An investigation of the impact of a portfolio based curriculum on children's ICT independence.

Iain Alexander Knox

Abstract

Very rarely, in education, do we see innovation that promises and delivers educational benefits without negative consequence. In the early stages of the introduction of ICT into education, promises were made of improved learning, 'state of the art' resourcing and even a decrease in teacher's workload. However, the reality was associated more with problems of integration into the curriculum. That is to say problems associated with the assessment of learning, the lack of time or money and effective management of the new ICT resources. It is within this ICT context that this research is grounded. The purpose of the research was to investigate the extent to which ICT can support the development of children's independence and individual responsibility for learning. The study used an action research approach to track the ICT development of 30 Y4 children over a period of 15 months. During four distinct action research cycles, a variety of surveys were developed and used to assess the changes in the children's approached to ICT. Changes, that were as a result of the implementation of a portfolio-based curriculum, through generally, a more child centred approach to ICT. As a result of the implementation of the above approach, it was found that the children showed an increase in their independence. They became, on the whole, more responsible and competent through their ICT work. They developed a more positive approach to their ICT tasks and showed that they could be more self-supporting at home and at school. This research illustrates the effect of a more focussed ICT curriculum. It highlights how use of an ICT portfolio can develop children's ICT thinking, ICT skills and ICT language. It illustrates the effectiveness of an integrated approach to ICT and highlights the current curricular constraints on such ICT development.

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Declaration

No material submitted in this thesis has been previously been submitted for a degree in any University.

Statement of Copyright

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Introduction

Introduction – Apparent Tensions

By its very nature education creates change. If we are to believe that education takes an individual forward in their knowledge and thinking, then education itself must take itself forward to meet the developing needs of the individual. However development within any sphere can create tension. For within each sphere there is a set of parameters or tolerances, which define the status quo. Anything that infringes on of these tolerances and upsets the current balance will create tension. Currently it could be said that within the sphere of Information and Communication Technology in education there are specific constraints. Namely;

The restriction of the Literacy and Numeracy Hour

With the implementation of the National Literacy and Numeracy strategies in 1999 into the Primary Curriculum the 'flexibility' and 'availability' of the teacher within morning sessions has been severely limited. The strategies are set out as follows:

Numeracy
Oral Work and Mental Calculation (5 to 10 minutes)
The Main teaching activity (30 to 40 minutes)
A Plenary (10 to 15 minutes)
Pg 13, Numeracy Strategy, Department For Education and Employment (1999)

Literacy
Shared Work (15 minutes)
Sentence Level Work (10 minutes)
Word Level Work (20 minutes) Plenary (15 minutes)
Pg 12 Literacy Strategy DFEE (1999)

Within this, according to the DFEE (1999), the teacher shall, 'devote a high proportion of the lesson time to direct teaching of whole classes and groups.' Pg 5.

Although such plans are clear and effective at structuring teacher time, they bind the teacher to a very rigid, ordered way of teaching, leaving little time for other concerns. If the strategy is followed strictly then the computer should only be used for 20 minutes during the 'independent' section. During this time, the teacher should, ideally, work with a particular focus group and would therefore have no time to assist with ICT problems. Further to this, the DFEE (1999) believe that the activity that is used should be 'consistent with the lesson objectives.' This limits the teacher and the child in their choice of ICT program or task. Therefore what is being suggested is that if we increase

children's ICT independence they will not need teacher assistance. This will free the teacher. Equally the teacher will be more able to provide open ended/integrated tasks that would allow for more flexing of the lesson objectives.

'The off white heat of technology.'

