachers to understand their needs. Everyone who will teach using ICT must have courses in technical information about the use of ICT, rather than methods for integrating ICT into instruction (Berger and Carlson, 1988).

Teacher training and ICT support are very important factors in supporting pupil's learning. Teacher training and time for self-directed exploration and learning will help them to be confident, familiar, and skilled in choosing software and integrating technology into the curriculum. Training also supports the use of ICT to improve pupil's learning. There are major barriers for utilising ICT such as a lack of technology training and support services. Teachers can also participate in workshops that integrate developmental theory and research regarding ICT use with hands-on experience. Mentors can also provide teachers with affirmation, support, and suggestions for classroom use. As teachers implementing technology in the classroom, their vision of the role of technology in teaching and learning will undoubtedly change (Judge, 2006; Haugland, 2000). As described by Waite (2004), teachers should have more and clearer priority given to useful classroom activities in ICT training. Its success in transforming the nature of teaching and learning and giving pupils skills for working life will depend on its congruence with teacher.

Blackhurst and Edyburn, (2000) demonstrate how to improve instruction for people with special educational needs and the history of special education technology. Because school increases the use of technology for pupils with special educational needs, it is important to have access to instructional materials, media, and technology for special education teachers. Moreover, McLinden et al., (2002) and Yelland, (2001) report that SEN pupils need teachers who are educated in the area.. Learners with special educational needs need special schools to address those needs. If teachers are not qualified to teach with ICT, the effect of its availability alone might generate biased achievement that would limit their usefulness.

Whitehurst (2006) states that it is very important to listen to young people with special learning needs about the inclusion of new technology. If the young learner with special educational needs speaks about the advantages and disadvantages of the new technology this could improve learning. As demonstrated by Hasselbring and Williams (2000), teachers have found that involving ICT for pupils with special educational needs can assist them to succeed in levelling the playing field within the regular classroom. According to Behrmann (1998), teachers have to be aware of the importance role of ICT tools for pupil's learning. It is important for teachers to understand that virtually all applications of ICT tools for pupils to learn, as well as tools for teachers, provide learning opportunities and can be defined as assistive technology. This is true for individual pupils with special educational needs whose needs have a primary impact on academic performance (SEN) or functional performance (multiple physical and visual disabilities).

The new policy document on ICT in education also criticises some training courses for being skewed towards training in ICT skills, not the application of ICT to enhance learning and teaching (Chi Lai, 2005). As argued by Delargey (2006), basic ICT skills training is not enough to equip pupils teachers to use ICT effectively in their teaching. For teachers to develop and renew professional skills, they have to have a diploma in the use of ICT in order to teach ICT (Delargey, 2006).

### **3.4.3. Government Targets**

Government targets for 2002 as Outlined in the National Initiatives included the following:

- Teachers should be confident and competent in teaching using ICT across the curriculum. A main mechanism for achieving this is the New Opportunities Fund (NOF) training for teachers and librarians; this scheme utilises funds raised by the national lottery to support projects in education, health and the environment. Under this scheme, schools have to plan and implement programmes of in-service training with the aim of raising the skills levels of all teachers, rather than just ICT specialists.
- All schools should be connected to the Internet; within England, the National Grid for Learning (NGfL) represents both a means of accessing information (connectivity) and the numerous resources available (content) to support education and lifelong learning (Harris and Kington, 2002).

#### **3.4.4. Teacher Experiences (ICT Skills and Confidence)**

Teachers with only a few years' experience have been more supportive of the inclusion of SEN pupils in mainstream schools (Al-Zyoudi, 2006). According to Ortiz and Yates (2001), the most important variables influencing performance in a learning language are learning styles and strategies. Teachers need to understand the pupil's need and his/her ability to learn through appropriate teacher training in both learning styles and learning strategies. Furthermore, teachers can design instructions which meet the needs of individuals with different stylistic preferences and teach pupils how to improve their learning strategies.

According to Cox et al, (2003) teachers who favoured ICT were likely to have well-developed ICT skills and to see ICT as an important tool for learning and instruction. They were also likely to value collaborative working, enquiry and decision making by pupils.

#### **3.4.5. Recommendations for Developing Policy for Early Years of Education**

- Resources for professional training in ICT in early education should be expanded to take account of the needs and benefits highlighted by the KidSmart Early Learning programme.

- ICT resources should be made more generally available to the early years of education sector and fully integrated into school curricula to deliver the established benefits for early years of education development.
- Parents should be helped to support the education of their children through the development of parental partnerships. ICT has the potential to stimulate this involvement.
- There is a need to support knowledge building and co-operation at all levels. Resources should be made available to support active networks of parents and teachers (Berry et al., 2003).
- Teachers need to read and understand the literature and the research, to work with and teach pupils with special educational needs. Teachers have to accept that they are teaching SEN pupils and the teacher can be an advocate for the pupil and his/her family. Teachers have to be experienced in all of the things which make them able to teach (Hovis, 2004).

#### **3.4.6. Teacher Support and Facilities**

As described by Brünemann et al., (2002) the governmental objective for professional development is stated in *Education on line*: 'Over the next few years, teachers, head teachers, school boards and others working in or for a school will acquire the knowledge and skills they need in order to integrate ICT effectively into new school practice'. Therefore, the government will focus on:

- The Digital Drivers' Licence which is a certificate intended for teachers in primary and secondary education to improve their ICT skills. The government has defined a set of objectives for these skills.
- The post of ICT co-ordinator that every school has to appoint. The ICT co-ordinator is the person in the school (usually a teacher) who stimulates instructional use of ICT in the school.
- The terms of reference for school management which specify the skills a school manager must have to be able to implement the managerial, educational, and financial changes, as well as the human resources necessary to introduce ICT into the school.

- The relationship between ICT and teaching methods. How can teachers make good use of the endless possibilities of ICT?

Herbert et al., (2006) suggest that in order to improve the environment for teacher training, and the environment for working as a staff member, institutions need to adopt a more systematic and systemic approach to ensure they appropriately manage, support and train their teaching staff. In addition, it is important to note that "uniformity of practice may be administratively efficient but [it is] educationally unsound" and in their efforts to apply consistent policy to all circumstances involving teaching staff, many schools and faculties are hampered by over-regulation at the institutional level.

Brodin and Lindstrand (2003) explain that educators working with pupils with special educational needs need special support and training in the use of ICT and software. The results of their study show that teachers have to do a training programme focused on improving pupils with special educational needs reading and writing abilities.

### **3.5. The Effect of Home Computers on Pupils' Learning**

Rauterberg (2004) states that over 60% of UK children have access to home computers. It appears that the use of this new technology by children at home for educational purposes is rather limited, and that most of the time is spent on computer games. (Some investigators suggest, of course, that game playing is not always mindless – arguing that it can enhance cognitive and spatial skills). Brodin and Lindstrand (2003) suggest that children can become participants and active problem-solvers through ICT activity. Children with special educational needs can experience the happiness of playing and experience a feeling of solidarity at the computer.

The use of ICT offers a communicative form that can adapt stimuli to the pupil's needs. Adults and children, normal, impaired and special educational needs, need to become competent users to be prepared for life and work in the future. Children's growing use of entertainment technologies increasingly brings with it both the risk of possible harm and the promise of enriched learning, well-being and positive development. Moreover, pupils who have access to computers at home have better attitudes and show more self-confidence when using computers than those who do not

use computers at home (Convertino, 2006). Effective solutions to the problem of the digital divide should consider providing not only access to computer hardware, but also training and software that makes computers useful and meaningful to children (Convertino, 2006). Moseley et al, (2001) support this view and suggest that the home use of ICT often provides more and better opportunities for learning than use in school.

Penuel et al. (2002) support this view and suggest that pupils from the same schools who have access to home computers significantly outscored a group of pupils without access, on a measure of technology skills. Moreover pupils with home computers had a more positive attitude toward computers than pupils without them.

The use of ICT at home will improve the relationship between parents and school through communication. Valentine et al, (2005) described that parents preferred to be able to contact schools via email, to have training and help from schools in relation to supporting their children with school work using ICT and to have more information about which websites they should encourage their children to use. In addition the ability of parents to support their children's use of ICT varied widely according to whether they had developed ICT skills through training courses or using computers in their own occupations. Teachers were only providing guidance about ICT use to parents who were knowledgeable or motivated enough to approach them for help and so were implicitly reproducing divides in pupils' access to home support. Moreover there is a need to find ways of reaching 'hard-to-reach' parents. For example, family literacy and learning programmes should include sessions which address how parents can support children's use of ICT for school work (Valentine, 2005)..

Subrahmanyam et al., (2001) explored how the use of ICT as a new technology will affect other activities. They also investigated how the time pupils spent on computers affected the time on other activities, e.g. playing ICT games and browsing the Internet was often regarded as better than playing outside with friends. They suggest that factors such as age, gender, and ethnicity affect the influence of home computer use on cognitive skills, academic development, social development and relationships. They found that computers used by a male adult in the home were positively

correlated with male and female pupils. In addition pupils with home computers reported higher and better grades in Maths and English than pupils without one.

The use of electronic communication and games by children was investigated by Rauterberg (2004). The study consisted of two programmes named the After School Programme and Classroom Programme. The After School Programmes were called "The Fifth Dimension" and included the typical uses of home computers, such as educational software, computer games, Internet, and multi-user dungeons (MUD) activities. Subject matter included social development, geography, communications, reading, writing, social studies, health, technology, language, and problem solving. The computer games and Internet activities were based in a social and cognitive context that includes a ladder of challenges (Rauterberg, 2004). The results show that technology is sufficiently advanced for both classroom and home computer.

Subrahmanyam et al., (2000) describes that how the time is spent on home computer displays other activities such as playing games. However, the use of the ICT as a learning tool instead of watching television is defiantly positive; but using the computer to replace playing with other children or practising sport will adversely affect a child's health and communication skills. The use of computers and telecommunications technologies has been increased by family users, also new opportunities to forge home/school connections supported by new and advanced technologies have become possible. Many new programmes have been implemented in recent years that make desktop computers available to pupils for use at home.

There are some factors that affect the ability to learn such as learning styles, teacher training, the availability of the ICT, parental involvement and teacher experiences which are illustrated in Figure 3-1.



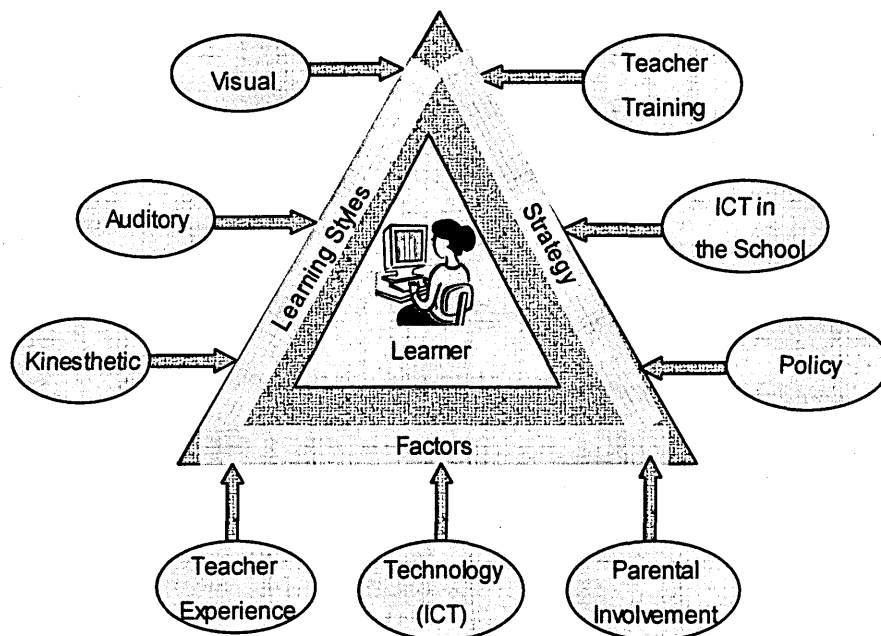


Figure 3-1: Factors that Influence the Learner

### 3.6. Use of Word Processors to Improve Writing

Computers can be very helpful in improving the written language performance of pupils with special learning needs. They are the most common type of supporting learning technology that affects learners. In addition there are many different software packages and other assistive devices available to support SEN pupils to improve their learning. Computer facilities such as word processing, spell-check/grammar-check and spreadsheet capabilities can improve learning for all pupils with special educational needs (MacArthur, 1988).

For those pupils who struggle with reading and writing skills, word processing can play a significant role in improving those skills. In addition, teachers must provide written instructions to make a difference by way of contrast but the use of word processing software can have great benefits for SEN pupils by allowing them to become more active in the writing process itself.

Research in the field of writing using the computer has a long history and during the 1980's and early 1990's it was suggested that writing on computers may help pupils produce better work. Goldberg et al., (2003) investigated the impact of word processing on pupils writing. The result of their study describes how word processing has a positive impact on pupils of all ages and improves some skills such as the ability to master the QUERTY keyboard. Although they did report that when pupils write on a computer they tend to produce more text and make more revisions.

The British Education Communication and Technology Agency (BECTA) (2003) suggest using web-based resources in Primary ICT. As they progress through primary school, pupils should develop skills in using a wide range of ICT tools. Most of the ICT curriculum at Key Stages 1 and 2 can be taught using a set of basic software tools including (BECTA, 2003):

- A word processor with word bank and the facility to integrate pictures and text;
- A paint package;
- A multimedia authoring package;
- An object-based graphics package;
- Graphing software;
- A database;
- A spreadsheet;
- Logo;
- An email package.

There is a different view from Cox et al, (2003) who suggested that it is important to consider the extent of home use of ICT, and the way this may affect pupils' perceptions of school use. They also described that there are gaps between the type of programmes have been used at home and at school. One survey for pupils in years 3 and 5 (ages 7–8 and 9–10) found that the most frequent activity at school was word processing (which the pupils found boring), while the most popular activity at home was playing games. The result of their study suggested that schools should learn from what works at home and allow pupils to work on activities that they find valuable, motivating and worthwhile. Another problem arises from the fact that pupil'

computers at home are often far in advance of those they have access to at school. Teachers need to acknowledge pupils' innovative uses of technology at home when developing their practices at school.

### **3.6.1. Differences between Writing on Computer and using Paper and Pencil**

Goldberg et al., (2003) investigated the difference between writing with computers and paper and pencil. They show that significant effect sizes in favour of computers were found for quantity of writing on computer and quality of writing with paper and pencil. In addition it was a mixed result, i.e. pupils who use computers in learning to write are more engaged and motivated in their writing, and produce lengthier texts of higher quality. They also described how the writing process was more collaborative, iterative, and social in computer classrooms when compared with paper and pencil environments.

In the same view of research but with different results, Russell and Haney (1997) demonstrate the difference between writing on computer versus paper-and-pencil. Their study has been carried out on middle school pupil's performance in multiple-choice and written test questions. They show that multiple-choice exam results do not differ greatly between pupils who write on a computer and those who write by hand.

Not all the researchers agree about the computer replacing paper and pencil. Goldberg et al., (2003) examined the difference between writing on computer and using paper and pencil. They conclude that when a pupil writes using paper and pencil he/she has a plan. First the pupils outlined their ideas, wrote a draft, then revised the draft, produced a second draft, and then proof read the draft before producing the final version. This improved the writing process to be more linear. But it was different when pupils used the computer as a writing tool as the process of producing and revising text was more integrated. With the use of ICT, pupils were always speeding up; they began by recording ideas and then modified their ideas before completing an entire draft. Pupils also appeared more willing to abandon ideas in mid-stream to pursue a new idea. In this way, the process of revision tended to begin earlier in the writing process and often was performed as new ideas were being recorded. Rather

than waiting until an entire draft of text was produced before beginning the revision process, pupils appeared to critically examine and edit their text as ideas flowed from their mind to a written form.

To investigate the impact of computers on pupil's writing performance, Russell and Haney (2000) designed a study of 72 primary school pupils who wrote on both computer and paper. Their three-year research study concluded that the length and quality of writing produced on paper was higher than writing produced on computer. These results occurred even though pupils who wrote on a computer had received keyboarding instruction (Russell and Haney, 2000).

### **3.7. Summary**

This Chapter has introduced the link between special educational needs and information and communication technology (ICT). Technology, particularly the use of ICT, has been a great improvement in the field of education. Researchers (Clements, 1998; Dede, 2000; Rauterberg, 2004; Pearson et al., 2005; Murphy, 2006; Hartley, 2006) have a strong and widespread belief that the use of ICT has resulted in greater opportunities for improving learning in general. Others (Harris and Boyd, 1998; Tillman, 2006; Elkind, 1998 and Convertino, 2006) conclude that the use of ICT has been found to have positive impact on pupils' self-concepts and on pupils' attitudes toward learning. In addition pupils were more motivated and successful in school, and had improved their self-confidence and self-esteem when using ICT-based instruction. This was particularly true when the technology allowed learners to control their own learning.

Proposing a different view of the effect of ICT on pupil's learning, Bialo and Sivin-Kachala (1996) and Torgerson and Zhu (2003) argue that the influence of using ICT on learning is very weak. However, ICT shows promise for the pupils with special learning needs. There are indications that the use of ICT may improve the quality and quantity of pupil's work. It may also affect pupils' positive perceptions of themselves as learners.



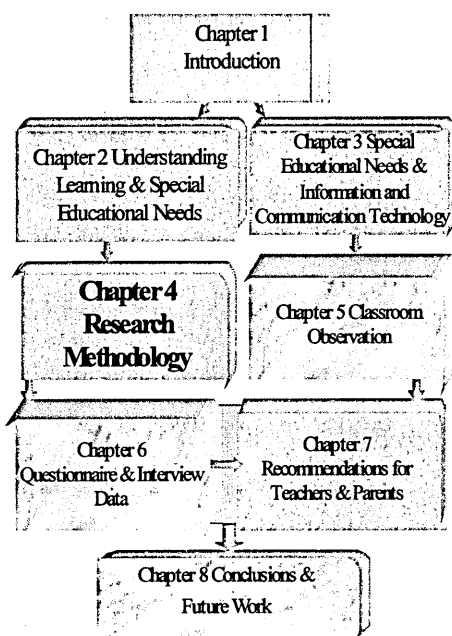
In the area of the use of ICT in the school, researchers (Al Ghamdi et al., 2004; Youngblut, 1998; Kehr and Greyrose, 1998; Hasselbring and Williams, 2000; Scottish Executive Report, 2005) indicated that the use of ICT is changing the face of education in schools. In addition, its use within the classroom offers opportunities for new approaches to teaching and learning.

In the area of teacher training, researchers (Goodison, 2002; Haugland, 2000; Yelland, 2001; Judge, 2006; Blackhurst and Edyburn, 2000) suggest that teachers must have ICT training to be able to teach computing. Moreover, teacher training is very important for the teacher to be able to teach the topics. The following Chapter will describe the research methodology used to achieve the aim and objectives of this research project.

# CHAPTER 4

## 4. RESEARCH METHODOLOGY

### 4.1. Introduction



This Chapter describes the research techniques and methodology adopted by the researcher to achieve the aim and objectives presented in Chapter 1. This Chapter is structured as follows, Section 4.2 discusses both quantitative and qualitative research techniques. Due to the exploratory nature of the research a qualitative method approach has been chosen.

The data collection discussion in Section 4.3 is followed by Section 4.4 which explains the research

evaluation and case study. The adopted research methodology for this project is identified in Section 4.5 which is divided into four phases. The Chapter concludes with a summary in Section 4.6. The Chapter also described the research methodology which has been illustrated in Figure 4.3.

## **4.2. Overview of the Research Methodology**

The literature review described in Chapters 2 and 3 established what has been published within the field of special educational needs and ICT with an understanding of the research area. Furthermore, the literature review indicated that there are two gaps in the knowledge that required further research. The gaps led to the development of the research aim, which was to understand how ICT is perceived to affect the learning capability of primary age pupils, including those with special educational needs.