In a speech about the Government's commitment to ICT in schools, Tony Blair echoed Harold Wilson sentiments about the 'white heat of technology,' (BBC Online News August 17 1998). However the state of computers in a great many primary schools has never matched this inspiring statement. With the advancement of computer technologies in the past decade, the gap between the provision of ICT at home and school is ever widening. Since the provision of the first BBC computers in 1972, schools, on the whole, have been laggardly in their use of up to date computer technologies. Papert 1994 cited in Crawford (1996) suggests,

> 'In the wake of the startling growth in science and technology in our recent past, some areas of human activity have undergone a mega-change . . . . School is a notable example of an area that has not'. Pg 2

As the price of Personal Computers decrease, so the computer purchases by households increase. Schools however cannot afford to continue to purchase ICT technology to match this advancement. Through a 'Survey of ICT in schools' by the DFEE in 1998 the average expenditure for ICT per school was £2649. This included purchases not only of hardware but software and consumables also. It could be suggested that to maintain the standard of ICT provision in schools and avoid the obsolete technology trap this figure of expenditure should be increased to £3000? This, in the case of some schools is more than their educational budget ! Furthermore this will only be compounded with the implementation of the National Grid for learning and its pump priming exercise of spending £700 million to input computer hardware into schools. The result will be schools with excellent ICT facilities that become quickly outdated and that cannot be updated, let alone expanded due to decreasing school budgets and increasing ICT costs. However this does not address the problem that if schools are teaching children on outdated technology they are not giving them the skills to utilise their home computers effectively. Moreover if schools were to spend such money, then the use of the ICT equipment would be far more effective if the children were more ICT independent.

The need for assessment

Within the current curricular framework assessment is obligatory. As Primary teachers we must assess progress. In brief the purpose of assessment is to,

> ' - Assess pupils work against the key objectives for the year.
> - At the end of the key stage, assess pupils work against national standards.
> - Give you supplementary information about individual children's attainment and progress so that you can report to the parents and the next child's teacher.
> - Help the school to set targets ' Pg 37 DFEE (1999.)

Assessment within the Numeracy and Literacy framework can be seen in terms of short term assessment, assessing on a daily basis, medium term assessment which will 'review and record progress children are making over time,' Pg 34 and long term assessment which will 'assess and review pupil's progress.' Pg 36 DFEE (1999.)

Yet, time for meaningful assessment is limited within primary education. This is even more the case for children assessing and having increased responsibility for their own learning.

Essentially these tensions were the main things that I identified within my classroom and within the context of the school that I worked in. The purpose of my research was to resolve and perhaps ease these tensions. Then as a result there would be an improvement in the learning environment in my classroom. To this end the following method of action research was seen as the most appropriate for the classroom context.

Action Research.

Action research has been widely advocated as the one of the most effective approaches towards educational research and in particular research by a practising teacher. Hopkins (1985), McNiff (1988), Carr and Kemmis (1986). My research, reported here, followed a model that is based upon Hopkins' (1985) model of action research. Hopkins highlights four parts to his cyclical model of action research namely; **P**lan, **A**ction, **O**bserve and **R**eflect. Each part of the cycle is given its own heading and as the research develops progression is made though the cycle. Within each section of the cycle the resulting work feeds and develops into the next, building on each development until

there is a desirable outcome. Within this research, I felt that there were four very definite stages.

Cycle One - This witnessed the initial fact gathering that provided a background to the research. I identified tentative research areas that were pertinent to the research group by designing and implementing In School ICT and Out of School ICT Questionnaires to provide background information and a benchmark against which to analyse changes.
In School ICT Questionnaire – Appendix 4
Out of School ICT Questionnaire - Appendix 5

Cycle Two – I designed, implemented and assessed a structured ICT Portfolio. This provided the structure designed to raise the children's independence. At the same time I began to carry out a form of evaluation each week. This 'Hot Pencil' analysis was designed to give an insight into the children's thoughts over the week and to encourage them to analyse their progress.
ICT Portfolio – Appendix 7
Hot Pencil Review – Appendix 6

Cycle Three – Elements were added to my ICT portfolio in the form of ICT Targets to further develop children's independence. Their impact on the children was then assessed through an ICT task Questionnaire. I also carried out an ICT preferences questionnaire to assess the effect of groupings on children's ICT independence.
ICT Tasks – Appendix 12
ICT Task Questionnaire – Appendix 13
ICT Preferences Questionnaire – Appendix 14