Neuman (2006) states that researchers can think of research as the use of scientific techniques to transform ideas. In general, research consists of two basic approaches, namely the quantitative and the qualitative techniques. Robson (2002) supports this view by arguing that qualitative and quantitative methods need to be interrelated if significant additions are to be made to the body of knowledge.

Neuman (2000) identifies that both quantitative and qualitative researchers use careful, systematic methods to gather high quality data. In addition the common methods used in both are illustrated in table 4-1. Moreover, each approach uses several specific research techniques. Some techniques, such as interviewing, can gather data by either a quantitative or qualitative method (Easterby-Smith et al., 2002). Moreover quantitative and qualitative data are different in some ways, but they complement each other as well. Neuman (2006) describes some of the strengths of qualitative techniques as the direct contact with participants, and the ability to take unique experiences into account.

Quantitative Research	Qualitative Research
Observation: structured Questionnaire (self-administered) Structured interview Content analysis of document	Participant observation Observation: semi-structured and unstructured Focused interview In-depth Oral life histories Focus group/group interview

Table 4-1 The Common Methods used in Quantitative and Qualitative Research  
(Adopted from Blaikie, 2000)

#### 4.2.1. Quantitative Research

Quantitative methods are built upon a foundation of premises and beliefs, including the assumption that data must yield proof or strong confirmation of a theory or hypothesis in a research setting. Quantitative research is often referred to as the traditional scientific research approach. It is presented as a pervasive, scientific mode of enquiry, characterised by objectivity, reliability and prediction. Much of the data collected and used are in a numerical format. Quantitative researchers tend to be dispassionate, neutral and detached when using this form of enquiry. The most common form of this research approach is within laboratory settings, where the environment and experimental conditions can be closely controlled (Neuman, 2006; Robson, 2002).

The main strengths of the quantitative approach are described by Robson (2002) as precision and control. Control is achieved through the sampling and design, and precision through quantitative and reliable measurement. The main limitation, with respect to 'real world enquiries', is that human beings are far more complex than the 'narrow' view imposed by a quantitative approach. Unlike within a laboratory setting,



it is difficult to gain control over the many variables within a social setting (Robson, 2002).

#### **4.2.2. Qualitative Research**

Qualitative research is primarily based on an investigative approach, where much of the data collected is through interviews, surveys and observation, and is in the form of words. Qualitative data are an attractive nuisance. However, this attractiveness is undeniable (Robson, 2002). Easterby-Smith et al., (2002) support this view by stating that qualitative research is a collection of interpretative techniques which seek to describe ongoing daily life or interactions within a selected group. However, qualitative data are difficult to communicate, in a systematic and honest manner. The most important tool in qualitative research methods is the interview.

Black (1999), describes how qualitative research can provide a more informative picture of culturally based process and practices, and a depth to context-based explanation of events, processes, results, and ultimately future policies and practice. The main strengths of the qualitative research approach described by Robson (2002) are the insights gained from an inside view of the world under investigation and the researcher's personal involvement. This enables the researcher to derive unexpected and striking observations to examine further.

#### **4.2.3. Research Strategy**

There are many research strategies or methods that can be used to collect the data necessary to answer the research question. It is important for researchers to adopt a structured and rationalised approach. This helps them when carrying out an enquiry as well as providing credibility when validating and receiving feedback during the process.

There are two types of design: fixed designs which use quantitative methods and flexible designs which tend to use qualitative methods. Also researchers need to select a research strategy and methodology that links to the research question (Robson, 2002; Black, 1999, Easterby-Smith et al., 2002; Johnson and Duberley, 2000). However, there are many types and contexts of research. Researchers need to adopt an

interesting strategy to develop their work in a simplistic way for the reader to understand by using an interesting rather than passive style of writing. There are a number of factors that affect the success of research such as motivation, support or supervision, style and personal qualities.

The following issues are required for successful management research.

1. It is very important for the researcher to manage time and understand the problem that is seen as important at the moment.
2. It has to be promoted effectively via academics, consultation and the business media.
3. It has to be related to the needs and concerns of the managers to whom it is addressed.
4. It must be presented in an engaging way.

As described by Easterby-Smith et al., (2002) when a researcher is doing a Masters degree, it is best to select a flexible strategy, because of the limitations of time.

### **4.3. Data Collection**

Data collection seems to be the most appropriate point to present the issue of ethical research (Black, 1999; Robson, 2002; Neuman, 2006, 2000). However, ethical research takes longer to complete, costs more money, is more complicated, and is more likely to be terminated before completion. There are a number of data available on different aspects of society in addition to what a researcher will collect. The main techniques for qualitative research are a literature review, surveys, and interviews. However each technique has some strengths and weaknesses (Robson, 2002). These techniques are explained in the following Section.

#### **4.3.1. Literature Review**

For qualitative research the literature review is important for developing ideas. The literature review also helps to gain a deeper understanding of key issues and to provide insight into organisations and institutions (Robson, 2002). Some goals of a literature review are to;

- Summarise and gain a familiarity with a body of knowledge. A review explains to the reader that the researcher knows the research area and the major issues.
- Demonstrate the path of previous research and how the current project links to it in statistical techniques. That can be referenced and sorted so that converging lines of inquiry and patterns can be uncovered.
- Learn from others and encourage new ways of looking at the data. A good review identifies blind alleys and suggests hypotheses for replication.
- Find out what is already known and what specific methodologies have been used (Neuman, 2006).

#### **4.3.2. Observation**

The definition of observation as described by Black (1999) is to make scientific examination and explanation of why it happens and what might happen next under certain circumstances. Robson (2002) supports this idea, describing that direct observation is one of the most popular available methods and is the best way to see people behaving in public. However, there are some advantage and disadvantage of using the direct observation as illustrated in Table 4-2.

A number of authors such as Black 1999; Robson 2002; and Nachmias and Nachmias 1981, suggest that with a limited number of events our social science research will be virtually known's for all the observed people; and you have to be trained as an observer but it is different when you have a big group project. In addition, observation instruments need to be piloted to ensure not only the checklists are appropriate indicators of constructs, but also, if more than one observation is to be involves.

As described by Nachmias and Nachmias (1981) there are two types of observation: controlled and non-controlled. Controlled observation should clearly address what, how and when to observe. Non-controlled is a more flexible and unstructured observation technique. However their view about observation is explained in the suggestion that observation is not enough for quality research, researchers must collect data by asking questions.

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>▪ It is direct, researchers have to watch, listen to the people and after that describe and analyse what he/she saw and heard (Boeree, 1998).</li> <li>▪ With direct observation the researchers can see real life or a complete explanation.</li> <li>▪ Observation will allow the researchers to understand events and their causes by focusing on the systematic pursuit of truth (Black 1999).</li> </ul>	<ul style="list-style-type: none"> <li>▪ Observed behaviour can lead to participants changing their behaviour rather than showing the researchers what they are really like during the time of the observation.</li> <li>▪ A long term observational study will only catch a glimpse of the natural behaviour.</li> </ul>

Table 4-2 The Advantages and Disadvantages of using Direct Observation

Observation is necessary for studies of children because it is hard for a child to introspect and to continue to be attentive to lengthy adult tasks (Robson 2002; Nachmias and Nachmias 1981). Overall, Easterby-Smith et al., (2002) suggest that observation is the best fact and external reality knowledge for collecting data.

#### 4.3.3. Interviewing

Interviewing is a favoured method among researchers for gathering data (Easterby-Smith et al., 2002). It is explained by Robson (2002) as the researcher asking respondents questions about a topic. Also Neuman (2000) describes the interview as involving asking questions, listening, expressing interest and recording what is said. There are wide ranges of ways in which interviews may be conducted such as, structured, semi-structured and unstructured. Moreover, there are different types of interview; telephone, fax, e-mail, face to face, and group. In addition there are three types of question; closed, open, and fixed-alternative.

The successful interviews depend on the researcher's skills and capabilities of understanding the other person's views, in order to give them a chance to explain their own beliefs. However, there are some weaknesses with interviews such as the expense of gathering a wide range of data. Also the time limitations of the interviewee can lead to the important questions not being finished, possible bias and difficulties in establishing reliability. Among the strengths, however, is the ability for flexible knowledge and providing an in-depth understanding of the informant's experiences (Oppenheim, 1993).

#### 4.3.4. Questionnaires

Questionnaires are the researcher's strategy and the most used quantitative research for data collection (Black, 1999; Robson, 2002). There are different types of questionnaire as illustrated in Figure 4-1.

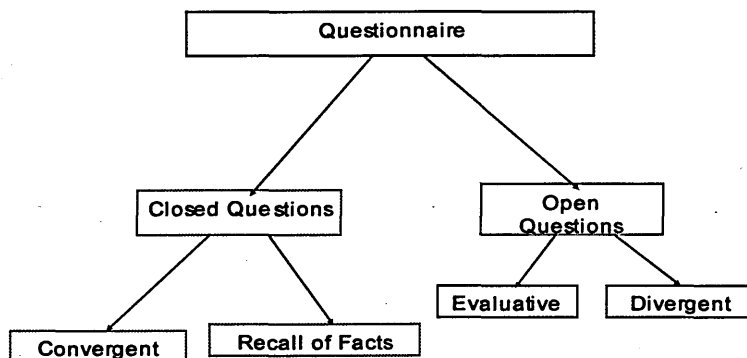


Figure 4-1: Types of Questionnaire

Open questions allow a free answer to deeper questioning, while closed questions have a limited range of possible responses and are quick to complete. Questionnaires can be face to face, posted (or email), or telephone. However there are a number of strengths and weaknesses of using a questionnaire as shown in Figure 4-2.

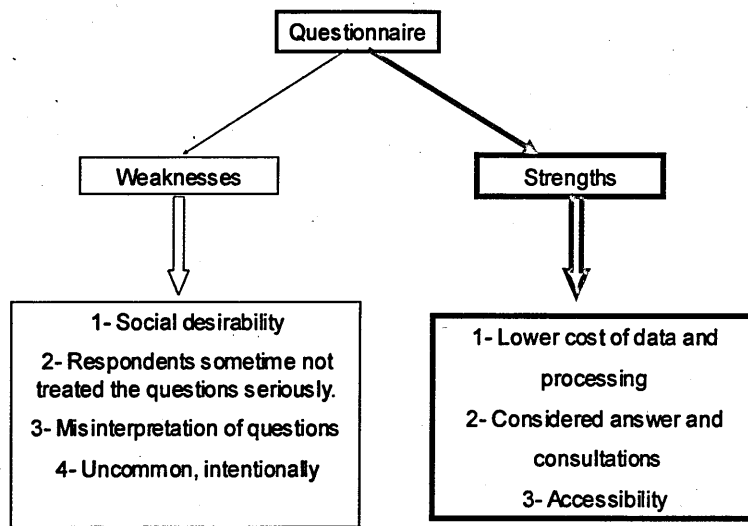


Figure 4-2: The Weaknesses and Strengths of the Questionnaire

There are some systematic guidelines to designing a successful questionnaire. It should be unambiguous and clear, simple, professional, not too long, covering all the important issues, and be straightforward (Black, 1999). These guidelines can enhance returns. Easterby-Smith et al., (2002) state that it is always advisable to pilot the questionnaire on a small number of people before using it for real. Also, to help respondents understand the research, a short covering letter explaining the project can be useful. It is very important to explain how confidential the information will be. Robson (2002) explains that the design of the questionnaire needs to achieve the goals of the research and specifically to answer the research question (Black, 1999).

#### 4.4. Research Evaluation

Evaluation is important in the field of education. It is the structure of educational provision for pupils with special educational needs such as learning difficulties (Robson, 2002). The problem of how to judge the qualitative method has not been solved yet. Easterby-Smith et al., (2002) state that the qualitative method is an aid or tool to help respondents think for themselves about their own world and to consider a

topic possibly for the first time. The qualitative research needs to minimise the problem of selective plausibility, which can be achieved through the use of various techniques including expert opinion, case study, reliability and validity, and triangulation.

#### **4.4.1. Expert Opinion**

Experts must be people who have studied and worked in the research area and are capable of understanding the expert in the work area (Black, 1999). The Delphi Technique demonstrated by Stuter (1998) is a systematic approach that can be used to gather information. The way to obtain this information is to bring a group of people with expert knowledge and judgment about a subject together. Moreover, the setting or type of group is immaterial for the success of the technique. The point is that when people are in groups they can share specific expertise about the topic. There are eight procedures for using the Delphi Technique as suggested by Dunham (1996):

1. Choose a suitable team.
2. Identify the principal issue which should be very clear for communication with members of the Delphi team.
3. Develop a survey – the survey will focus sharply on the issue and seek reactions/responses from the experts for the Delphi members.
4. Assemble a panel of experts for the Delphi group – it is important to find experts who will have the opportunity to support and assist in determining answers to certain question about the research area.
5. Conduct the first round questionnaire and tally the final score. Send the questionnaire to each one of the Delphi members. Every participant answers the survey separately and returns it to the survey initiators so that the responses can be summarised.
6. Conduct the second round questionnaire with the Delphi group – summarise and combine the results and send them back to the group.
7. Send the third round questionnaire and analyse the results. Each step will concentrate more sharply on the responses required by the researcher.

8. Explain the results – the group must now study the result of the three rounds and interpret them. Following the interpretation, an agreement on the initial topic should be ready.

Stuter (1998) states that the Delphi Technique is very effective with parents, teachers, school children and community groups.

#### 4.4.2. Case Study

Using case studies is the way that researchers can see and investigate the subject in a real life situation where interaction is of paramount interest and they encourage a greater depth of study of chains of events. They tend to allow the researcher to answer why, and how, questions more thoroughly than those with representative samples, whereas the latter allow one to see how widespread the phenomena are (Black, 1999).

Robson (2002) states that the case study is a research strategy which helps researchers to search and assemble an empirical investigation in a particular contemporary phenomenon through real life and multiple sources of evidence. Additionally there are many types of case study such as:

- **Individual case study;** very useful for doing research that involves the empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence.
- **Set of individual case studies;** same as individual case study but, a small number of individuals with some factors in common are studied.
- **Community study;** concentrates on one or more local communities such as family life, leisure, and work, to describe and analyse the pattern and relation between the main aspects of community life.
- **Social group studies;** cover both studies in small direct contact groups such as families and larger more diffuse ones such as occupation groups.
- **Studies of organisations and institutions;** cover places such as workplaces, schools, trades unions, and many possible foci such as industrial management, organisational issues and organisational cultures.



**Studies of events, roles and relationships:** focus on a specific event such as studies for police, citizens, and specific crimes.

The main limitations or risks of the case study are:

- **Validity:** in terms of the degree that a useful to typology of kinds of understanding involved in qualitative techniques (Robson, 2002). There are three categories to qualitative research: reactivity (the way the researcher's presence may interface), respondent bias (for example trying to answer what they think the researcher wants to listen to) and researcher bias (assumptions or preconceptions that the researcher bring to the situation).
- **Reliability:** is linked closely to replication where two or more researchers study the same phenomenon in a very similar condition and should produce the similar results. Neuman (2000) there are three types of reliability stability which reliability across time, representative reliability which is reliability across a group of people and equivalence which is applies when researchers use multiple indicators.
- **Generalisation:** concerns the characteristics of research findings that allow them to be applied to other situations.

#### 4.4.3. Triangulation

Triangulation is described by Neuman (2006) as the researcher observing something from multiple points or several angles and can involve both qualitative and quantitative techniques. There are different types of triangulation such as triangulation of measures, triangulation of theory, triangulation of observer, and triangulation of method.

Robson (2002) explains that triangulation is a valuable and frequently used strategy for increasing the validity of flexible research. However, it also opens up possibilities

of discrepancies and disagreement among the different sources. Interview and documentary might be contradictory or two observers could disagree about what has happened.

#### **4.5. Research Methodology Adopted for the Study**

A research methodology that satisfies the academic demands of the study has been selected to include observation for the school pupils, interviews with the school teachers, and survey for the pupils parents. The selected approach is a mixed of fixed and flexible or quantitative and qualitative before the data collection. After which time, admits certain flexibility along its evolution. The research methodology has been divided into four phases that will focus on the area of the research as illustrated in Figure 4.3.

- Literature review
- Data collection and idea formation
- Data Analysis
- Developing recommendation for teachers' and parents' validation

##### **4.5.1. Phase 1: Literature Review**

The first stage of the methodology is the literature review which is presented in Chapters 2 and 3. The review relates to special educational needs and the use of ICT, and identifies any gaps in the knowledge for which further research is required.

The literature review serves to provide information on how ICT is perceived to affect pupil's learning for those with and without special educational needs. The literature review provides an understanding of key issues and considers the aspects of ICT that could best be used by teachers and parents within the curriculum to motivate and engage pupils in learning. The major outputs of this phase contribute to the conceptual study recommendations.

#### **4.5.2. Phase 2: Data collection and idea formation**

The second phase of the methodology is data collection which has been undertaken in three ways. Firstly, direct observation which has been carried out in three schools, two of them with mixed pupils with and without special educational needs, and the third school which is a special school for SEN pupils. Also personal contacts, generally through interviews, with 17 people comprised of head-teachers, teachers, and ICT coordinators. Secondly, the collected data takes place over a period of time. The third data collection is from 175 surveys for pupils' parents from all schools.

- Observation was carried out in three schools. Observation has been chosen because this is the best way to gather data from the pupils, specifically pupils with special educational needs which is described in Chapter 5.
- Triangulation has been achieved by using different method of data collection including observation with the chosen classes, interviews with a number of school teachers, head-teachers, and ICT coordinators and a survey of the pupils' parents with pupils aged from 5-10 years. Teachers were interviewed using a semi-structured, questionnaire. The answers were recorded and analysed using statistical package for social sciences (SPSS) software and are presented in Chapter 6.

Interviews have been chosen because teachers are always busy and that was regarded as the easiest way to collect information from them. At the beginning it was quite hard to manage suitable times for teachers to do the interviews. This is the reason why most of the interviews took place in the staff room during their tea time or lunch time. Some of the interviews have been cancelled after the time had been set because of an emergency call for the teacher.

It was no problem to gather data from the pupils' parents because all parents are interested in talking about their pupils and this is the reason the questionnaire has been used. The questionnaire was looking at the kind of programmes pupils

have been using most of the time and the average time they use the computer each week. Also the questionnaire concentrated on the effect of ICT in pupils learning, especially in reading and writing, including those with special educational needs. Questions about the effect of sound and access to the Internet have been asked; all questionnaires have been explained in Chapter 6.

- Also the author used both qualitative and quantitative techniques for collecting the data.

#### **4.5.3. Phase 3: Data Analysis**

During this phase a critical analysis of the gathered data is performed in order to establish the relationships between the different variables involved in pupils' learning. The data collected were analysed using the Statistical Package for Social Sciences (SPSS) programme. The SPSS (version 15.0) computer programme was used to analyse the scores of the instruments in this study which used both descriptive and inferential statistics. The output of this process is the findings of and recommendations for both teachers and parents, and is presented in Chapter 7.

#### **4.5.4. Phase 4: Developing Recommendations for Teachers and Parents**

The fourth phase will involve the development of the conceptual recommendations for parents and teachers who are responsible for pupils learning. The recommendations will be related to the use of ICT by pupils with and without special educational needs in primary age. This phase will explain how important parents' involvement with their pupils learning is, specifically for pupils with SEN..

The recommendations for teachers and parents will be developed from the data collection and analysis of three case studies, parents' questionnaire and literature review. Furthermore, these recommendations will also be based on the various outcomes and findings from this study. They will include learning strategy for pupils with special educational needs and the role of ICT to overcome these needs.

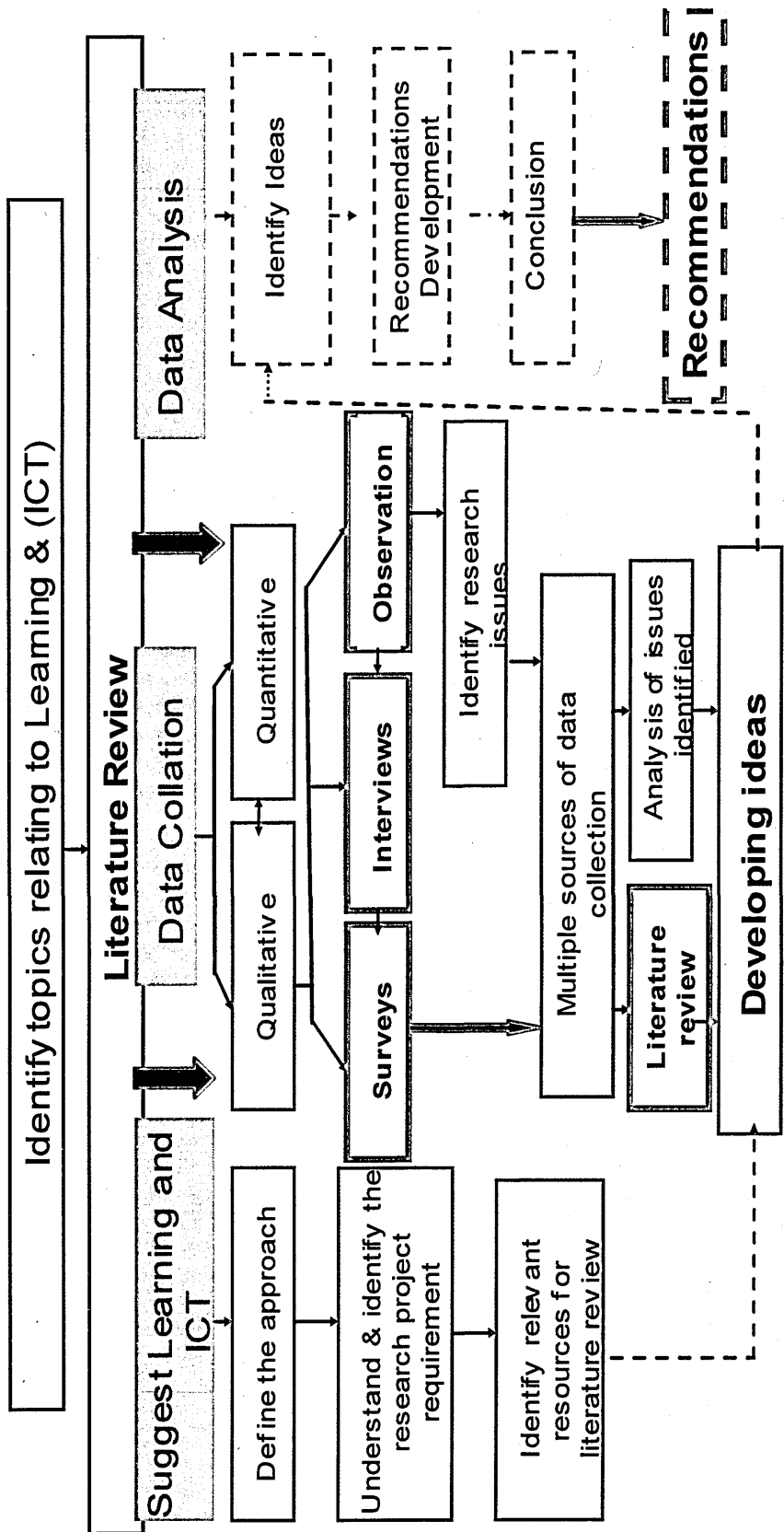


Figure 4-3: Research Methodology

#### **4.6. Summary**

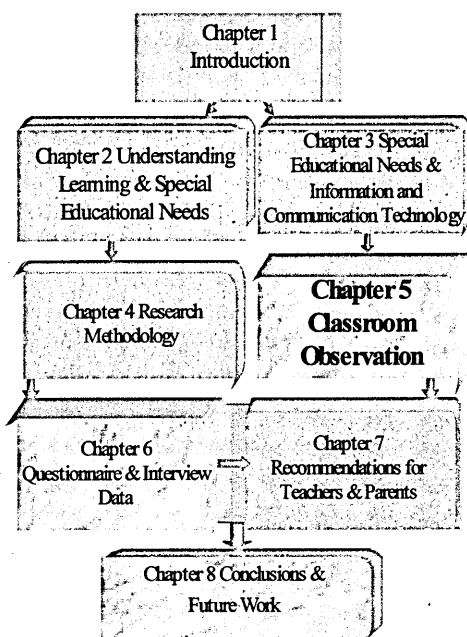
This Chapter has introduced the design of the research methodology for the study. It starts with an overview of the methodology and a definition of qualitative and quantitative techniques. A qualitative research approach was chosen due to the exploratory nature of the research. The initial stage of the work was to be a survey and this was adopted due to the number of organisations the research needed to cover. Then a case study approach was chosen because the research involved specific schools. The approaches to be followed in order to collect data are linked to the aim and objectives of the study.

Chapters 5 and 6 will address the data collection and analysis, and cover the findings from the observations, interviews and surveys..

# Chapter 5

## 5. CLASSROOM OBSERVATION

### 5.1. Introduction



This project was designed to investigate the perceived effect of the use of ICT in pupils' learning. This Chapter discusses research observation in three case study schools (two at primary and one at middle school). The case studies involve a wide range of data collection during the spring and summer terms. Three schools in different demographic areas agreed to take part in the study. Two of these were located in Bedfordshire and one in Milton Keynes for

pupils with SEN. The sample was designed to cover a range of pupils, with and without special educational needs, aged between 5 and 10 years old.

The Chapter is divided into ten Sections. The following Section presents an overview of the three case studies. The process of gaining access to these case studies, including the challenges in approaching the special school, has been explained in Section 5.3. More details of case studies 1 and 2 which focus on normal schools have been

described in Sections 5.4 and 5.5 respectively. ICT locations and the kind of technology employed in the schools have been also presented. Case study 3 which focuses on pupils with special educational needs has been discussed in Section 5.6. Observation design, activity and findings for all the case studies which were carried out between the beginning of March and the end of July 2007 has been explained in Section 5.7. The software used in all the case studies and the pupils' activities during the observation has also been explained. Section 5.8 discusses the main points of the observation and the differences between ICT based and normal lessons in the special school are discussed in Section 5.9. The Chapter ends with a summary, which provides the reader with a short explanation about the findings of the three case studies, and is presented in Section 5.10.

## 5.2: An Overview of the Case Studies

The case studies were three schools two in Bedfordshire and one in Milton Keynes in three different areas. The names of both the case study schools and the pupils were omitted for the protection of their privacy and confidentiality. Five groups were observed over a period of five months. Each group consists of 25-30 pupils and are similar in terms of educational ability. Most of the pupils in the case studies have good general health but some of them do experience special educational needs. The third case study was in a special school for pupils with special educational needs.

A hundred and fifty pupils took part in the study aged from 5 to 10 years old with different ethnic backgrounds and a mixed ability to learn. Information for the research was collected from both school and home. The school teachers were interviewed and pupils were observed in the classrooms by the researcher. Data were collected from home via parents' questionnaires. The key stages of participants in this project are illustrated in table 5-1.

Key Stage	School Year	Ages
1	1 – 2	5 – 7 years old
2	3 – 6	8 – 11 years old

Table 5-1 Key Stage of Participant Pupils



### 5.3. Process to School Access

This study inevitably involves pupils and the best way to collect data from pupils specifically those with special educational needs is through observation (Robson, 2002). Initially, a plan was set up to conduct a number of observations within schools. Each school was identified based on a number of criteria such as age of the pupils and how easily it could be accessed – personal contacts, travel implications for the researcher.

In **case study (1)**, the school was contacted by phone through the head-teacher's secretary. The head-teacher was out of office for three weeks, therefore, her secretary informed the deputy head-teacher. Two hours later the deputy head-teacher phoned back and refused access to the school, however suggested meeting her to explain the project.

When the head-teacher returned to her office, the researcher phoned the school again to arrange a meeting with the head-teacher. Additionally, she received a formal letter from the University illustrating the importance to the study for the researcher to observe pupils in the school. The letter is included in Appendix III. The author explained the research project and its main benefits to school. She welcomed the idea of conducting the case study within the school and said, "*It sounded very interesting but she would like to speak to the teachers first.*" In the meeting the head-teacher requested the researcher to apply for Criminal Records Bureau (CRB) clearance before accessing the school. Moreover during the meeting there was a useful discussion about use of ICT in the school and how the teachers and herself tried to use the ICT policy in the school. The author informed the head-teacher about her experience with ICT and stated that she would be very pleased if she could assist the teachers during the project duration.

With help from the school, the CRB was received after three weeks. The head-teacher informed the researcher that the teachers accepted her to carry out the observations in the school from beginning from March 2007. The author has drawn an observation timetable for each class which is included in Appendix V.

In **case study (2)**, the author phoned the school to meet the head-teacher whose secretary suggested discussing the project with the ICT coordinator. The ICT coordinator contacted the researcher to find out about the project area. She welcomed the study and discussed it with the head-teacher and teachers who are responsible for teaching ICT. After four days, the author commenced the observation based on a formal letter from the University and a final agreement from the school.

The author faced greater challenges in approaching **case study (3)** which is a school for pupils with learning difficulties and it took about three months to access the school. Four schools were contacted during the initial phase of the project. The first school claimed to have a few other projects running simultaneously and were not able to co-operate. In the second school for children with disability, the ICT coordinator requested a formal letter from the University. It was difficult to arrange a meeting with her and after several trials she agreed to discuss the project. After a long period of time, she informed the researcher that permission had to be obtained from the pupils' parents. The researcher failed to access the school after several trials with the ICT coordinator and a similar process was followed with a third school for children with learning difficulties.

In the fourth school, the same process was also followed taking about ten working days to extract an agreement from the ICT coordinator to access the school. The author had discussed the project with her and she was very enthusiastic to see the results. She had also obtained permission from the head-teacher. The head-teacher was very helpful in supporting the data collection by sending a letter to the parents to explain the importance of the research project. The full letter is included in Appendix IV.

#### **5.4. Case study (1)**

The case study has a high percentage of pupils with different ethnic backgrounds. The school is a voluntary controlled, Church of England Lower School in a friendly, growing village. It was founded in 1865 to provide education according to the principles and practices of the Church of England. The school has 292 pupils from reception to year four. The pupils in the school have access to ICT twice a week

including the internet in the ICT room. The school ICT coordinator said "*The main reason to design a website was to encourage pupils to search for information via the internet*".

It is part of the ICT policy to have use of the Internet. The school encourages pupils to use the resources available on the Internet, together with the development of appropriate skills for the analysis and evaluation of such resources.

In the ICT room there are 26 PCs linked as part of the whole school network, plus two PCs in each classroom. This allows one PC for each pupil plus a few spare ones as stand by. Each machine is equipped with speakers and headphones that can be used for communication with multimedia resources. The teacher has one PC on her desk which is connected to an interactive whiteboard. Resources that are available include a scanner, digital camera, and two printers including laser. It has been observed that some of the classrooms have interactive whiteboards.

The most common location for using ICT in the school is in a separate room (ICT room) which has one computer for each pupil. Pupils using ICT twice a week and each lesson lasts 45 to 60 minutes. Pupils sometimes use the computers in the classroom but with only two computers per classroom obviously only two pupils at a time can use them.

### **5.5. Case Study (2)**

This case study school was founded in 1973 to provide education according to the principles and practices of the Church of England as a Voluntary Controlled Church of England Middle School administered by Bedfordshire Local Authority.

The school is a flourishing and industrious school which provides a very high quality of both academic and social education. There are 550 pupils in the school which cover the age range of 9 to 13 years old. It has a combination of pupils with and without special educational needs. The spiritual and emotional development of the pupils is the concern of effective pastoral care, within the tenets of the Church of England but the school also welcomes pupils of other faiths and cultures. The pupils come from

different backgrounds within the catchment area of the school near Cranfield University.

The school strategy in the use of ICT includes the need:

- To use ICT to specifically support the literacy and numeracy projects within the school.
- To develop learning which promotes the communication of ideas and information in a variety of ways using ICT capabilities where appropriate, e.g. word processing, use of electronic mail, desk-top publishing and design, using text and symbols.
- To develop learning which promotes the collection, classification, storage, retrieval, modification and interpretation of information using ICT capabilities where appropriate. These include abilities such as information handling and presentation.

The location for the use of ICT in the school is in a separate room (ICT room) which has one computer for each pupil in a class. Pupils using ICT once a week with an average session from 50 to 60 minutes; this is the only time pupils can use ICT at school.

The ICT room has 34 PCs with flat screens linked to the whole school network, which allows one PC for each pupil and a few spare ones, plus 1 laptop for each classroom for the class teacher connected to the interactive whiteboard. Also there are 2 PCs in the ICT room for the teachers' use, one laptop for the teachers' work and a further PC which is connected to the interactive whiteboard.

All the classes have an interactive whiteboard which is connected to the teachers' laptops. The activities most used at school focused on educational goals such as using Microsoft word, Microsoft excel, Microsoft PowerPoint and games programmes related to shape and numbers or encouraging story writing. Pupils were aware that any attempts to access the Internet must be supervised by the teacher.

### 5.6. Case Study (3)

The third case study is a popular special school in Milton Keynes for pupils with special educational needs. The school was originally opened in 1985 as a combined school and from September 2006 become (catering for pupils from 5 to 11 years old). The school benefits from both traditional classrooms, all equipped with up-to-date ICT equipment, and shared areas which are used for a variety library, an ICT suite and a fully equipped hall.

All pupils within the school have their own laptop with wireless connection, and the use of ICT equipment (including Interactive Whiteboard and laptops) plays a prominent role in school pupils' learning. The school is proud of its ICT facilities and strives to ensure that these new technologies are used in innovative and motivating ways. Pupils in the school are based in mainstream classes and receive a range of support according to their needs.

This school is different from the other two in that it is well-equipped with ICT with each pupil having his/her own laptop with wireless connected to the Internet. Also the class teacher has a laptop which is similar to the pupils' with another one on her desk connected to the interactive whiteboard.

The school has an ICT wing with 15 computers because each class has 11 pupils. The ICT room includes one laptop which is connected to the interactive whiteboard, one desktop for the ICT coordinator and two printers including a laser. Each computer has got Bluetooth to connect with sound and music. The room includes lots of CDs and DVDs with learning activities and various pages of softwares for pupils with special educational needs. Each wall also has a poster to represent different kinds of software related to the pupils' learning approach such as Microsoft word, PowerPoint, ABC programmes for the early years and Microsoft excel.

The computer location in this school was chosen as it provided a quiet place where the pupil would not be distracted by other pupils such as at the back of the classroom. Other locations were chosen for a number of reasons such as being near the electric power or the teacher can choose a suitable place. In this school pupils have not got a

specific time or day to use computer but can use it every day at any time. The school coordinator said *“We have not got a specific time for ICT for various reasons. Pupils with special educational needs get fed up quickly and they like to change their places from lesson to lesson with the laptop. We also have more flexibility to do that.”*

## **5.7. Observation Design**

The observation was designed to answer the research question relating to the perceived effect of ICT on pupils learning, including those with special educational needs. At the beginning the observation concentrated on a specific point such as the location and flexibility of using ICT and how that affects pupils' learning and the kind of technology used in each school. A structured observation sheet was designed, initially as a checklist that included the main observation points. After discussion with the thesis supervisor, an observation template was created and filled in during each observation session. Examples from the observation have been included and are shown in a grey text box.

### **5.7.1. Observation in Case Studies**

Timed and recorded observations were carried out during the five months in case studies 1 and 2 which started at the beginning of March and ended by the end of July 2007. Case study 3 which is the special school observation has been carried out for two and a half months from the middle of May to the end of July 2007.

Pupils were observed during their normal activities for approximately 45 minutes to 1 hour each week in the normal schools and 2 to 3 hours for the special school. Observation showed pupils working alone, with partners or as a group and asking for teachers' help. Twenty sessions of observation were carried out in each school. All the work was conducted during normal timetabled classes and the whole class as a group was used for evaluation purposes.

The classes were selected on the chosen day by the teacher's ability to have someone observing the pupils during the lesson. The pupils could therefore be observed using both ICT based applications and traditional learning lessons.

### 5.7.2. Software Use

The software that has been used most often during the observation time in the school is illustrated in Table 5-2. For the young children in the case studies, activities focused on developing and encouraging cognitive skills such as the ABC programme for the early years, talking book, Simple Infant Programme and story book. The oldest pupils were more engaged to use programmes such as, Microsoft word, Microsoft Excel, and problem solving games. In the special school, pupils used different programmes such as, ABC programme for special educational needs, story book, and alphabet programme which is suited to the pupils' ability to learn.

Software	Type of the software	Pupils age
ABC	Early years activities	5 – 7 years old
Story book	Interactive reader	5 – 8 years old
Simple infant video toolkit 2	Early childhood activities	5 – 6 years old
Word processing	Microsoft word	6 – 9 years old
Talking book	Early years activities	5 – 7 years old
Simple Infant Programme	Microsoft word	6 – 7 years old
The great fire of London	Microsoft PowerPoint	6 – 8 years old
Welcome to 2 Type	Microsoft word	7 – 8 years old
Spreadsheet	Microsoft Excel	9 – 10 years old
Lemmings	Problem solving game	7 – 9 years old
Flowol	Ordering programme	9 – 10 years old

Table 5-2 The Software used most often During the Observation

### 5.8. Main Points of the Observation

The observation was concentrated on key points such as the different ways of communication, and the impacts on behaviour, type of learning and specific groups of pupils.

### 5.8.1. Different Ways of Communication

- **Teacher to pupils**

From the first visit to the school, the use of ICT has been focused on both teaching and learning. Teachers agreed that teaching by using interactive whiteboard has proven to be a very helpful tool for delivering tasks to a whole class and special educational software to support learning. The observation in the school has indicated how the communication between teacher and pupils is very important as illustrated in the following example.

At the beginning of each lesson, the teacher has to use some kind of technology to describe the task that pupils are going to do such as: video tab and interactive whiteboard. When the teacher starts using the interactive whiteboard to explain a program, pupils were busy chatting to each other, therefore when the teacher asked them some questions nobody answered. The teacher was quite upset and said *"I will repeat the task again then I will ask them the questions."* Then everyone listened. After that the teacher asked them again.

- **Pupils to teacher**

ICT is a very helpful tool for this form of communication but teachers still play the important role. The use of ICT can engage pupils more to the learning task that makes the communication between them and the teacher very high. The following scenario from one of the case studies emphasised how the communication between pupils and teacher can improve the pupils' learning.

Three pupils, one girl and two boys were working together. The girl showed the boys how to insert a picture. The boys were not happy; they had been shouting at each other because they did not finish their task. When the teacher asked how their task was going on, one of the boys started crying and said we can not do anything with our task. In just twelve minutes after the teacher explained the task to them again they worked much better. They had a picture and one sentence on their screen.



- **Pupil to pupil**

During the observation most of the pupils were working in groups of two or three while others, working individually, were more confident about using ICT. However, when pupils found something interesting they were eager to share the information together. That means the use of ICT in the classroom helps pupils to communicate as indicated from the following observation example.

There were three boys, teacher asked for an owl they decided to design a frame. The researcher believes that from the way they spoke to each other and laughed they enjoyed using computer. One of them asked the other about the spelling. He had not started on the computer yet. He was clearly quite unsure about the use of the computer. But they still were chatting together about the colour of their frame and which kind of story they were going to write.

- **Pupils to ICT**

It has been observed that the communication between pupils and ICT is high. Teachers reported that pupils can concentrate on the ICT more than in a normal lesson because they feel more independent. The following example is from case study three it explains how the use of ICT help pupils with special educational needs to communicate with the learning task and concentrate more.

One boy sat at the back of the classroom facing the computer, he was very quiet for more than 20 minutes then the teacher asked him "Are you OK?" He said "Yes! That is fun." He was still facing the computer using the Alphabet programme to match the right sounds with the right letter. His teacher emphasised that "Pupils with special educational needs can concentrate more and pupils can express themselves more with the use of computer to finish their tasks."