Cycle Four – I drew all elements of the research together and analysed them. Also, to provide an element of triangulation, I developed a Parental survey. Furthermore I re-implemented 'Hot Pencil' analysis to provide more data against which to assess the children's increased independence.
Hot Pencil Review – Appendix 6
Parental Questionnaire – Appendix 19

Each stage was based upon the action research cycle and saw elements of the study being developed, implemented and analysed. Each element reflected approximately a

six months time period, with the central two occupying the academic year 1999-2000. But most importantly, it must be noted that the multitude of approaches that were implemented were accumulative, developed only because of the work that had gone before. No piece of work was carried out in isolation. Each piece built on what had been learnt in the previous cycle. When the four elements are collected together in this fashion, they form a simple action research cycle themselves.

Educational Ambitions

My main educational ambition was to address or even ease the tensions that were mentioned earlier. To this end I felt that an over riding ambition of the research was to increase the ICT independence of the children within the classroom. I felt that above everything, a more ICT independent, ICT confident pupil would help to ease the tensions. To achieve this goal, my research process encouraged me to design and refine several tools. These being; In School and Out of School Questionnaire, ICT portfolio, Hot Pencil review sheets, ICT Tasks, ICT Task Questionnaire, ICT Preference Questionnaire and Parent Questionnaire. They were designed for the following reasons;

A structured ICT portfolio

To develop self confidence.

The nature of teaching and learning has to change as the curriculum and the needs of the children change. If we do not change education to meet the needs of the children then education will firstly bear no relevance for them and secondly it will be uninviting and uninteresting. Tapscott's (1998) vision of the new generation is one of a group of individuals who want to participate actively in everything that they do. From their work with computers, to their relationships, to their education, they want to be active, not just 'viewers or listeners,' Pg 1, North Central Regional Educational Laboratory, May 1999. To this end the portfolio approach to collecting and organising ICT work should give the children an approach to learning that meets their needs. It should fit more closely with the way that they want to learn, actively. As Wohosky (1997) argues, 'portfolios allow students to monitor and assess their progress and help them to set goals for themselves as learners. Students should then begin to take more pride in their work as the responsibility for evaluation becomes partially their responsibility.' So by using a

more active way of learning that gives the children more active participation it would be hoped that they were more positive towards their learning and their ability to learn.

To develop ownership of learning.

Wade and Yarbrough (1996) suggest that it is a generally accepted notion that portfolios, 'provide opportunities for student choice.' Pg 64. Their view indicates that by giving children the opportunity to carry out and then collate their own work, they are being allowed to actively seek learning that they are interested in. Furthermore, with guided review and planning to engender further work, their self organisation, therefore their independence will increase which will allow for a further increase in the control of learning that they have.

To develop interaction.

Brandes and Ginnis (1990) comment that, 'a learners affective and cognitive growth are enhanced by positive interaction with other learners.' Pg 15. It has to be acknowledged that within the primary classroom there is the opportunity for children to learn and benefit from interaction with other children. From a practical point of view, teachers' time with each individual is very short. By encouraging children to promote their expertise they should benefit from the experience of supporting, explaining and solving problems for each other. To this end, if the children do actively follow their own learning path, then the possibilities for supporting each other will increase. For just as one child completes an activity, so another may need help to complete it. So there are distinct opportunities for interaction and mutual learning.

Hot Pencil Reviews

To develop self confidence.

Brandes et al (1990) comment that, 'when we value the learner, we increase her self esteem and her openness to learning.' Pg 13. If the teacher sets him or herself up as authority in the classroom, without giving the children a chance to say what they think or feel, they cannot be valuing the learner. By asking the children to put down their ideas, reflecting on what they have done during the week, the teacher will be able to see what they really thought. If teachers then use this information to inform their planning, then not only are they valuing the learner, but they are addressing their needs directly. As a result the children should feel more accommodated and be more positive.

To develop ownership of learning.