### 5.8.2. Impact on Behaviour

Behaviour can be thought of in a number of different ways such as, behaviour in lesson, concentration in lesson, commitment to the learning task and enjoyment. This view has been described by Higgins (2007) and Subrahmanyam et al. (2001) in Chapter one, Section 1.1.

- **Behaviour in lesson**

Teachers reported that pupils' behaviour in lessons was very positive when ICT have been used as pupils are generally challenged and engaged. Many of the pupils felt very upset and were noisy towards the end of the ICT lesson and when they failed to connect to the Internet. Five teachers suggest that the use of ICT supports pupils with special educational needs to work independently. It was observed that ICT had a very positive impact on pupils' behaviour in terms of focus and improvement in completing their tasks.

- **Concentration in lessons**

Teachers were asked whether they felt that by using ICT pupils were helped to concentrate more in terms of their learning ability. All the teachers from the school for pupils with special educational needs have reported that ICT help pupils concentrate longer than a book can. The following scenario is from an observation within the special school. These pupils were happy using ICT.

Boy (A) sat at the end of a table facing the computer. He was very quiet for more than 15 minutes, then the teacher asked him "Is this interesting?" He said "Yes!" He was facing and concentrating on his laptop for ten minutes more and did not realise that the researcher was sitting next him for more than seven minutes. He was very sensible and concentrating when the researcher asked the teacher about this. She said "This is unusual for him but, this is only when he is using computer and you can ask him about any letter he has seen on the screen. This means that pupil A likes to interact with his own computer for more concentration.

- **Commitment to the learning task**

All teachers agreed that the use of ICT helped pupils complete their tasks on time and that they have been very keen to show the teachers their work. Also when ICT are used in the classroom pupils focus on both teaching through the use of interactive whiteboard and learning through presentation devices which allow work to be completed. In addition using an interactive whiteboard within the classroom helps teachers to demonstrate the learning topics. With the whiteboard pupils can see what they are going to do and then explain their ideas on the computer.

- **Enjoyment**

Teachers indicated that all pupils enjoyed using ICT in the school and at home. It was observed that pupils enjoyed using ICT through physical signs of enjoyment and words of excitement such as done it, perfect, that is cool and love it. The reason for pupils' enjoyment is that they like to be independent and able to do many tasks on their own.

### **5.8.3. Impact on Learning**

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When ICT were used in the school the class was focused and concentrated on both teaching and learning (for example, the use of interactive whiteboards to support teaching). Most of the teachers reported that the use of interactive whiteboards had a very positive impact. The employment of this kind of technology helps teachers to present the topics to the whole class and could increase the pace of lessons to the extent that pupils were aware of this increased pace.

Teachers described how the use of ICT resources enhance and support learning through teaching. The availability of interaction, the visual quality of resources, and the updated information that is available all time improves the teaching approaches. The use of interactive whiteboard supports the visual learner to observe, then talk and question to an increasing extent.

If other classes have got interactive whiteboards and they are not being used, this upsets those teachers who do not have a whiteboard. In addition the use of ICT

facilities makes work easier and it is accomplished more quickly, aspects of analysis that could be focused upon to greater extents, or work being completed outside school more effectively.

- **Quality of work**

Teachers in the studies widely reported on reading and writing improvements through the use of ICT. They reported that ICT helped presentation, particularly for those whose hand writing was poor.

They also reported that the use of ICT encouraged the pupils to work faster, enabled them to explore things in greater depth, allowed for redrafting, affected coursework positively, and supported revision. In addition, the use of ICT will help pupils to take responsibility for their work and improve their ability to communicate as well as being keen to finish their work on time then show it to the teacher as soon as they can. Coordinators reported that ICT is very helpful with pupils with learning difficulties. The following example was reported by one of the ICT coordinators;

Pupil B who is a 7 year old boy with special educational needs had an accident a year ago. He broke his right arm and right leg. The doctor asked him to stay at home for a month. When he was at home his parents allowed him to use the computer for three hours a day for nearly a whole month using the other hand. When he returned to school his writing was at the same level as his peers; although he was in plaster this did not stop him improving. When the researcher met his mum and asked her why she permitted her child (B) to use the computer she said "My son likes computers more than anything else. When he had the accident and being home for long time, we asked him to buy a play station. He chose a laptop but he promised to use it to help him with his study and he did." She also said "The technology makes my son feel as normal as his peers."

- **Making lessons more interesting**

Teachers were asked whether ICT made lessons more interesting. Most of them reported that they felt lessons were more interesting when ICT has been used. Only

two teachers out of seventeen said we have been taught by the old ways without the use of ICT so it was no different.

Some teachers indicated that ICT made lessons more interesting because they did not have to write as much, but others indicated that learning potential was enhanced. For example, *"The Internet helps pupils to access more information."*, *"Pupils can experiment and change things."*, and *"It makes it easier as things do not get 'rubbed off' if you do not write them down fast enough."* Only one of the teachers reported that if the teacher is a slow writer the pupils get bored and with the interactive whiteboard that will never happen. Also a teacher said that the use of ICT facilities make the work more interesting if we use pictures to explain the topic.

- **Independent pupil learning**

Teachers indicated that ICT was supporting pupils with their work especially those with special educational needs. They reported that there are some programmes for those pupils, for which teachers can set the programme and the pupils can repeat it as much as they can to understand the lesson. They also indicated that pupils like to work more to use the computer for longer to help them write more quickly and neatly. Special software for pupils with special educational needs will help them to improve their learning and work independently. One teacher used the example of his son to indicate how the use of ICT helped him to be more independent.

*"My son when he was young had dyslexia and all the time his sister had to read the magazine for him. One day when my son was listening to the news they said there are some computer programs to help children with dyslexia. He asked me to buy one and I decided to buy a computer for him. From that time he was very keen to read the magazine on his own and he did improve a lot by using the computer program."*

- **Pupils' confidence**

Teachers have been asked if pupils felt better about themselves and more self-confident when they use ICT. All teachers reported that pupils are very happy and confident when they do some ICT work. They could do things and show things they

had not been able to do without the use of ICT, such as maths and science homework, especially those with special educational needs. Teachers reported that pupils could explore more and share ideas with others more widely. They reported confidence increasing due to the quality of work or its presentation. Pupils can work at their own pace and show what they had achieved as shown in the example from the observation.

One of the pupils could not get on with his task. It looked as if he was lost and very upset and he asked one of the teachers to give him some help. The teacher asked him to put some words under the picture and try to write a story. Fifteen minutes later he had a small picture on the screen but he did not look confident. He was struggling with how to insert the picture but tried really hard to do something nice. After twelve minutes he shouted "I got it. I done it." When we looked on his computer screen he had a beautiful picture and two sentences. He was very happy and confident.

#### **5.8.4. Impact on specific group of pupils**

The successful use of ICT in the school and at home deepens a pupil's ability to use its communication aspects initially, then to move on at appropriate times to discover more information. Different groups of pupils were found to be gaining in different ways from the use of ICT. Communication in the special school has been improved by using ICT for sharing information at a basic and fundamental level. The information aspects of ICT were fundamentally important and differed between other distinctive groups, such as boys and girls, and pupils with special educational needs.

- **Pupils with special educational needs**

From the observation, pupils in the special school use ICT more than at the normal school. The availability of laptops for each pupil makes communication between the pupils easier as reported by the teachers and ICT coordinator. One of the teachers said "*Some pupils could not communicate with the external world, either at all, or easily, without the use of ICT based access devices.*" Teachers indicate that pupils with

special educational needs can work on their own with ICT but they can not leave them working in other learning environment on their own. To control the use of ICT by pupils with special educational needs the teacher uses a key switch to enable them to write or adding any communication.

- **Boys and girls**

Teachers reported that there was a significant impact of ICT as a learning tool on both boys and girls. From the observation and interviews there was little difference in the use of ICT for boys and girls in the primary age. However, boys tended to demonstrate greater improvement than girls between the ages of nine and ten. The findings from this study implied that the use of ICT probably had a positive effect on boys and girls but boys tended to demonstrate better profiles than girls. An example from the observation is:

Two pupils, one boy and one girl were working together. The boy was faster than the girl. They were talking to each other sharing information but when the boy had finished his work he would then go back to help the girl. The boy was very happy to help his friend and the girl appreciated his help.

#### **5.8.5. The type of learning Styles**

Learner preferentially take and process information in different ways including seeing and hearing, reflecting and acting, reasoning logically and intuitively, analysing and visualising. However there are many types of learning styles. The most popular learning styles are visual learning style, auditory learning style and kinesthetic leaning style which described in more details in Section 2.3.

- **Visual learning style**

Teachers reported that the use of ICT as a learning tool is very important for pupils with a visual learning style. It could help those pupils to observe more and understand quicker the use of colour and ICT facilities, and be able to remember more easily.

The importance of the visual aspect to writing was also reported by one teacher from the special school who said, *“When the pupil is typing he/she is not just typing he/she is reading as well and it is different with the hand writing pupil not reading what he writes until it is finished. I think the computer writing will improve the pupil’s learning because he/she can read his/her writing more than once.”*

- **Auditory learning style**

It is very clear that pupils in case studies 1 and 3 have been using the auditory learning style by using sound programmes which attract the pupils more. Teachers and parents reported that if the pupil uses the sound to correct the spelling it will improve their learning. It also helps pupil to concentrate when listening to comprehension. If pupils are listening and watching the learning programme, that will improve their learning. For example when pupils listen to the story using the headphones to get them away from any noisy distraction, then they are asked after they finished for some sentences to begin a story, most of them will get it right. Also with different colours, especially with year one pupils, as reported by the ICT coordinator, the computer could improve the quality of their writing.

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- **Kinesthetic learning style**

The number of pupils with a kinesthetic learning style was limited in all the case studies with most of the pupils having visual and auditory learning styles or a multimodal learning preference which uses all three learning styles. However, teachers have reported that the kinesthetic learning style supports pupils learning through the using of sound and touching the screen. One teacher in the special school said, *“Pupils use the keyboard and touch screen to help them think and write at the same time without realising that it had helped them learn.”*

### **5.9. Difference between ICT and Normal Lesson in School for special educational needs**

In the English lesson, the class teacher always starts by reading a story to the pupils. Usually there are three teachers in the classroom and the pupils are distributed as follows: five pupils with the class teacher, three with an assistant teacher and one with assistant teacher outside the classroom.



Firstly, pupils read the story on their own then they match the words with a practice book. After words, they write the words again in the same book. The teacher has some cards with the same words as are in the story in large writing, with each separate word on a card. Some cards have pictures on them or are coloured to help pupils understand the words. The pupils have to repeat the words again.

In the next fifteen minutes of the lesson, the class teacher has another set of cards for a story time. The cards have pictures related to the story that the pupils read together. The teacher mixes the cards and then asked the pupils to organise them in order. Each time one of the pupils has to arrange the story cards in the right order and read it to the class.

From the observation the researcher found that ICT help teachers greatly in the way they teach. For example one of the lessons was focused on the use of sound to match cards. The teacher holds some cards and makes sound of a word. The pupils have to repeat the word. The teacher reported that with this way of learning pupils enjoyed it and all other ideas from the use of ICT.

After that the teacher asked for a different word with the same rhythm and she writes it down on the blackboard. One pupil was banging on the table with his pencil. Another pupil said why we have to learn words in this way. He felt bored by this method. Pupils use the same work book at home which is "Read Write Inc". When the teacher requested the pupils to spell some words, she used the cards to help them spell them correctly.

The classroom walls are decorated with letters and keywords in different colours and shapes. The teacher has a book with each word on a square. She asked the pupils to read the words suddenly. One of the pupils was so happy and he responded by saying "*It's a nice rhythm as music*". The pupils repeated the words after their teacher. Another activity involved the teacher reading a word and the pupils pointing to it with their wood stick. Each lesson lasts between 40 to 50 minutes.

In the maths lesson, there was a maths teacher, class teacher and two assistant teachers. Pupils and teachers were set in a big circle of fourteen people. One of the pupils was very upset but when the teacher asked him to explain some number he did his best and became happy. After this activity, the teachers distributed the pupils into four groups. Each group has a teacher who provides more practice.

There is a considerable difference between lessons employing ICT and normal lessons. In the former each pupil has his/her own laptop that makes the work more flexible and each pupil can work on his own and move around. The class was designed for that with only two tables having the pupils' name on them while the other two tables have not. When the pupils using ICT the teacher has to set the programme and the pupils can repeat it by themselves until they understand it.

With ICT-based lessons, the teacher sometimes employed an interactive whiteboard for pupils to play games using the touch screen which makes the work more fun and learning can be quicker. One of the games programmes was called "Mr Men Matching" which was used to test the pupils' concentration. The game was based on every pupil matching cards together. Teachers reported using the interactive whiteboard for pupils with learning difficulties helps them present the topics to the whole class.

#### **5.10. Summary**

This summary provides an overview of the case studies on the perceived effect of the ICT on the learning capability of primary age pupils including those with special educational needs. The research was designed as three case studies which involved five classrooms being observed and recorded using a notebook. Pupils from the ages of 5 to 10 were chosen from the three schools including one for pupils with special educational needs. Observation was carried out during the spring and summer terms at the beginning of March to the end of July 2007.

The observation concentrated on a number of factors such as the type of learning, impact on learning, impact on behaviour, and the impact on specific groups of pupils.

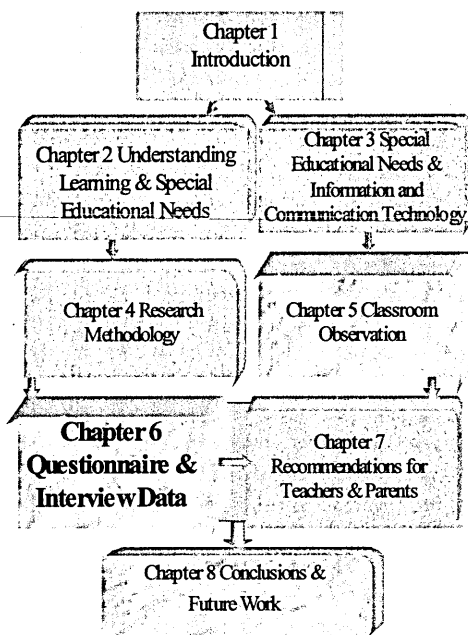
It showed that significant themes emerged such as the positive effect that the use of ICT can have on pupils' communication and their ability and desire to work as a team. Behaviour in lessons has been reported by teachers as better in most cases and the quality of work also enhanced when ICT has been used. The use of ICT is helpful with pupils who have special educational needs in that they often become more confident to work on their own.

Chapter 6 will describe the semi-structured questionnaires and interviews with parents and teachers.

# Chapter 6

## 6. QUESTIONNAIRE AND INTERVIEW DATA

### 6.1. Background



Data were gathered from three sources: observation, which has been described in Chapter 5; questionnaire, and interviews which are presented in this Chapter. These data were organised to answer the research questions which were presented in Chapter 1. Chapter 6 comprises thirteen Sections in which Section 6.2 discusses the questionnaire data design and collection followed by Section 6.3 which describes the analysis of the questionnaire. Section 6.4 explains

interview data collection. It is very important in the education field to have information from the teachers which is discussed in Section 6.5. The access to computers and programmes which have been used most often at home are described in Section 6.6. Parents' views about the impact of ICT on pupils' learning and the effects of the Internet have been explained in Section 6.7.

The use of ICT is clearly a very important learning tool for pupils with special educational needs, an observation that is discussed in Section 6.8 followed by an analysis of how parents are involved in their children's learning. Parents' involvements in their pupils learning includes teacher training and the effect of ICT on pupils' attention spans have been explained in Sections 6.9 to 6.11. The use of ICT as a teaching tool has been explained in Section 6.12 and is followed by Section 6.13 which is the Chapter summary.

## **6.2. Questionnaire Design**

This Section describes the instrument used in the study with parents and how the data were gathered. The questions were written in such a way as to be understandable by participants and the questionnaire is composed of four Sections with each Section comprising four to five questions. The full questionnaire is included in Appendix I. It commences with the research title and subject of the survey which is an introduction of the research project to explain the purpose of the survey being conducted. Section 1 was designed to capture general information about the parents and their children e.g. gender, age and ethnic background. The remainder of the questions focused on the use of ICT at home for pupils with and without special educational needs. The questionnaires end by thanking the respondents for their time and patience in completing the questionnaire.

The questionnaire has been piloted by a number of professional people with experience in the education field. The feedback about the introduction and the title of the research project was that it is very clear and interesting and makes the parents enthusiastic and keen to answer the questionnaire. One parent who is also the head of a school's ICT emphasised that the research area is very interesting and the way that the questionnaire has been written is perfect and easy for the parents to understand. In addition the experience of people whose children were grown up stated that "*We wish we had children in that age range so we could answer this questionnaire – it is very important.*" After the questionnaires were piloted, they were sent to the parents by the school office.

### 6.3. Questionnaire Data Analysis

As mentioned above, the questionnaire was designed to answer the research question relating to the effect of ICT on pupils learning including those with special educational needs. A total of 470 questionnaires were distributed to pupils' parents across the three schools by both the schools' administration offices and the researcher. 175 responses were returned i.e. a percentage of (37%). This has been summarised in Figure 6-1.

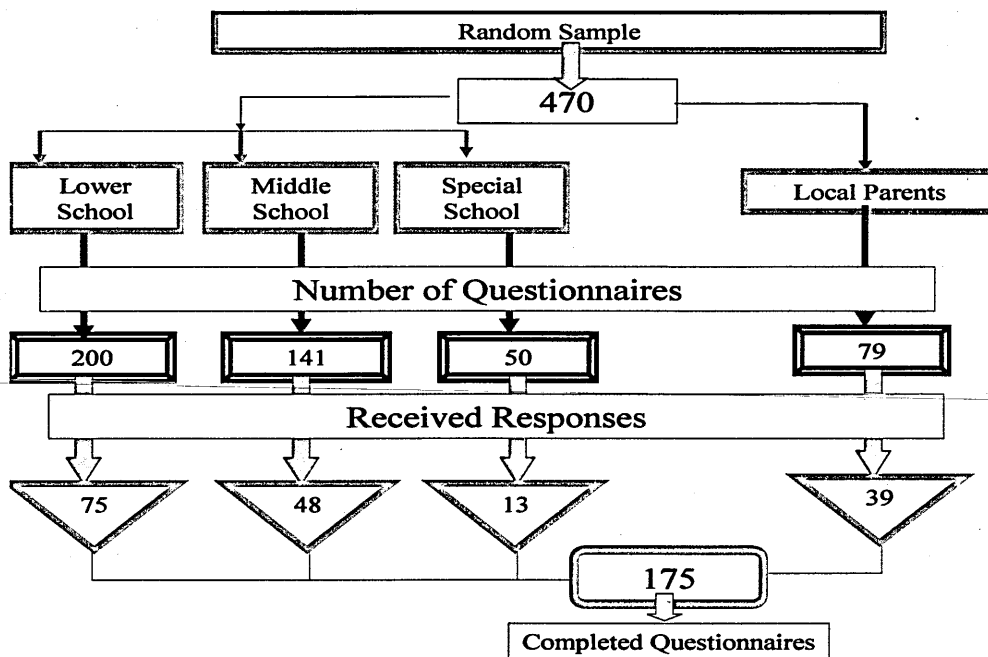


Figure 6-1: Responses from the Questionnaires

The questionnaire relates to all parents aged between 25 and 65 and elicits data about ethnicity, gender and familiarity with the computer. It also includes a pupil's age, access to a computer at home and the kind of programmes they have used. The distribution of respondents to the questionnaires was 50 (28.6%) male and 125 (71.4%) female. The average age of the participants was 45.26 years old which is detailed as follows. 26 (14.9%) participants were aged between 25 and 35 years, with 131 participants (74.9%) aged from 35-45 years, and 18 (10.3%) aged 45-55 years

old. In terms of language spoken by the participants, 113 (64.6%) of the parents were English-speakers while 62 (35.4%) have a native language other than English. The parents' ethnic background composition were 123 (70.3%) British, 12 (6.9%) Arab, 37 (21.1 %) Asian, and 3 Italians.

A question about the parents' recent experiences of using computer at home revealed that 4 (2.3%) were unfamiliar, all female, 12 (6.9%) had low familiarity, 43 (24.6%) medium familiarity, 55 (31.4%) high familiarity and 61 (34.9%) claiming to be very familiar, most of which were male. So far, from the result of the questionnaire the research has concluded that males are more familiar with ICT than females Figure 6-2. This view is consistent with that found by Subrahmanyam et al., (2001)

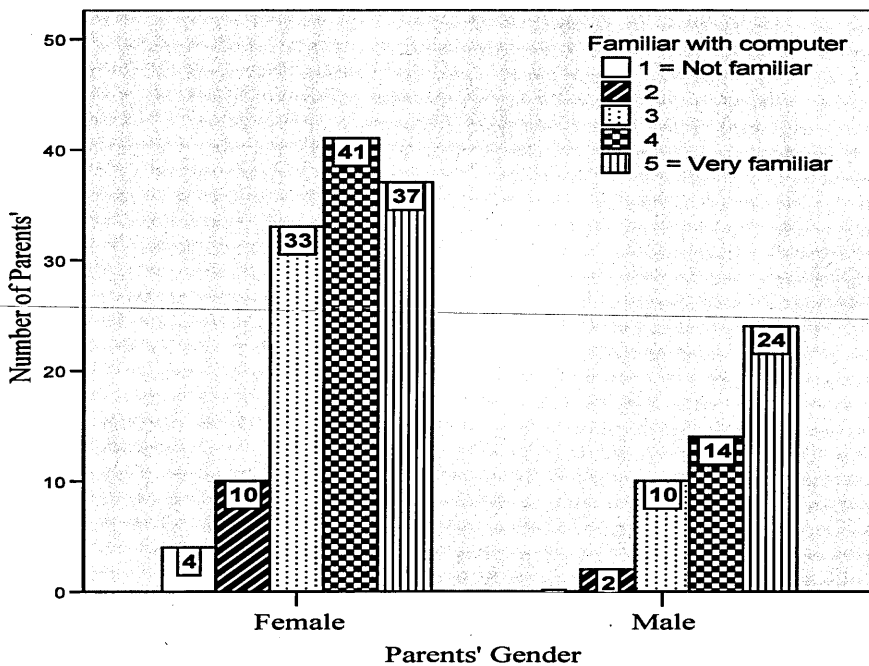


Figure 6-2: Familiarity of Parents with ICT

#### 6.4. Interview Data Collection

Teachers were interviewed because they are critical informants as to what enhances or inhibits the learning environment in the classrooms. They were interviewed using a semi-structured questionnaire which invited comments on the effect of ICT on pupil's

learning whether they had special educational needs or not. The full questionnaire is included in Appendix II.

The interviews were carried out one month after the observation. The reason is that, by then, the author had established a good rapport with the school teachers. The interviews were tape recorded and transcribed by hand written notes. Each interview was rewritten as a new document using Microsoft word then Microsoft Excel. They were then analysed using the Statistical Package for Social Sciences programme (SPSS).

The initial plan was to carry out 25 interviews with school teachers but, because they were often difficult to access, this number was reduced to 17 interviews with teachers, head-teachers, and an ICT coordinator. Each interview lasted between half an hour and 45 minutes. The age distributions of the teachers was as follows: five in the age range of 25 to 35; three aged between 35 to 45; seven aged between 45 to 55 and two aged between 55 to 65.

All teachers emphasised that pupils who used ICT were making progress towards their educational goals and improvement. Furthermore, the use of ICT was a positive experience that could enhance the pupils' learning. There are some factors such as children's age, teacher's age, and the kind of subject they have been teaching.

### **6.5. Teachers' Interviews**

In this research study, teachers reported widely that ICT offered them enhanced resources to support learning. Additionally the use of ICT could enhance the range of teaching approaches taken. Teachers who employed interactive whiteboards reported that these facilities helped pupils observe, then talk and ask questions. In all case studies, teachers described that the result of using ICT in the classroom was very positive in terms of helping pupils to finish their work on time and more quickly.

Seventeen teachers were interviewed, 8 (41.1%) of whom teach all subjects, 4 (23.5%) are ICT teachers, 2 (11.8%) teach geography and two (11.8%) teach maths and ICT. All teachers are using ICT in their teaching activities but, unsurprisingly, the ICT teachers do so the most. They use ICT between 15 and 20 hours a week while



the others use them for presenting their work or preparing themselves for learning tasks.

## **6.6. Access to Information and Communication Technology**

Most of the parents who participated in this study, i.e. 171 (97.7%), have access to a computer at home and had used the computer while only 4 (2.3%) have not. In addition those parents who do not have a computer at home reported that computers are the key component for supporting pupils with special educational needs. Most of the parents reported a positive impact from the use of computers to assist pupils' learning, specifically for SEN pupils. Some writers (Kehr and Greyrose, 1998; Hasselbring and Williams, 2000) support this view which has been described in Chapter 3 Section 3.3.2. They also reported that it is a helpful tool for teachers to get lesson ideas and opinions from other learning tools, i.e. ICT can improve the way they teach. However, ICT has a positive effect because pupils need to know how to use technology nowadays at an early age. In addition, the use of the Internet helps learners to search for information, and enhances typing skills.

Some parents believe that the use of ICT has had a positive impact because as a new technology it should be used in everything, not just for homework. Others believe that the influence of ICT has been very positive in the field of education. This point of view is the same as Haugland (2000). Parents also reported that we must educate our children and ourselves in the use of ICT in order for them and us to be successful learners. With the use of ICT, many tasks, such as homework, presentation, and learning topics will be much easier. This will encourage both pupils and teachers to undertake more difficult tasks.

### **6.6.1. Programmes used at Home**

The most frequently used programmes at home were the Internet, games and word processing which have been used by 136 (77.8%) of the children in the study, followed by excel, e-mail, and PowerPoint presentation which have been used by 33 (81.2%). Only 3 (1.7%) of parents reported that their children used a computer at school and not at home. The results of the questionnaire showed that the use of the computer at home and school varied according to the child's age. At the age of 5-7,

pupils predominantly used it for playing games, using Microsoft word and drawing. It is different between the ages of 8-10 where pupils use computers for their homework and different programmes such as Microsoft excel, Flowol, sciences, maths, and the Internet to search for more information.

Teachers reported that pupils use computers at a young age for playing games and at the same time they are learning. It is different with the older pupils who can read better and use the Internet and other software, helping them with their learning and homework. Figure 6-3 illustrates the relationship between the children's age and the programmes used at home.

Teachers reported that pupils who have computer opportunities at home also have a lot of opportunities to gain information elsewhere. They also suggested that there was more parental involvement/support in children's learning. Table 6-1 illustrates the programmes that have been used at home.

## **6.7. Impact on Learning**

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In the survey, parents were asked if using ICT would help their children to learn better. A total of 101 (57.7%) reported that ICT assisted their children into a positive learning environment because they regarded ICT as a teaching and learning tool (Hartley, 2006; Section 3.2). It is also important to improve children's skills such as reading and writing by the use of ICT (Judge, 2006; McLinden et al., 2002). Parents reported that ICT help their children to work successfully and independently. They improve children's work by recognising the importance of completing their work.

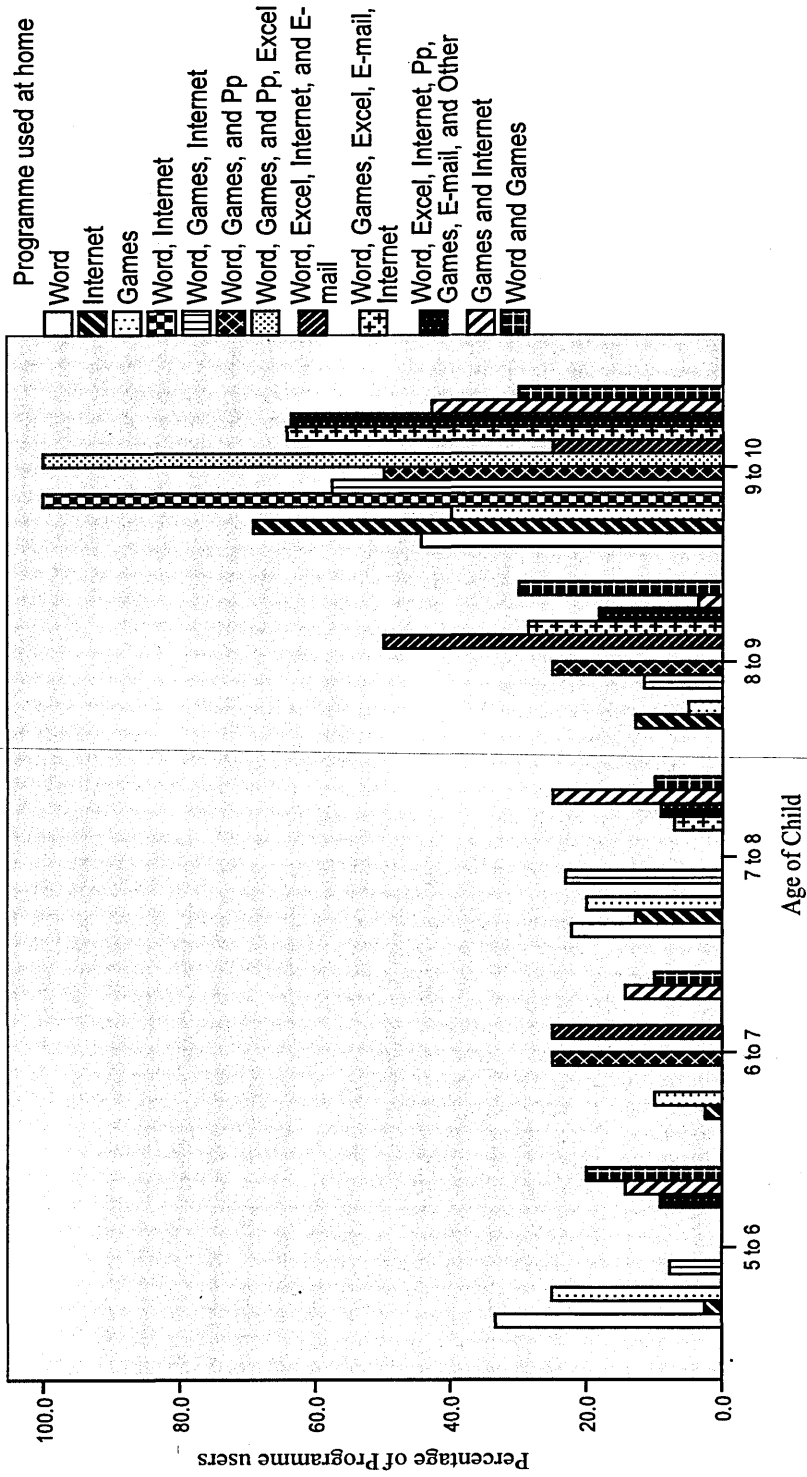


Figure 6-3: Relation between the Pupils' ages' and the Programmes used at Home

		Frequency	Percent	Valid Percent
Valid	Internet	39	22.3	22.7
	Games and Internet	28	16.0	16.3
	Word, Games, Internet	26	14.9	15.1
	Games	20	11.4	11.6
	Word, Games, Excel, E-mail, Internet	14	8.0	8.1
	Word, Excel, Internet, Pp, Games, E-mail, and Other	11	6.3	6.4
	Word and Games	10	5.7	5.8
	Word	9	5.1	5.2
	Word, Internet	4	2.3	2.3
	Word, Games, and Pp	4	2.3	2.3
	Word, Excel, Internet, and E-mail	4	2.3	2.3
	Word, Games, and Pp, Excel	3	1.7	1.7
	Total	172	98.3	100.0
Missing	12.00	3	1.7	
Total		175	100.0	

Table 6-1 Programmes used at Home

Some of the parents emphasised that learning with ICT can happen more quickly than other traditional learning methods and also using ICT is more interesting. In addition, the use of ICT could help a child to be independent and work at his/her pace. The ICT has, however, to be combined with appropriate learning tasks where teaching provides a core of focused pointers (such as where to find appropriate sources, and how to select relevant information).

Not all the parents have a positive view about the use of ICT; 25 (14.3%) indicated their views were different. They reported that learning has to be from books with experienced teachers; the use of ICT is good but pupils of primary age can lose their concentration more quickly. Furthermore, some parents indicated that information on the web is too much for the child to understand and it is not straight forward. However this information alone does not enhance learning. Also they prefer their children to learn from reading a book. In addition with the computer it is too easy to find the information but books require more concentration. Forty eight parents (27.4%) do not know if the use of ICT can help children to learn better and Figure 6.4 illustrates parents' views about its effect on pupils learning.

#### **6.7.1. Impact on Reading**

Parents who participated in this study were asked if they felt the use of ICT as a tool could help their children to read. Fifty six (32%) broadly agreed and fifteen (8.6%) emphasised that ICT facilities, games and good software can assist a child's reading. This view has been supported by Pearson et al. (2005) and Elkind (1998) and is explained in Chapter 3, Section 3.2. Four respondents (2.3%) reported that ICT can help the child to move the words with the use of ICT facilities such as cut and paste. The ICT is also regarded as helpful in assisting with punctuation. This view has been supported by Hoffman and Blake (2003) who added that Word helps weaker writers to improve the quality of their writing. This view was supported by six (35.3%) teachers.

Three (17.6%) teachers also added that pupils like to read from the computer screen more than a book. The use of the colours which attract pupils more than reading from the book make them engage with the computer screen to read from it.

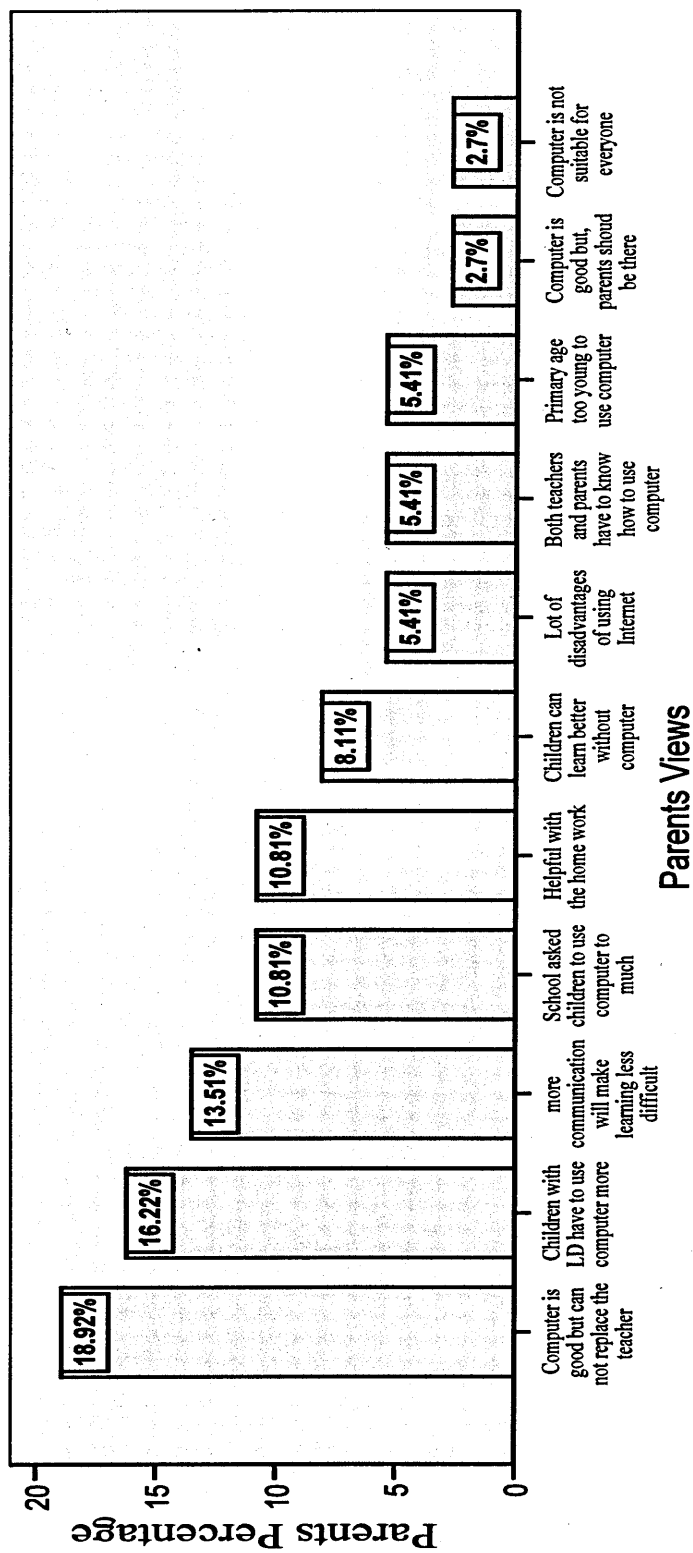


Figure 6-4: Parents' Views about the use of ICT as Learning Tools

Ninety two (52.6%) of parents believe that books are the best way for children to learn how to read and for the parents to enjoy their children reading. In addition parents reported that children sometimes cannot concentrate on the computer as they can with a book and children can read better without a computer.

Books provide pupils with more flexibility and can be used at any time and anywhere. If a child struggles with reading a computer can not make any different. 26 (14.9%) parents did not agree on the use of ICT to improve pupils learning. One of the parents has found difficulties in answering the question because he believes that pupils like ICT and parents can not estimate if it improves their children's reading or not. Seven teachers (41.2%) supported this view but added that the computer is not a library book and children still need the teacher to help. This point of view is highly consistent with those found by Convertino (2006). Parents also reported that pupils have to know how to read first and then they can use the computer. Table 6-2 illustrates parents' views about the use of ICT as a learning tools.