The Hot Pencil review guides the children to review their week and acknowledge; that there are links from week to week, that some tasks may take more than a week to complete, that they have a choice in planning what they want to continue to work on, that by expressing their grievances about certain lessons, the teacher will endeavour to remedy the problem. Indeed as Leadbetter (1999) argues self organisation is, 'attained through reflective planning and review.' Pg 55. So ultimately if a child is more organised then they should be able to be given more control of their learning.

ICT Targets

To develop self confidence.

In describing the unmotivated student Weiner (1980) commented that they will generally display negativity towards their education. They choose easy tasks, quit when they experience difficulties and work with little or no enthusiasm. To this end Fox (1993) points out that goal setting, 'an extremely effective way for teachers to increase (children's) motivation.' Pg 121. Therefore by setting and evaluating realistic targets with the children it is hoped that they will be more motivated. Coupled with the fact that the children are motivated through the fact that they are able to choose and guide their own work, through the portfolio, it would eventually be hoped that they would see, 'the need for excellence for its own sake.' Cochrane.(2002)

To develop ownership of learning.

As Brandes et al (1990) point out, 'the most effective learning is 'owned' by learners who are consistently regarded as responsible for themselves.' Pg 13. Using the ICT targets we are asking children to choose the activities that they want to do from a selection and challenge themselves to complete those activities. It would be hoped that through this approach, the children will feel that they have a role to play in organising their learning.

To develop interaction.

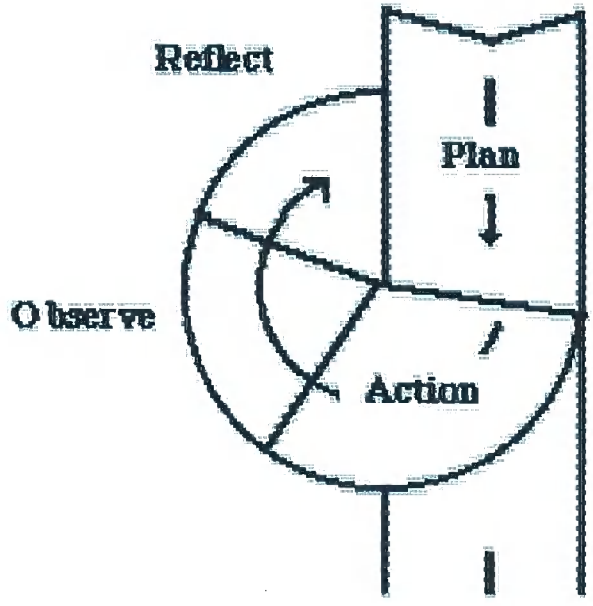
Bastiani and Wolfendale (2000) comment that parental contribution to education comes 'from and via such major dimensions as: the home curriculum, parental/familial engagement with school life . . . . and the reciprocal extension of these into the home.'

By asking children to take their work home and actively seek support to solve the problems that they encounter, we are drawing on parental help. Primarily it is hoped that parents will take the time to 'engage with school life,' and help to solve their children's problems. However it will also be interesting to see how children and adults do approach the problems that they encounter and how this process affects them. As O'Hagan (1986) in Stacey (1991) comments, 'empowerment in community education (is) 'providing people with the knowledge and skills which allow them to struggle for and gain power for themselves.' Pg 32-33. Equally it could be said that children should also be given the enthusiasm, aswell as the skills and knowledge, 'to gain power for themselves.'