		Frequency	Percent	Valid Percent
Valid	Reading has to be from the book	42	24.0	35.3
	Improve reading	16	9.1	13.4
	Computer facilities, good software and games help child to learn	15	8.6	12.6
	Child likes books more	9	5.1	7.6
	Learn to read first then use computer	9	5.1	7.6
	Child can read better without computer	9	5.1	7.6
	Help with punctuation	7	4.0	5.9
	How good is the software	5	2.9	4.2
	Computer make it easy to move words	4	2.3	3.4

	Child cannot concentrate with the computer	3	1.7	2.5
	Total	119	68.0	100.0
Missing	1.00	56	32.0	
Total		175	100.0	

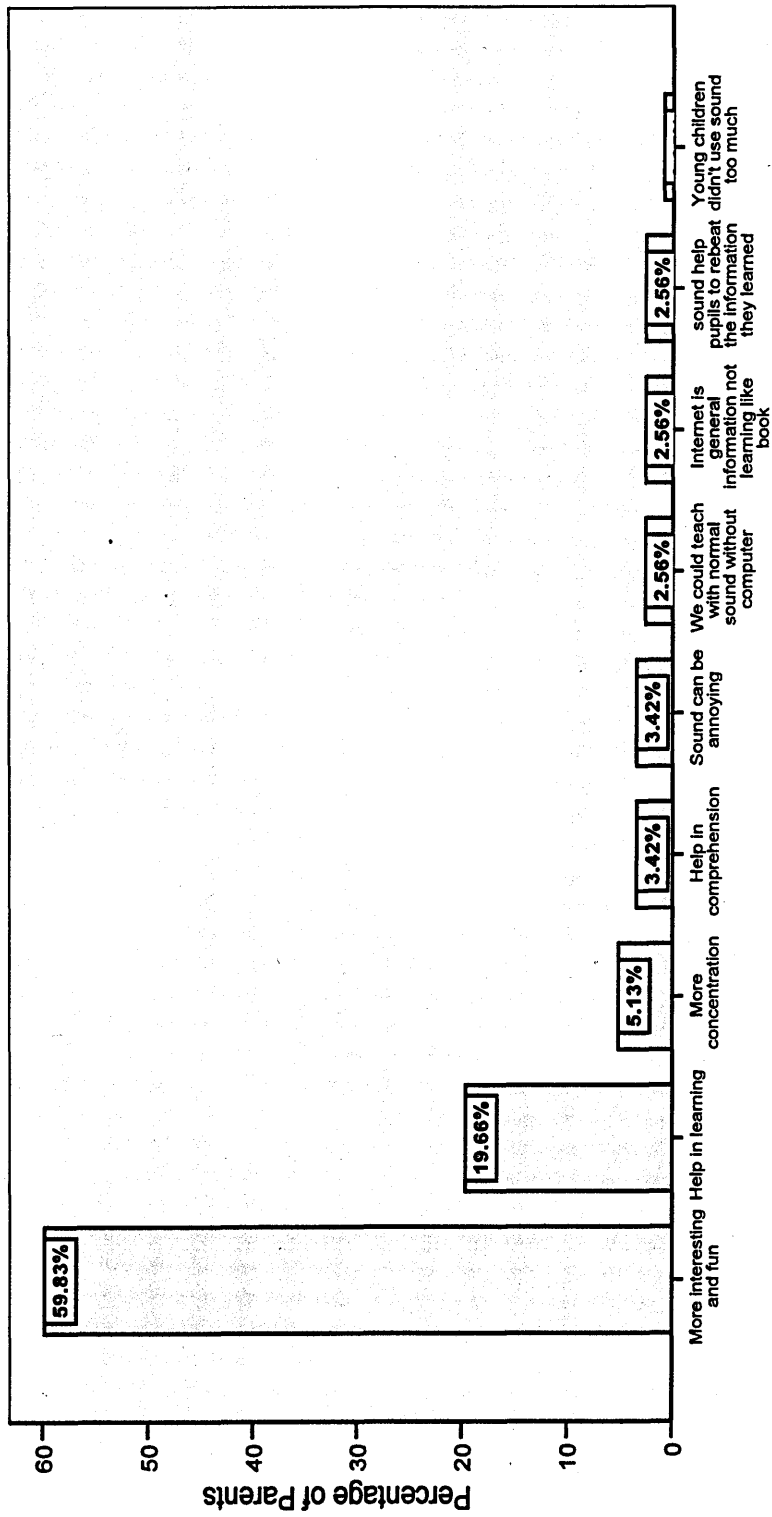
Table 6-2 Parents' View of the use of ICT as Learning Tools

### 6.7.2. Impact of Sound Programmes

131 (74.9%) parents felt that the use of programmes with sound could help pupils to learn better by repeating the programme. Seventy parents (40.7%) indicated that using sound is more interesting and fun and 29 (16.5%) agreed that sound helps children to concentrate for longer and to improve their learning. Sound makes the association between what the child hears and what he sees.

All the teachers agreed that sound has a positive effect on children's learning. Five teachers (29.4%) reported that sound will help a great deal if the child is a poor reader and three others felt that sound makes lessons enjoyable. Sound can help children with a visual learning style to learn better. However 12 (6.9%) parents mentioned that sound is sometimes annoying and disturbing, and young children do not need to use it. Furthermore 32 (18.3%) parents reported that they have no idea if sound can help a child to learn better. There were no comments from teachers concerning this issue. Figure 6-5 illustrates the parents' views about the use of computer sound and its effect on children's learning.





**Effect of Sound Programmes**

Figure 6-5: Parents' Views on the Effect of Sound Programmes on Pupils Learning

### 6.7.3. Impact of the Internet on Pupils' Learning

The view that access to the Internet could help children's learning was agreed by 161 (92%) parents. Perhaps the most significant finding here is that using the Internet would provide the learner with access to more information. This helps children with their homework as reported by 129 (73.7%) parents and 13 (76.5%) teachers. Teachers also agree that access to the Internet has a positive impact on children's learning but indicated that they cannot leave the children to use the Internet on their own in the young age range.

Web sites that have good software can help children to learn better and work at their own pace and that could help children with special educational needs to be more independent. Teachers reported that the use of the Internet to search for information and teaching materials is an excellent tool for providing experiences. These experiences will improve the child's knowledge and ability to learn. Parents indicated that the Internet should play a major role in the classroom in helping their children to communicate with others around the world but under teacher supervision. In addition teachers said the Internet is a very helpful learning tool that could help them get authentic materials from anywhere. Wheeler (2005) supports this point of view and adds that the use of the internet can provide pupils with access to a vast repository of information, learning resources and experiences. Table 6-3 illustrates how parents feel the Internet can affect their children's learning.

		Frequency	Percent	Valid Percent
Valid	Child can access more information to help with their homework	129	73.7	89.6
	A lot of helpful websites	6	3.4	4.2
	Children in this age range are too young to use the Internet	3	1.7	2.1
	It's fun and child can work at own pace	3	1.7	2.1

	Internet is useful but does not help child to learn	3	1.7	2.1
	Total	144	82.3	100.0
Missing	1.00	31	17.7	
Total		175	100.0	

Table 6-3 Parents' Views on the Impact of the Internet on Children's Learning

### 6.8. ICT and pupils with special educational needs

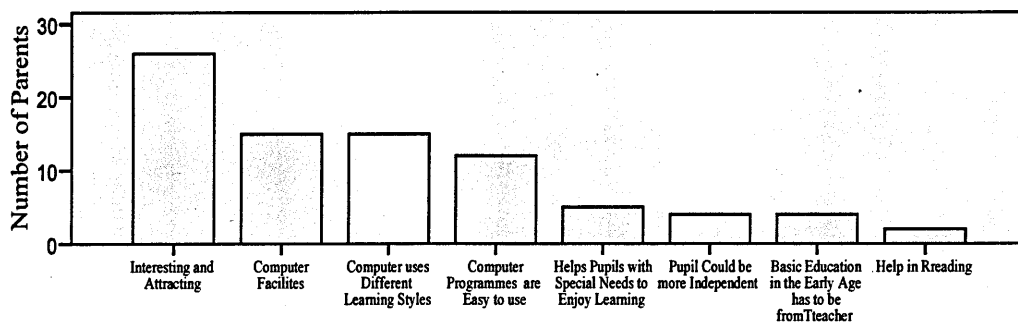
Most of the parents 107 (61.1%), including those who have children with special educational needs, and six teachers (35.3%) agreed that ICT facilities and special software for SEN children can improve learning (see also Price and Samuels, 2000; Clements, 1998, and Section 3.2).

All 17 of the participating teachers agreed that the use of ICT is a very helpful tool for pupils with special educational needs. Three teachers (17.6%) indicated that these pupils are able to understand the information quicker when they use ICT. Some parents, i.e. 26 (14.9%), said ICT is an interesting and attractive technology for pupils with special educational needs. *"We have to use it to help children to get the best learning environment."*

Fifteen parents (8.6%) who have children with SEN reported that ICT employed different learning styles which are suitable for everyone and this will improve the quality of teaching.. Four parents (2.3%) reported that ICT helps special needs pupils to be more independent and five of them (2.9%) said that ICT will help pupils to enjoy learning.

Not all parents were happy with the idea of using ICT for pupils with special educational needs. Five parents (2.9%) said that basic education in the early years has

to be from the teacher because they set the quality of learning. Figure 6-6 illustrates the effect of ICT on pupils with special educational needs.



ICT and Pupils with Special Needs

Figure 6-6: The Effect of ICT on Pupils with Special educational needs

### 6.8.1. ICT and Teaching Pupils with special educational needs

104 parents (59.4%) and three teachers (17.6%) reported that a combination of ICT and experienced teachers should help pupils to learn. They also emphasised that special software for pupils with special educational needs could improve the quality of teaching. Judge (2006) supports this view and suggests that there are some factors that affect the use of ICT in classrooms such as the quality of the software and the attitude of the teachers. Moreover four parents (2.3%) reported that pupils with special educational needs can express themselves better with the use of ICT and complete their task more quickly and successfully.

Not all the parents agreed that the use of ICT would improve the quality of teaching. Six parents (3.4%) reported that teachers set the quality of learning and pupils with special educational needs cannot concentrate with a computer. However 16 teachers (94.1%) agreed that ICT is a very helpful teaching aid, specifically for pupils with special educational needs. They have also indicated that ICT facilities such as the interactive whiteboard can help the teacher to explain the lesson to the whole class at once rather than going to each pupil individually. Figure 6-7 illustrates parents' views about the use of ICT and teaching pupils with special educational needs.

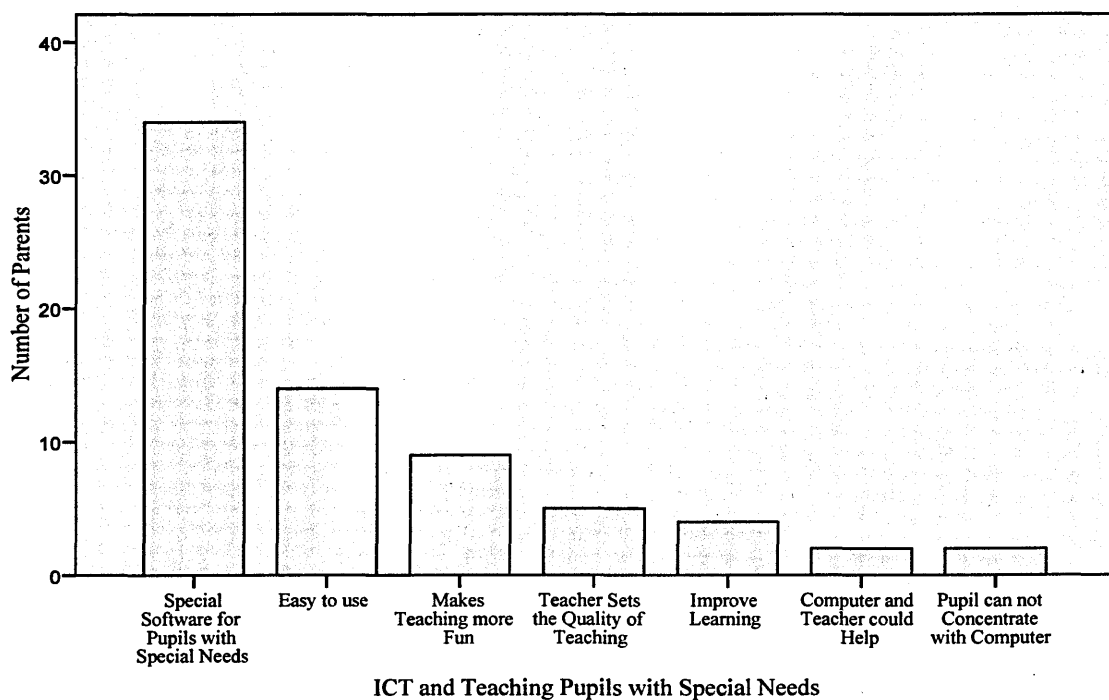


Figure 6-7: Parents' Views about the use of ICT and the teaching of pupils with Special educational needs

### 6.9. Parents' Involvement in their children's learning

114 parents (65.1%) supported the idea that parents and teachers have to work together in order to overcome any issues, and that they complement each other. This point about how teacher and parents can work together is explained in more detail in Chapter 7. Teachers should be able to direct the parents to reduce the learning difficulties. When parents and teachers were asked how they can work together, 62 parents (35.4%) suggested holding more meetings and having more communication with teachers. Furthermore 12 teachers (70.6) said *"Parents have to attend teachers' evenings and help with the pupils' homework."* Four teachers (23.56%) asked parents to help voluntarily in the school and to be in touch all time with their child's teacher. Only one teacher said that parents have to make sure the learning happens by testing their pupil at home. In addition five parents (2.9%) proposed that a pack of

information be sent home before each term started for the parents to read and understand the new teaching methods.

### 6.9.1. Communication between school and parents

The communications between school and parents has to be strong because both are interested in the pupils' development and working for the pupils to learn better. Parents preferred to be provided with more technical or learning support from the school so they could fully help with their child's learning. Also communication will help parents to understand their child's learning style and how to work with it, as illustrated in Figure 6-8.

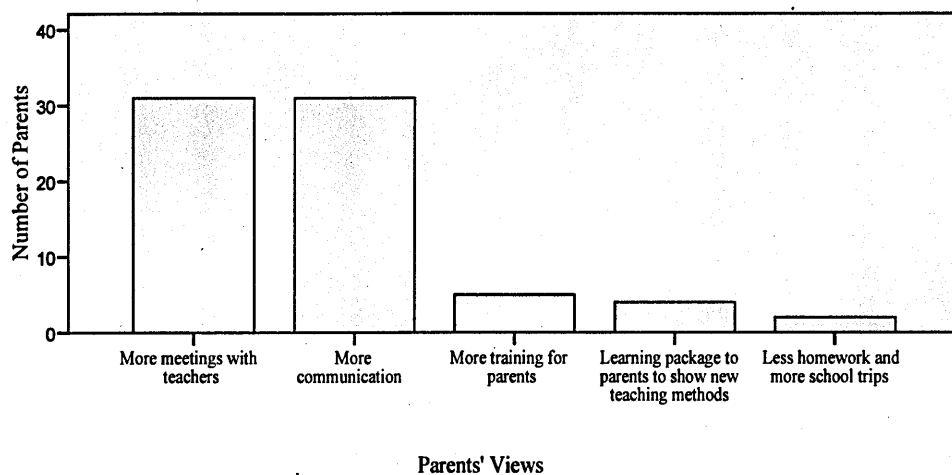


Figure 6-8: Areas for improved communication between Teachers and Parents

### 6.9.2. Parents' General Comments

When parents have been requested to write further comments, 41 responded with a range of responses as follows:

- The computer is good but parents should be there and the school asks pupils to use the computer too much.
- Computer is very helpful with homework, however it cannot replace the teacher.

- There are many disadvantages of using the Internet, both teachers and parents have to know how to use a computer.
- Primary age is too young to use ICT and it is not suitable for everyone; more communication will make learning less difficult and more enjoyable.
- Pupils can learn better without the use of ICT.

#### **6.10. Teachers' Training**

Teachers were asked if they had had enough training in the use of ICT. Fourteen (82.4%) said "Yes" but five (29.4) reported that they have not had enough training in the use of ICT and that the most training they have had in the last few years is in the use of the interactive whiteboard. Moreover two teachers reported that they have to pay for the training.

Teachers in the special school reported that the availability of laptops for every pupil has helped them to become familiar with the using of ICT. Teachers and educators for the special school have a basic education as regular teachers. The ICT coordinator's role is to help any other teachers.

Training courses appealed more to older than to younger teachers. However, it is reasonable to believe that younger teachers are more interested in using new technology than older teachers and that the younger teachers, having grown up in the ICT era, are more familiar with the technology anyway.

#### **6.11. The use of ICT and Pupils' Attention**

Teachers who were interviewed during this research asserted that ICT is a very helpful learning tool that has a positive effect on their pupils' interest towards schoolwork. ICT can help pupils to take pride in their work and translate their ideas while supporting pupils' research for more information. Furthermore, the use of ICT in the classroom help pupils to take their work seriously and they are very keen to improve their quality of work which helps them to finish their tasks on time.

Some teachers indicated that the effect of ICT depends upon what was being done, but that interest was stimulated even if sometimes content was not affected. Figure 6-9 illustrates how the use of ICT in the classroom helps teachers to receive better attention from the pupils.

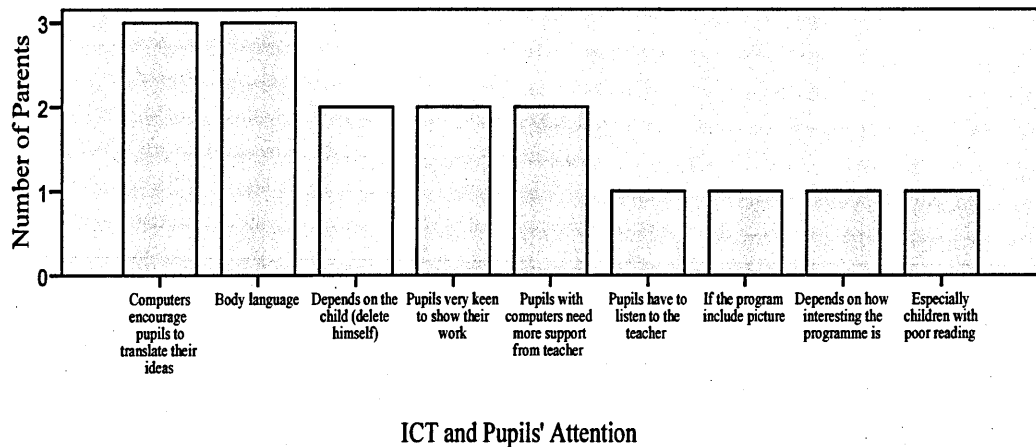


Figure 6-9: How the use of ICT in the Classroom Helps Teachers to Receive better Attention from Pupils

### 6.12. Teaching with ICT

The use of ICT including interactive whiteboards as teaching tools are reported by six (35.3%) teachers as being very important for demonstrating topics to the whole class at once. Roschelle et al., (2000) and Penuel et al., (2002) support this view and add that the use of an interactive whiteboard to replace the blackboard makes it easier for the teacher to demonstrate work. Teachers also suggested that ICT facilities and good software could improve pupils' learning and make the work look better, specifically for pupils with special educational needs. They reported that ICT as a teaching tool could help pupils to a higher order engagement with creative processes. This view is highlighted by Loveless (2003) in Section 3.3.

Not all teachers agree that ICT helps them to teach better; four (23.5%) proposed that pupils need teacher support more than any other learning technology, specifically in the primary age. This point of view is highly consistent with that of Sherman et al. (2004).



### **6.13. Summary**

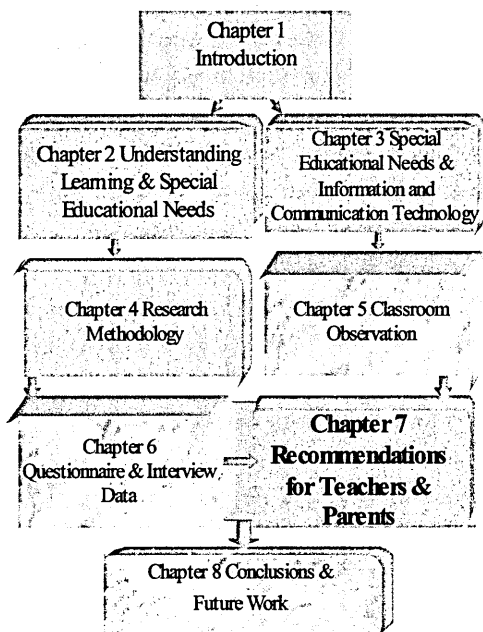
Overall, there was a great deal of information collected from the parents' questionnaires and interviews with teachers which illustrates the importance of using ICT in pupils' learning. The findings of the study provide evidence to suggest that the use of ICT is perceived to have a positive effect on pupil's learning as reported by teachers and parents. However, the use of ICT in schools is not fully understood by parents. Furthermore the research found that ICT is perceived to improve the quality of teaching and help teachers to demonstrate their work.

The main finding of this Chapter revealed that parents with and without access to a computer agreed with their pupils using ICT as a new technology. Chapter 7 will provide recommendations for teachers and parents.

# Chapter 7

## 7. RECOMMENDATIONS FOR TEACHERS AND PARENTS

### 7.1. Introduction



Information and communication technology (ICT) has changed school conditions over the past decades. It matters that all pupils with and without special educational needs have a better chance of learning using new technology with which they can access and represent their views and experiences. Those pupils with special educational needs need to be treated with respect by their parents and teachers through the provision of tools to enable them to respond and influence the world.

Pupils with special educational need often face a life-long problem that will require on-going multi-modal management and support. For this reason parents need to be aware of the new technology such as ICT and the research based interventions which are now available, to help their children. Parents and teachers play a crucial role in controlling the pupil's use of ICT and they need to know the role of the ICT in their

pupil's learning, especially those pupils with special educational needs (Brodin and Lindstrand, 2003).