Review

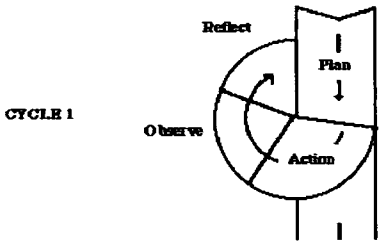
The main tensions that I identified that sparked off the research were; The restrictions of the Literacy and Numeracy Hour, the discrepancy between ICT promises and ICT delivery and the difficulty of creating opportunities for meaningful and beneficial assessment for both teacher and pupil. Effectively, I thought that to address these tensions, I needed to develop a more ICT independent child. To address this, this research implemented the following; *1. A structured ICT portfolio.* This way of teaching and learning ICT was designed to give both the teacher and the pupil the opportunity to develop their subject knowledge and ICT confidence. It was designed as a way of increasing children's independence thus developing their 'self sufficient' use of the computer. Moreover it allowed the children the opportunity to maximise their potential use of the computer within their ICT sessions. *2. ICT targets.* These homework tasks provided sufficient direction for the pupils to see what they could achieve if they had been given the basics. They also encouraged them to learn for themselves and find out how to complete tasks independently. *3. Hot Pencil reviews.* These weekly reviews encouraged the children to think more carefully about their work and begin to assess themselves, their performance and the tasks that they had been engaged in.

Cycle One



ICT in context

Cycle One



ICT in context

This chapter reflects the first cycle of this action research project. The whole research project and the consequential written work have split naturally into four cycles. Each cycle creates a picture of the work that was carried out within that cycle. It illustrates the journey that I went through. It highlights the reasons for my choices of methods based on the Literature reviews that informed all my decisions. It shows the tools that I developed, used and adapted. It considers the decisions that I made from the information that my tools gathered. But each cycle relies on the last and cannot be taken out of the context that it was embedded into. To this end, each chapter or cycle introduction will consider the context in which the research is set in at that point in time. This will be the *'Where we have come from ? '* section. Then I will review what is to come within that cycle, the '*Where are we now ?* 'part. Finally, I will consider what to expect in the following cycle, through the '*Where does this take us? '* section.

Where have we come from?

Through the *Introduction* I considered the main reasons that I embarked upon this research and identified the 'tensions' that brought about this ICT research project. That is to say I established that within the context that I was working in, I found that the following were uppermost in my mind: The restriction of the Literacy and Numeracy hour, the ineffective use of ICT in the classrooms and the constant need for effective, purposeful assessment.

Where are we now ?

Firstly, through the *Action Research Literature Review* I found out the reasons why this form of research was effective for this form of project and which particular action research model was to be used and why.

Then, within the *ICT in Current Primary Education Literature Review* I reviewed the context of ICT within Primary schools at the time of the study. I also considered the idea of why ICT is an important element of the Primary Curriculum and therefore why it should be an important

element of this study. Effectively in this chapter I set the national picture of ICT in schools then brought the context down to school level with the first element of my own research.

These elements of 'my own research' are reflected in *Cycle One – ICT in context.* Firstly, I carried out a SWOT analysis to identify what the ICT context was within the school that I was working in. This provided certain tentative foci which guided the research and provided research questions to address. I then used these research questions to develop questionnaires. These questionnaires were to be used to find out more information to answer these research questions. Then having tested the questionnaires with a sample class I had an initial set of data with which I could begin to answer the research questions.

Where are we going ?

Within the next cycle I need to research and establish what method I am going to use to bring about this improvement to the use of ICT. Equally having set the context of ICT at a National and school level, it would be effective to draw on research that is more child based. Furthermore, having tested the questionnaires, I should implement them further with the children in the focus classes. Then having assessed their responses I could analyse how the sets of children compare.

Action Research.

What do we want to find out and why ?

Before embarking on my research project I had make certain fundamental decisions. Perhaps the most import of these was the subject of the research. This has already been discussed in the introduction of the thesis. But to recap, I felt that I needed to address: The restrictions of the Literacy and Numeracy hours for ICT, the slow development of ICT potential within school and the need for effective ICT assessment. Therefore having established the 'what' of the research the next consideration should be how the research is going to be carried out. Consequently, this first literature review considers exactly this, the main 'how' of the research. This literature review assesses how action research differs from traditional research, particularly through the role of the researcher and the social element of this type of research. It offers definitions of action research given by the eminent action research practitioners and considers how they have developed action research. Lastly it relates action research into an educational context.

How does it differ from 'traditional research' ?

To understand how action research is different from 'traditional research' we must first define this term 'traditional research.' The most predominant forms of research within the social sciences are the positivist and interpretive forms. The former is characterised by Kolakowski in Carr and Kemmis' (1986) explanation, 'that valid knowledge can only be established by reference to that which is already manifested in experience' Pg 61. The latter is characterised by Carr and Kemmis (1986) as understandings, 'which seek to replace the scientific notions of explanation, prediction and control with the interpretive notions of understanding, meaning and action Pg 83.' However as a very simple illustration between action research and what we have said is 'traditional research,' Marx in Carr and Kemmis (1986) said that, 'philosophers have only interpreted the world in various ways . . . the point is to change it Pg 156.' Thus the differences can begin to be explored.

An Integrated approach

Within 'traditional' research the activities of research and action are separate entities to be used in a specific way, within a specific order. Dick 1993 believes action research is an amalgamation of research and action, it is more of a developing, evolving, hermeneutic tool that uses each turn of the action research spiral to build up understanding and implement change.

The Role of the researcher

As Crawford (1995) points out,

> 'Psychology has traditionally had a focus on describing and measuring individual characteristics, states and behavior and cognitive processes from a position of distanced objectivity.' Pg 240.

Traditionally research has been carried out by individuals that were external to the focus of research. Action research, however, differs from this in several ways. Firstly, action research is undertaken by people that are directly involved with the social situation that is to be changed. They are not external researchers but practitioners within that social situation. Secondly, action research can not only change the situation in which the research is carried out, but the researcher themselves. As Kemmis and McTaggart (1988) point out,

> 'Action research is research that treats people as autonomous, responsible agents who participate actively in making their own histories and conditions of life.' Pg 22.

Indeed some have seen the action research spiral as a learning cycle. E.g. Kolb in Dick (1993). Effectively by looking at what they do critically, action research can help practitioners to analyse their practice and improve what they do. Lastly action research is not a method of research which excludes researchers because of their lack of specialist knowledge. As Somekh (1995) confirms,

> 'It recognizes the trade off between the benefits of giving practitioners the central role in research and the resulting limitations in terms of the time they can devote to research and their lack of certain kinds of specialist knowledge.' Pg 341.

The importance of change in a social context

Unlike traditional researchers, action researchers use their everyday context as a base and use the questions that arise from that context as a basis for their research. To initiate research they have 'a felt need ... to initiate change.' Elliott (1991) Pg 53. With action research change is an integral part of the research, yet with traditional models the research primarily monitors and reports. Indeed Carr and Kemmis (1996) state that three conditions must exist for action research, one of which refers to the importance of change in a social context.

> ' a project takes as its subject matter a social practice, regarding it as a form of strategic action susceptible of improvement.' Carr and Kemmis (1986) Pg 165-166.

Griffiths and Davies sum up the differences between action research and traditional research quite succinctly. They state,

> 'The model of research that was used in this project is 'action research.' This method of research is usefully distinguished from a range of other kinds of social science research by its **emphasis on action.** It is different from 'positivist' research, which uses the physical sciences as a model. Action research is not trying to identify large scale casual laws. Instead it focuses on the **rigorous examination of a single situation, using knowledge drawn from experience and research findings** to illuminate it, in order to improve it. The differences from 'positivist' models are the most obvious, but it is important to note that it may make use of the 'qualitative' or 'ethnographic' research techniques, it is different from other qualitative or ethnographic research in that it is not seeking to contribute to large scale explanations of events. Nor is it seeking to discover grounded theory by the meticulous analysis of data. The purpose is always to **improve practice, rather than to find truths, universal or particular.**' (Griffiths and Davies 1993 in Hitchcock and Hughes 1995 Pg 27 – 28.)

To expand upon this:

'emphasis upon action.'

Action research by its very nature and indeed name is based upon action. As Somekh (1995) states it' bridges the divide between research and practice.' Pg 340. The researcher is both researcher and practitioner, they find out and then apply it. Effectively they are involved in the action, research is no longer a two stage process with separate researcher and practitioner. Indeed as the Action Research Planner (1988) illustrates, action research can be seen then as a 'systematically evolving, living process, changing both the researcher and the situations in which he or she acts.' Pg 22.