This Chapter presents recommendations for teachers and parents who are responsible for pupils' learning. Section 7.2 makes recommendations for teachers and explains their role in improving pupil's learning. Also the use of ICT to help with and improve pupils with special educational needs has been discussed. Section 7.3 provides recommendations for parents about the role of ICT to improve learning. The Chapter ends with a summary in Section 7.4 and Figure 7-1 summarises the recommendations for teachers and parents.

## **7.2. Recommendation for Teachers**

The Education Act of 1981 established that teachers need to be aware of the possibility that a pupil having learning problems may have an underlying need for additional learning support. For example, pupils will need to be monitored carefully and a proper assessment conducted if there is a cause for concern. Pupils need to be given positive information and a personal interest taken in their progress to meet their individual needs. To meet the additional support for pupils with special learning needs, teachers may be required to develop new skills, particularly if special equipment or materials are involved or if the teacher needs to collaborate with other teachers or work with a support teacher (Highland Learning and Teaching Toolkit, 2007).

### **7.2.1. Teachers to Improve Pupils' Learning**

The study found that it is very important for teachers to plan for classroom activities and to provide pupils with the opportunity to express their thinking, so that feedback from them can help with teacher skills development. In addition teachers have to use collaborative activities so that everyone is challenged and pupils are trained to listen to and respect one another's ideas. They also have to be sure that pupils have a chance to explain their own understanding and that they are active and involved to the end of the lesson. This finding is consistent with Dwyer, 2007.

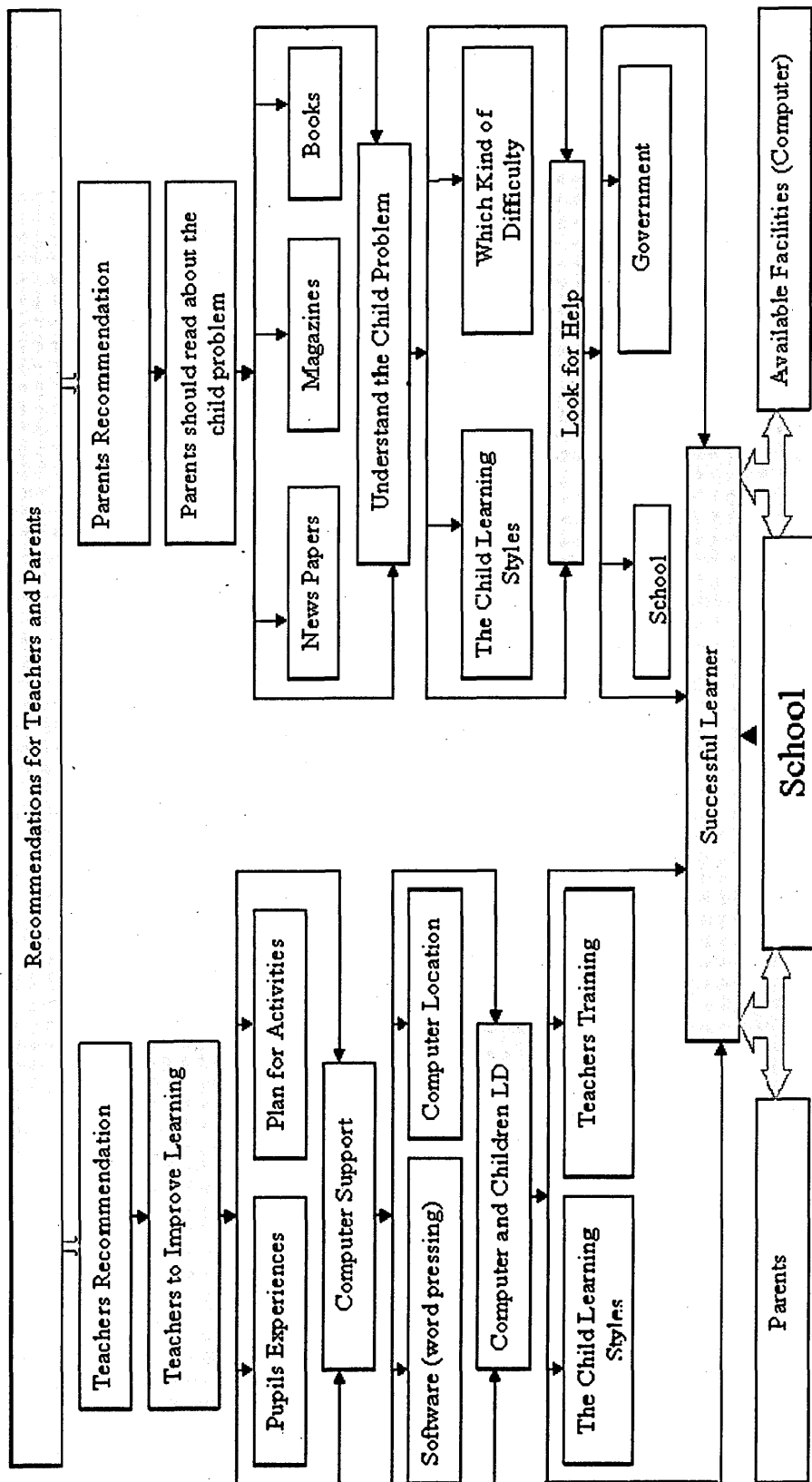


Figure 7-1: Recommendations for Teachers and Parents

### **7.2.2. ICT Organised to Support Teachers**

From the observation in the special school the author found that the location of ICT in a school building has an important effect on pupil's learning. Computers can be available in other places in the school in addition to the classroom, such as an ICT lab or ICT room, the library, or any room suitable for its use in the school. This flexibility in ICT locations could make a great deal of difference in terms of a student's opportunity for meaningful use. Teachers have to think carefully about where the learning can happen in addition to any ongoing programme designed to improve access to ICT. Observation in the special school used for the study suggested that pupils with special educational needs like to move around, so flexibility in the location and use of ICT in the school could help pupils to learn better. Furthermore, it is important for the teacher to ensure that all websites and intranets are as easy to use as possible when using the Internet specifically with pupils who have special educational needs and how that can best enhance the pupil's learning. This helps those pupils to enjoy learning and not be bored by the use of ICT. These recommendations are consistent with the findings of a research study by Behrman and Shields (2000).

From the semi-structured interviews in the three case studies, teachers reported that they have to be aware of the value of ICT as a learning tool; it can be very powerful in helping learners to improve their basic skills. Furthermore, the researcher realised that the use of ICT based tools, such as PowerPoint, interactive whiteboards and the Internet, can greatly help and support learners in visualising spatial concepts e.g. the use of shapes. Many pupils, especially those with special educational needs, may be competent in using ICT. And this can help teachers respond to those areas of work in which the pupils have a weakness.

The finding of this study suggests that most of the primary pupils have used Microsoft Word and this is helping them to improve their learning. For this reason teachers have to help pupils to use Word because the package makes rewriting and revising much less laborious and its value is immeasurable for those pupils with fine spelling, sequencing, spelling and other language manipulation problems.

### **7.2.3. ICT and Pupils with special educational needs**

From the data collection, teachers without experience of working with pupils with special educational needs felt uncomfortable in the way they teach those learners. They agree to the need for special training and experience to be able to work with pupils with special educational needs. In addition teachers must seek support, e.g. in the use of ICT to help pupils in learning basic skills through ICT use.

Teachers also reported that they have to be able to choose and explore software that is developmentally appropriate for their classrooms, and to select which programme is best for the pupils. While pupils with special educational needs are often able to use existing software it is important for the teacher to examine the software carefully to make sure that it is suitable for the learners' needs, or to find ways of adapting it to make it more appropriate. In addition teachers need to construct programmes that build on the knowledge that pupils bring to the classroom or through their interactive work with the ICT. The teacher has to be aware that knowledge is built on a pupil's experiences. Pupils readily acquire vocabulary to describe and share these mental representations and the concepts that evolve from them. Teachers have to consider how to interrelate pupil's knowledge with their acquisition of ICT (Refer to Myhill and Brackley, 2004).

The teachers interviewed in this project emphasised that they should make some effort to keep in touch with pupils' informal knowledge in order to raise teachers' self-awareness which will help them to understand pupil's strengths and weaknesses. This will promote self-regulation so teachers will have an improved ability to orchestrate, monitor and check their own cognitive activities (see also Sutherland, 2005). In this case schools are playing a significant role to improve their teaching capabilities, for example in acquiring new hardware and software for school pupils. The school should consider options that incorporate universal design features to facilitate access to ICT for all pupils, including those with special educational needs. This is consistent with the findings of Behrman and Shields (2000).

Teachers in the special school indicated that they should be provided with powerful and efficient learning tools to work effectively with special educational needs pupils.

These kinds of tools will help teachers to offer new and more effective means of learning while individualising instruction to the broad range of pupils' learning needs. ICT facilities could be one of these learning tools which enhance and provide an equitable learning environment for all pupils.

#### **7.2.4. Pupil's Learning Styles**

Teachers in the three case study described that it is important for teachers to recognise pupils as individuals with their own educational history and perspective towards schools, teaching and learning. They also need to understand and consider different learning styles in order to work out which is the most effective for the learners. This point has been described in Section 2.3. The Internet can be an excellent way to adapt information to meet the characteristics of human information processing (more explanation in Section 6.7). In addition, methods of imparting knowledge, such as lectures, books and journals or conference papers, are characterised by a linear progression of information for teachers to understand pupil's learning styles. When using ICT with pupils with special educational needs it is important for the teacher to make sure that she/he has effective and adequate support e.g. learning support and technical (see also Wheeler, 2000).

#### **7.2.5. Teacher Training**

The research indicated that teacher training helps to ensure that the preparatory work for access to ICT as a learning environment is undertaken before the learner starts the learning programme. The UK Government target is for all British teachers to have special training in the use of ICT. They have provided funding of £230 million to help teachers to improve pupils' learning in the use of ICT in the schools (Wheeler, 2000). The Government will also support teachers by a further spending of £20 million in the purchase of personal computers for teachers.

Teachers also reported that schools and community organisations should work together to provide different kinds of training for teachers, parents and other adults who work with pupils. This training should be suitable for the pupil's age and their ability to learn. This could strengthen their critical understanding of the motives underlying much of the software. It also empowers their knowledge to make good choices about their ICT use.

### **7.3. Recommendations for Parents**

The recommendations for parents presented in Figure 7-1, provides details on how information and communication technologies can enhance and support the development and learning of pupils with and without special educational needs. They also provide them with a secure foundation upon which they can build their knowledge. The recommendations will inform the best way for parents to understand their children's needs.

#### **7.3.1. Parents and the use of ICT**

This study has explored the perceived impact of the ICT in pupils' learning, of primary age including those with special educational needs. During this research in three schools the researcher found that the involvement of parents in general, and parents with children having special educational needs in particular, in schools became more intensive, more frequent and more focused. There are more facilities for parents to understand how they can help their children to learn better. Also parents are beginning to be more aware of the role of ICT, to improve their children's learning. To support this point, teachers and parents may need help in learning how to use these resources.

The questionnaire with the pupils parents and the interviews with the teachers suggested that the former have to be aware of the new technology such as Information and Communications Technology (ICT) and that it is an important part of our lives today. Also they have to prepare their children to use it in a positive way. Parents have to realise that ICT is very important for young pupils as it is for adults. In addition ICT is necessary for the pupil's confidence and interest in engaging with new technology. So parents are playing a significant role by directing their pupils to use ICT in a positive way.

Teachers in this study described ICT as potentially very powerful tools for enhancing primary age pupils learning, especially those with special educational needs. For example, the use of ICT programmes such as the Brain Works Better software can help pupils improve their attention skills. This helps them to learn better in and out of



school (see also Maximize Focus, 2005). Teachers reported that pupils who have support from family members and friends in the use of ICT get the most from learning with and through ICT in their early years of education. More explanation has been given in Section 3.2.

Teachers in case study three suggested that parents have to be aware of the most suitable programmes which could both affect their pupil's learning and are suitable for their needs. They can seek teachers' help because teachers have the educational knowledge required to develop useful learning environments; they cannot, however, put that into practice without the necessary programming skills. Ideally, teachers will be able to customise educational resources to suit individual learning needs (Roe, 2003). To improve the selection of programmes, parents have first to read about the suitable programmes then seek school support such as training led by teachers' experiences.

From the classroom observation the researcher found that learning with ICT can enhance present learning, and support and extend pupil's development with the use of sensitive feedback and dynamic presentation. Also the use of ICT can engage pupils in self-directed learning. The use of ICT and parents can add value in extending learning opportunities for pupils, often in ways that only ICT resources can offer. Such encounters can take place in all areas of the curriculum. ICT can help pupils with special educational needs to meet their needs, increase their autonomy, allow for greater responsibility, build confidence, encourage pupil's cooperation with peers, and to make decisions.

### **7.3.2. Parents in Relation to Pupils with special educational needs**

Parents play a key role in helping pupils to overcome their special educational needs and to achieve their educational goals. However, these pupils can have a hard time completing their education. Parents can help those pupils to have a successful childhood by keeping involved, focusing on individual strengths, finding the most suitable school, and holding high expectations. The best way forward for those parents described by all teachers in the study is to engage their children in discussions

about the relative merits of different tools, so that they can become resourceful learners.

#### **7.3.2.1. Reading about and awareness of the pupil's problem**

Teachers reported that it is very hard for a family to have a child with a learning problem. In addition teachers described that parents have to appreciate the nature of their child's needs and to accept these. The first step for parents in helping pupils with special educational needs is to understand their unique learning strengths and weaknesses. This information can help parents to understand that their child does not learn in the same way as other pupils do. Moreover parents have to find out as much as they can about the problems the pupil has and which kind of learning needs he/she has.

From the observation the author found that parents should also search for new technology such as ICT to improve their child's weaknesses. Teachers and parents have to understand that ICT have an appeal for pupils of all ages because they are fun, a combination of sound and visual images. It is an interesting environment where the pupils can easily check their progress and learn from their mistakes. It was also found that ICT as a learning tool for pupils with special educational needs are important because the pupils often need more practice to learn and remember a concept.

Teachers in the special school described that parents have to be aware of ICT because it is keeping features and flexibility allowing a pupil to progress at his/her own rate which improve their learning curve. Educational software for many different subjects such as mathematics and sciences are currently using game techniques which help pupils with special educational needs to concentrate and engage more.

#### **7.3.2.2. Pupil's Learning Style**

This study conclude that parents have to understand the nature of their pupil's learning styles, and learning struggles may lead well-meaning parents to have unacceptable expectations and to say and do things that actually contribute to a lowering of self-esteem and motivation. The misunderstanding could lead parents to being negative and even to punish (see also Brooks, 2006).

Parents have to know their child's learning style; does he/she learn best through looking, listening, or touching? And what are the easiest types of learning tasks that will be best for the pupil? A lot of sources of help are available for parents to make life and learning easier for their pupil. Parents can find the information they need by reading many of the books and journal articles, by asking professionals and looking in magazines about special educational needs or by contacting national organisations (see also - Larry and Silver, 2004; Disability and Society, 2006).

### **7.3.2.3. Looking for Help**

Teachers in the study suggested that parents must try to understand the nature of their pupil's problems not just in terms of learning e.g. school environments. Like classroom teachers, they must build on the pupil's strengths while compensating for, or adjusting to, the pupil's needs without exposing them unnecessarily. They have to seek school help in providing in-service training for parents on transition issues for special educational needs. This has been explained in Section 3.4.

To improve this point the researcher found that parents have to search for clues that can tell them about how their pupil can learn better. What is the pupil's weakest approach to learning? Moreover, the interviews with the teachers reported that parents who have children with special educational needs have to understand that they can be more involved earlier than for normal pupils. They also have to understand that their child can be affected by their own learning needs. It is very important for parents to search for information that will help their child to accept their needs. Furthermore parents who have children with special educational needs must have information about their needs before they suffer from it (see Martin and Potter, 1998; Austin, 2000; Cotton and Reed Wikelund, 2006).

Parents can look for help with the local agencies, support groups and in service training to help them cope with their child's learning needs. There are some agencies to support families such as, Pupils and Adults with Learning Disabilities, National Association for Pupils and Adults with Learning Disabilities (ACLAD), Division of Rehabilitation Services (DRS), and Individualized Education Programme (IEP). In

addition the local school system may have or be willing to organise a support group with help from one or more of the above agencies (Ness, 1989).

These agencies play a significant role in supporting parents to become familiar with their child's learning problem early on, so they can help them to become more comfortable with their strengths and weaknesses. Parents have the earliest opportunity to help pupils understand themselves, they are the important members in the team (student, teacher, parent), and their support can make the difference to a pupil's adjustment and success (Ness, 1989).

Most pupils with special educational needs prefer to use distraction rather than information given by teachers (see Gardner and Lundquist 2007). The use of ICT will help those pupils because ICT-based and video-based instructions are designed using this distraction kind of concept. Teachers in the study described that parents can seek school help to deal with their child's problem.

#### **7.3.2.4. Communication between Parents and School**

The results of the teachers' interviews and parents' questionnaire indicate that the majority of teachers are not aware of the nature and extent of pupils' expertise relating to their out-of-school uses of computers. For this reason parents have to be more involved with school and teachers by attending school functions, volunteer working and parent-teacher conferences, by tutoring at home, and being school governors. It is very important for parents to work directly with their pupils such as reading with them, supporting them in their homework and encouraging them to use resources such as ICT.

Parents have to check their pupil's homework, even if they cannot help and parents should help their pupil to understand the importance of school. However, Qiuyun (2003) and Lunts (2007) found that schools and teachers do not always make it clear to parents, i.e. in clear language, how they can help their pupils succeed in the use of new technology such as ICT. More details are provided in Section 2.6. To address this issue parents suggested that schools may send information (e.g. a booklet) to them to explain the needs of the education system and the learning method. The school can

also run training sessions for parents to understand the teaching technique in the use of ICT and other subjects in the school, so they can understand the school curriculum.

The result of the questionnaire with pupils' parents suggests that teachers can help parents to play their part at home by asking all parents to check their pupil's homework. They also can tell parents what help pupils can expect to receive from the school. Schools have to make sure that parents are made to feel welcome in the school, such as by organising a welcoming environment for parents, and discussing the importance of parents' help and support. In addition, the school can explain and focus on what makes the school's work easier to be understood by parents.

The school should provide an open and welcoming atmosphere to parents. Schools and parents often have differing opinions regarding the role of parents in education, with the school holding more power and often defining the role they would like to assign to the parents. This lack of communication may be due in part to the fact that most teachers are not formally trained to deal with parents. Moreover, parents may either be wary of bringing up concerns with the teacher or of being regarded as too outspoken.

The result of the questionnaire also found that parents in the special educational needs school felt that in order for a pupil to do well in school a parent must know what happens in the school each day. They also need information about the practices of parental involvement that is most likely to enhance a true partnership between schools and families. All the teachers liked having volunteers in the classroom, especially if the parents have experience in the use of ICT, to help pupils in the younger age group of primary school. Teachers in the study believe that ICT use will make a difference to pupil's learning, especially in the primary age.

#### **7.4. Summary**

This Chapter provides recommendation for teachers and parents who are responsible for a pupil's learning. It suggests the importance of understanding the pupil's learning style, and the nature of their learning problem. The role of ICT as a new

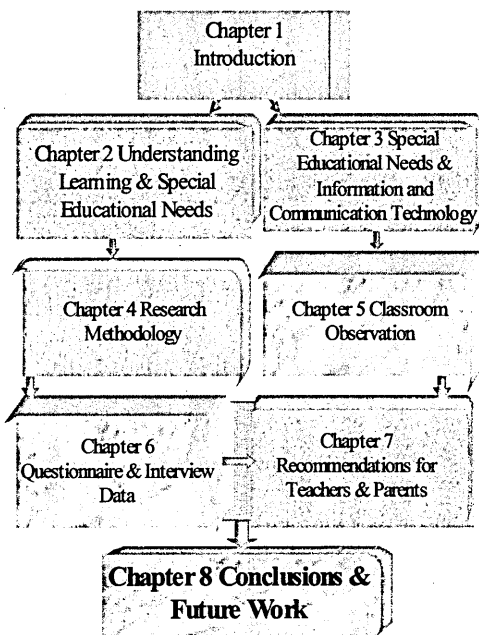
technology to help teachers and parents to improve the pupil's needs has been discussed.