'rigorous examination of a single situation, using knowledge drawn from experience and research findings'

The nature of action research is that an individual or individuals carry out research within the context of their own sphere. They feel a need to carry out research within their own community because they have identified something that they want to improve or change. This is unlike traditional research. As Swepson (1995) identifies, 'the research community identifies a need which the community is unaware of.' Whereas Swepson continues, traditional research believes, 'we do not have direct access to the real world only our perceptions of it, we therefore aim to achieve objectivity by excluding the perceptions of the researcher Pg 2.' Action research not only accepts the perceptions of the researcher but grounds itself in the situation that is researches. It accepts that the situation to be researched will have an inherent culture and that this will undoubtedly affect the research. But as Somekh (1995) points out, with action research, no effort is made 'to control the research context or design an experiment.' Pg. 340. So unlike traditional research, action research does not control but accepts and utilises the differences that each research context brings. Finally whilst traditional research focuses on 'establishing patterns and regulations in data and testing theories by means of fabrication procedures,' Pg 22, essentially action research benefits from its utilisation of not only generic, written knowledge from a theoretical perspective but specific knowledge from a single research context and the researcher's perceptions.

'to improve practice, rather than to find truths, universal or particular'

Kemmis (1993) believes that action research 'always understands itself as a concrete and practical expression of the aspiration to change the social or educational world for the better

Pg 3.' As the previous paragraph discusses, the nature of action research is such that it researches a specific community. Its function is to improve the action within that specific community. Unlike traditional research action research is not primarily concerned with creating and testing theories to eventually contribute to written knowledge. Its function is the improvement of a community through change. However this change does not only restrict itself to the research situation. In traditional research the researcher has to be at an objective distance to not allow his/her perceptions to influence the research findings. Whereas with action research the researcher is so deeply immersed in the process of change that they can experience an 'improvement in their own practice.' Action Research Planner Pg. 22. So through analysis of their research situation the individual analyses their own practice and addresses what Somekh (1995) calls 'knotty ethical questions.' Pg 342.

herehere

What is action research ? – A set of definitions.

Action research has a primary function of providing a framework through which change can be the result of research and analysis. Some of the most widely accepted definitions of action research are sited in Hopkins (1985):

> '(Action Research) aims to contribute to both the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually accepted ethical framework.'
> Rapoport in Hopkins (1985) Pg 44.

> 'Action Research is a form of self-reflective enquiry undertaken by participants in social (including educational) situations in order to improve the rationality and justice of (a) their own social or educational practices, (b) their understanding of these practices, and (c) the situations in which the participants are carried out.'
> Kemmis in Hopkins (1985) Pg 44.

> (Action Research) is the systematic study of attempts to improve educational practice by groups of participants by means of their own practical actions and by means of their own reflection upon the effects of those actions.' Ebbutt in Hopkins (1985) Pg 45.

> Action research might be defined by as 'the study of a social situation with a view to improving the quality of action within it.' Elliott in Hopkins (1985) Pg 45.

Where did it originate ?- Lewin, Stenhouse, Kemmis, and Elliot

Lewin

Generally it is accepted that the concept of action research has its origins in the work of social Psychologist Kurt Lewin who applied his model of research to community experiments in 1940s America. His work developed a cycle of research that he believed could 'move people forward (and) engage them in their own enquiries into their own lives.' McNiff (1988)Pg 22. He encouraged the importance of group decisions and commitment to improvement. Essentially for Lewin research is a social group activity, 'it is no use people enquring on their own, for they are part of the life of other people.' McNiff (1988) Pg 22. His model was widely used within social and then educational settings over a decade until its use declined. Carr and Kemmis (1986) believe that this was due to the increased support that academic researchers experienced from the technological industries of 1960's America that reinforced the research-development-diffusion (RD and D) model of the relationship between research and practice. Pg 166.