Chapter 8 will cover the conclusions and future work. The Chapter seeks to integrate and summarise the work presented in the rest of the thesis. In it both the research findings and areas requiring further work are discussed.

# Chapter 8

## 8. CONCLUSIONS AND FUTURE WORK

### 8.1. Introduction



The technology world has changed enormously in the past forty years. The revolutions in technology, especially the use of ICT, mean that we are flooded with information, pressed to make decisions based on that information, hurtling through changes in how we learn and the way we teach the stereotype of the successful. The focus of this research project was to understand how ICT was perceived by teachers and parents to affect the learning capability of primary age pupils

including those with special educational needs.

It is very clear that ICT has been used by both pupils with and without special educational needs. The crucial role of ICT on pupils's learning has been investigated and highlighted in the review of the literature presented in Chapter 3. The data to support the thesis were collected from a wide range of sources such as classroom observation with the pupils, interviews with the teachers, and questionnaires

completed by pupils' parents. In this Chapter, the thesis and its findings are reviewed and discussions about possible future work arising from it are given.

## **8.2. Thesis Conclusion**

In response to the research aim the study has found that the speed of change in technology will ensure an increasing use of ICT within the teaching environment. The main benefits identified for both learners and teachers are the promotion of shared working space and resources, better access to information, the promotion of collaborative learning, and radical new ways of teaching and learning.

The use of ICT in schools will change the teachers' role as well as requiring them to have other skills and responsibilities. Many of them will have experience in the use of distributed learning methods, the development life cycle of shared working spaces and resources, and virtual guides for pupils who use ICT (Al-Ghamdi et al., 2004). More details are set out in Section 3.3. Furthermore, the use of ICT will improve the learning experiences of pupils, helping them to think and communicate creatively. ICT can help pupils to interact with each other so that learning through communication can occur. The use of ICT also prepares primary pupils for a successful future and understanding of the technological world.

The use of ICT and special software can help pupils with special educational needs to develop vocabulary skills and knowledge. They can also help them to develop and improve their writing skills. For example, it is very hard and difficult for pupils of primary age to write a paragraph. However, the use of ICT graphics can make this much more interesting and enjoyable. Additionally, using clip art facilities can assist pupils to convey their thoughts more clearly. More explanation has been provided in Section 3.2 (see also Ybarra and Green, 2003).

### **8.2.1. Linking Data Analysis with Research Questions**

To answer the research questions, we started by explaining the literature review in relation to the use of ICT for improving pupils learning including those with special educational needs. Each question was answered based upon the analysis of the data



collected from classroom observation, parents' surveys and teacher's interviews. The data collected for the research project helped to answer the following research questions.

The main research question posed to address this broad purpose is:

***What is the perceived impact of using ICT on the learning capability of pupils in the early years of education?***

This research question in turn is divided into four sub-questions as follows:

1. How pupils learning and special educational needs can be defined?
2. How dose ICT help pupils with and without special educational needs?
3. How does ICT change the teacher's role in the classroom?
4. What support is required by the parents of pupils' special educational needs?

In order to answer the first question an extensive review of the literature was undertaken and is presented in Section 2.2. Special educational needs have been defined by a number of researchers such as, Harwell (2001), NIMH, (2007), Murphy (2006), Stevens (1996) Hay et al., (2007), Price et al., (2000), NICHCY (2004) and Kenyon, (2000). SEN are a weakness in different parts of the brain which affects the pupils ability to see and hear or to link information together. These weaknesses can be demonstrated in different ways such as extreme needs with spoken, reading, writing, or concentration which could expand to schoolwork. This definition was chosen because it has been repeated by a number of researchers.

To answer the second question, i.e. 'How does ICT help pupils with and without special educational needs?', the literature was reviewed in Section 3.2. This question was also answered by looking at the interviews and questionnaire questions which had been answered by teachers and pupils' parents. Their views suggested that ICT facilities and good software were perceived to have a positive impact on pupils learning and teaching for pupils with and without special educational needs. This has been described in Section 6.7.

The third question, 'How does the ICT change the teacher's role in the classroom?', has been answered from the literature review in Section 3.4 and from the interviews with teachers where they reported that (1) the ICT changed their role from being the

only learning focus in the classroom and (2) they now have the ICT to support them in their teaching.

The fourth question, 'What support is required by the parents of pupils with special educational needs?' has been answered by the literature discussed in Section 2.6. Furthermore, teachers reported that parents have to be involved in their pupils learning by attending parents' meeting, doing voluntary work in the school and helping their pupils with homework. These findings have been supported by Cotton and Reed Wikelund (1989) and Lunts (2007).

The participants' answers for each question from the surveys and interviews were coded as the researcher found similarities between the responses and the literature review. This process assisted in drawing the conclusions.

### **8.3. Key Findings**

This study was designed to understand how ICT was perceived by teachers and parents to affect the learning capability of primary age pupils including those with special educational needs. It was motivated by the strong empirical evidence showing that ICT had a positive impact on pupils learning, both those developing normally and those with SEN. This view is consistent with those of Judge (2006) and McLinden et al. (2002) both of which are described in Section 3.2. Also discussed in Chapter 3 are many areas for using ICT in the education of primary age pupils both with and without special educational needs.

A review of the survey research identified that ICT has been used by primary age pupils. From the interviews with the teachers they indicated that ICT is perceived to improve the quality of their teaching. A second issue raised was the shortage of teacher training for ICT, especially staff development and finally, teachers and parents needed time to become skilled with the use of ICT before attempting to teach with them. All these points have been explained in Sections 6.8, 6.9, and 6.10.

#### **8.3.1. Impact of ICT on Learning Activity**

Most of the teachers interviewed in this study had used ICT for their own teaching activity. They perceived the positive impact of ICT on the school curriculum. In addition employing ICT in schools and at home for pupils with special educational needs can use more primary source materials, address and solve real problems, develop analytical methods, and build learning and supporting skills such as drawing, maths and presentation. Some teachers reported that ICT is a key component for supporting pupils with special educational needs. Parents were found to have similar views about the effect of ICT on pupils learning, and both parents and teachers argued for more training and support in using ICT.

Parents reported that many pupils liked to use ICT and are likely to develop more positive attitudes towards their learning and themselves when they use them. For this reason ICT has provided the opportunity to create a wide range of interesting learning experiences for those pupils.

### **8.3.2. Use of Software**

This study provides important insights into the ICT and software used in the primary years. Teachers in a special school indicated that there is an increasing range of software tools which can be used to support the development of higher level thinking skills. These programmes such as, simple infant video toolkit 2, Lemmings, welcome to 2 type and ABC early years activities help pupils in their learning activities.

Teachers identified a number of points when selecting software for primary learners with special educational needs. In particular ease of use was mentioned most frequently and these programmes make a difference in pupils learning (Haugland, 2000). The first point in choosing programmes that meet the needs of as many pupils as possible will continue to be a high priority. In addition there are some pupils who will continue to struggle with literacy throughout the primary age. For this reason it is important for schools to make provision for those pupils who will need continued support with literacy learning throughout their school lives, as well as for those pupils who have special educational needs.

### **8.3.3. Sound Programmes and Learner**

Other important characteristics include sound programmes. Respondents indicated that primary pupils with special educational needs enjoyed learning with sound programmes they are fun, entertaining, and developmentally appropriate. They help pupils through communication and sharing with their peers, and improve learning through repetition.

Teachers used ICT in a variety of activities across their teaching activities such as using the interactive whiteboard. However, the majority of the teachers used ICT as an alternative way to develop and reinforce activities in the classroom. For example, two teachers reported that they used ICT “as a learning and teaching tool which helps them to receive better attention from the pupils.” Also the use of the ICT in the classroom helps them to present the lesson to the whole class. In addition, the use of sound with all this activity helps pupils to concentrate more and engaged with the learning programme.

Teachers and parents reported that sound programmes have had a powerful effect on pupils learning by helping them to share their expertise. The use of ICT sound programmes are powerful tools to reduce the pupils educational needs because pupils enjoying using them.

### **8.3.4. Access to Information**

Teachers reported that there are a number of reasons for exposing pupils to ICT, in particular the potential to access and present information in schools. First, and most important, there is a need to respond to a great deal of information. In addition, the availability of data information in the ICT database accessed through the Internet will offer the most cost-effective solution to information needs. Using ICT in the primary years does not only concern access to information but also involves using ICT systems to process and interpret the information (Paul, 2002). More explanations have been given in Section 6.7.

### **8.3.5. Pupils with Special educational needs**

The teachers in the case study special school stated that for those pupils who have special educational needs, ICT provide the only environment which they can manipulate and the only tools that reduce their level of needs. The use of ICT facilities such as modified keyboards, touch screens and the mouse may be used to allow extremely handicapped pupils to use regular software packages.

Parents reported that ICT is an interesting learning tool which offers pupils varied activities and increases the time a pupil is willing to spend practising academic skills. It is also a patient teacher that helps pupils to be more confident and provides them with the determination to overcome their needs. Many ICT programmes are set up in an interactive way and will respond to the pupil with a varying speed of presentation and difficulty, and that will encourage pupils with special educational needs to work for longer. This finding is consistent with that of Dwyer (2007).

The use of ICT can aid teaching pupils with special educational needs in basic skills including reading and writing. Pupils' parents asserted that ICT for pupils with special educational needs helped in increasing vocabulary as well as verbal language development. Additionally, it is important to recognise that ICT should not be used as a substitute for effective teaching. ICT is an effective and supplementary tool to the regular curriculum in teaching and learning.

### **8.3.6. The Impact of Parents' Involvement in their pupils Learning**

The importance of parents' involvement in their pupil's learning is (a) enhancement of parenting skills and home environment, (b) communication between school and home and vice versa, (c) parental volunteerism within the school, (d) enrichment of the pupil education by parents at home, (e) inclusion of parents in school decision making, and (f) extension of education through community.

Pupils who are guided by parents, teachers and other adults in the use of ICT have a good chance of using it in a very positive way, for instance, in the way that adults help them to make a good choice in the time they spend on the use of ICT, and to seek out software and online content that educates and inspires, not merely entertains. With

parents' and teachers' guidance and enthusiasm, pupils can use the ICT as a very positive learning tool to know other people in the world.

Parents and teachers have to support pupils to use ICT more actively, to create, design, think, and collaborate and communicate with their peers. The highly trained teachers will help pupils to play an active role in the emerging digital world. These various types of activities could empower pupils to participate in the emerging digital world, not merely to navigate through it. With the help of highly trained teachers, pupils can learn to use ICT to create and design their own software.

#### **8.4. Future Work**

The findings from this study suggest several areas where future research is needed:

- Further investigation is needed in the area of the relationship between learning styles, Special educational needs and ICT (see also Doyle and Humphrys, 1999).
- Specific investigations are very important into how assistive technologies to support pupils are needed. A replication of this study could examine the parents' views on improving parental involvement in pupils' education.
- The use of software, how to use it and which kind of software is suitable for pupils with special educational needs at various ages requires further investigation.
- Writing is an important, relatively unexplored topic for all learners with and without special educational needs. It shows where an individual's needs lie and his or her performance level. More research in this area with a more detailed analysis would give a better understanding of writing deficits in the reading problem. It would also allow for more structured interventions to improve the written language (Murphy, 2006).

- Future studies may investigate the effectiveness of ICT supported practices in the classroom across various subjects and grade levels, and how to disseminate the results to state and local education agencies and teachers.
- Future researcher may investigate the mature and established field of research in the area of digital technologies such as ICT and special educational needs (Abbott, 2007).

## **8.5. Summary**

This Chapter integrates and summarises the work presented in the rest of the thesis. In it both the research findings and areas requiring further work have been discussed.

The objectives of this research were to: (i) Investigate the literature about the relationship between information and communication technology (ICT) and pupils with special educational needs; (ii) Identify some of the factors that affect the use of information and communication technology (ICT) for assisting pupils' learning (reading and writing) ability in three case studies school; (iii) Investigate the current use of ICT resources in three schools and the roles played by teachers and parents in these schools to help pupils learn in both classroom and home environments; (iv) Assess the perceived impact of ICT on pupils' learning through observation and interviews in the case study schools; (v) Communicate examples of best practice, for both teachers and parents, on more effective way of using ICT to improve pupils' learning This Chapter has shown that not only has this objective been achieved, but also that the research reported in this thesis opens a potentially rich seam of future research topics.

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# APPENDICES



Not at all familiar 1  2  3  4  5  very familiar

**Section (2) the use of computer at home:**

1. Do you have computer at home? Yes  No   
2. Which programme does your child use most of the time? (Select)

Microsoft Word	<input type="checkbox"/>	Internet Explore	<input type="checkbox"/>
Microsoft Excel	<input type="checkbox"/>	Microsoft PowerPoint	<input type="checkbox"/>
Games	<input type="checkbox"/>	E-mail	<input type="checkbox"/>
Others	<input type="checkbox"/>	Do not know	<input type="checkbox"/>

.....

3. On average, how many hours does your child spend on computer per week?

None	<input type="checkbox"/>	Less than 2 hours	<input type="checkbox"/>
2 - 4 hours	<input type="checkbox"/>	4 - 6 hours	<input type="checkbox"/>
6 - 8 hours	<input type="checkbox"/>	8 - 10 hours	<input type="checkbox"/>
More than 10 hours	<input type="checkbox"/>	Do not know	<input type="checkbox"/>

4. Can you give some examples of type of thing that your child has learned from computer?

.....  
.....  
.....

**Section (3) the impact of the ICT on pupil's learning:**

1. Do you think your child learns better when she/he uses computer?

Yes  No  Do not know

Why/Why not

.....  
.....

.....  
2. Do you feel that the use of computer helps your child read better than if they did not have access to a computer?

Yes  No  Do not know

Why do you think this?

.....  
.....  
.....

3. Do you think using ICT programmes with sound helps your child to learn better than those that are silent?

Yes  No  Do not know

Why/Why not

.....  
.....  
.....

4. Do you think that access to the internet helps pupils learn?

Yes  No  Do not know

Why do you think this?

.....  
.....  
.....

**Section (4) ICT use for pupils with special educational needs:**

1. Do you believe the use of ICT is helpful for pupils with special education needs?

Yes  No  Do not know

Why? Why not?

.....  
.....  
.....

2. Do you think the use of ICT will improve the quality of teaching for pupils with special educational needs?

Yes  No  Do not know

Why? Why not?

.....  
.....

3. Do you think it is important for teachers and parents to work together to improve a pupils' learning?

Yes  No  Do not know

Why? Why not?

.....  
.....

How do you think that this could be improved?

.....  
.....

4. Do you have any other comments?

.....

**Thank you for taking the time to complete this questionnaire, your views are very important to us.**

**Please return as soon as possible**



## Appendix II: Teachers Interview Questions

### Introduction

The use of ICT is becoming increasingly important in pupils' literacy education. However, the way in which they are used is inconsistent across pedagogical environments. Many of us talk about the integration of ICT into schools as an ideal, but do we know what this means in terms of pupil's learning. The more I examine the concept of ideal integration, the more I'm inclined to think there is no general agreement as to what that concept means. Understanding this is a first step in my research at Cranfield University.

### Research Aim and Objectives

The aim of this research is to understand how ICT is perceived to affect the learning capability of primary age pupils, including those with special education needs.

The specific objectives are to:

- (i) Investigate the literature about the relationship between information and communication technology (ICT) and pupils with special educational needs;
- (ii) (ii) Identify some of the factors that affect the use of information and communication technology (ICT) for assisting pupils learning (reading and writing) ability in three case studies school;
- (iii) Investigate the current use of ICT resources in three schools and the roles played by teachers and parents in this school to help pupils learn in both classroom and home environments;
- (iv) Assess the perceived impact of ICT on pupils' learning through observation and interviews in the study school ;

- (v) Produce a set of recommendations for both teachers and parents on more effective way of using ICT to improve pupils' learning.

**Section (1) General Information:**

1 - Which of the following age ranges do you fit into?

- Between 25 to 35
- Between 35 to 45
- Between 45 to 55
- Between 55 to 65

3- Which of the following range is the age of the pupils you teach?

- 5 to 6
- 6 to 7
- 7 to 8
- 8 to 9
- 9 to 10

4- Which subjects do you teach?

**Section (2) the use of computer in the classroom:**

1. Please indicate how many hours each week you use ICT in your teaching activities. Can you explain which kind of activities the pupils undertake?
2. Do you believe you are able to teach better when a computer is used in the classroom? Why?
3. Does the use of ICT in the classroom help you to get receive better attention form your pupils?

4. Does using computers programmes with sound help with your teaching? Why? Why not?
5. Do you think that access to the internet will help with pupil's learning?  
In which way?

**Section (3) the impact of the computer in the pupils learning:**

2. In your view does the use of computers help pupils to read? Why? Why not?
3. Do you think learners feel better about themselves when they learn how to use the computer? If so how?
4. Computers provide learners new ways for pupils to be creative or a good writer such as using Microsoft word to help them writing. What do you think about that?
5. Do you think learners access the computer as readily as paper and pencil, books, and other more traditional educational resources? Why do you think this?

**Section (4) computer for pupils with special educational needs:**

1. Do you believe the use of computers is helpful for pupils with special educational needs? If so why? Why not?
2. Do you think the use of computers will improve the quality of learning and teaching for pupils with special educational needs? Why? Why not?

**Section (5) computer and teacher training:**

1. Have you had training in the use of computers? Which kind of training?
2. Do you think if the teacher and parents worked together the child will learn better? Why/why not?

3. Is there any thing else you want to tell us that might help us to improve this survey?

**“Thank you very much for your time”**

#### Appendix III: Cover Letter

This appendix, present the official cover letter that was mailed to the school head-teacher to help in access to the school.

4<sup>th</sup> February 2007

Dear <Title Name>

Eman is currently undertaking a Masters by Research under my supervision into the relationship between ICT and learning disability. As part of this study it would be very useful for her to observe how pupils interact with ICT and to talk to them and teachers about their learning experiences. She is keen to be seen as a resource while undertaking this research and I feel that she could be both useful to the school and produce a well researched study which you would of course have access to.

Eman and I would greatly appreciate your help with this project. Please contact me if you have any questions.

Yours faithfully

Eman Abdalla

Appendix IV: School Letter to the Parents

**SPECIAL PRIMARY SCHOOL**

School Address

Headteacher:

13<sup>th</sup> July, 2007

Dear Parents

As a school we have been taking part in a research project on ICT and learning. They have been focussing on the positive effect of ICT can have on motivation and learning. Something which we recognise is very important.

As part of their research they are interesting in finding out parental views. Please find attached a questionnaire linked to ICT and learning.

Please return completed questionnaire to the school office.

Thank you very much for spending just a few minutes completing this for them.

Deputy Head-teacher

Appendix V: School Timetable

School ICT Time Table (March)

First week

Mrs B	Year (2)	Thursday	11:00 – 12:00 01/03/07
Miss G	Year (1)	Friday	1:30 – 2:30 2/03/07

Second week

Mrs H	Year (4)	Tuesday	1:10 – 2:15 06/03/07
Mrs T	Year (3)	Wednesday	1:10 – 2:15 07/03/07

Third week

Mrs B	Year (2)	Thursday	11:00 – 12:00 15/03/07
Miss G	Year (1)	Friday	1:30 – 2:30 16/03/07

Fourth week

Mrs H	Year (4)	Tuesday	1:10 – 2:15 20/03/07
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Mrs T	Year (3)	Wednesday	1:10 – 2:15 21/03/07
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Fifth week of March

Mrs B	Year (2)	Thursday	1:30 – 2:30 29/03/07
Miss G	Year (1)	Friday	1:30 – 2:30 30/03/07