Stenhouse

The active hub of action research thus moved from America to the United Kingdom through the work of Lawrence Stenhouse. It was his belief that teachers should be researchers that saw the surge of action research in educational settings in the UK. As McNiff (1988) points out, as director of the Schools Council Humanities Curriculum Project from 1967 to 1972 Stenhouse steered a project that emphasised 'the need for discussion, for close interpersonal relationships, and for the teacher to act as a neutral chairman Pg 25.' He encouraged the belief that

> 'fruitful development in the field of curriculum and teaching depends on evolving styles of co-operative research by teachers.'

however his work was in an age when,

> 'the assumption was still that the external researcher was the expert; he ultimately wrote the reports. Teachers were there to be researched on.' Stenhouse (1975) Pg 162.

Elliott

Yet the names of many of the researchers that worked with Stenhouse also became synonymous with the development of Action research. As Somekh (1995) states, Elliott like Stenhouse,

> 'sees curriculum not merely as the transmission of a selection of values and knowledge of a culture, but as an interactive process whereby students and teachers construct values and knowledge through cognitive engagement with materials selected by the teacher, mediated by student-teacher and teacher-teacher interactions.'Pg 345.

However his view of teacher as researcher differs in that he does not see the 'development of understanding as preceding the introduction of changes, ' whereas Elliott sees the process as a 'hermeneutic process of movement back and forth from the particularities of practice to theories of interpretation.' Kemmis in McNiff (1988) Pg 26. It was through the Ford Teaching Project and by establishing the Classroom Action Research Network that Elliott popularised action research with teachers as a method of doing research in school.

Kemmis

Kemmis, like Elliott worked with Stenhouse and encouraged the term 'educational action research.' His ideas stem from those of Lewin, but show considerable refinement. Through such work as the Action Research Planner (Kemmis and McTaggart (1988) he has 'formalised the concept of action research and how it applies to education.' Hopkins (1985) Pg 48.

In no way does this provide an exhaustive list of people who have made contributions to the theory and practice of action research, however it does provide details of some of the most eminent thinkers in terms of action research.

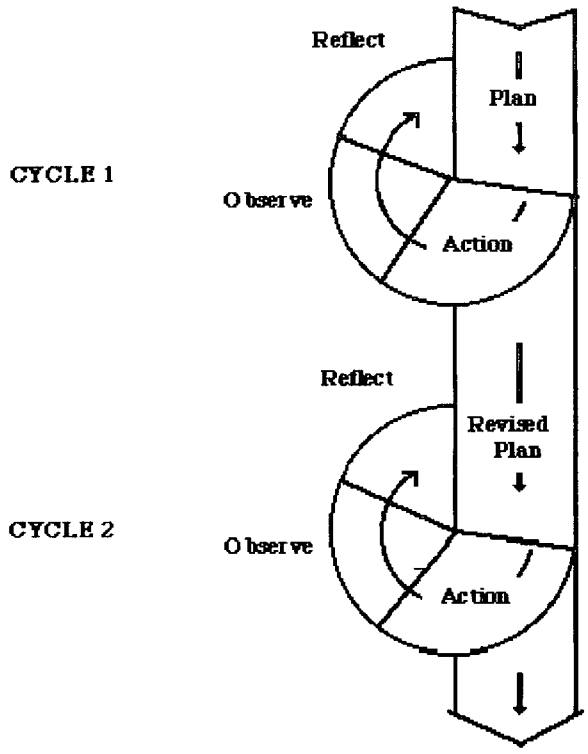
Models of Research

Action research, based on the original work of Lewin, uses a cyclical, progressive method of research. Lewin saw his model as a 'spiral of steps,' McNiff (1988) Pg 22, with four

stages : planning, acting, observing and reflecting which would then move on in a cyclical nature to re-planning, acting, observing and reflecting. This model is shown below.

Lewins Model of Action Research

Kemmis' used this self reflective spiral as a basis for his action research scheme. His model, utilizing the same terms as Lewin, save replacing replanning with revised plan, is shown below.



A diagram of Kemmis model of action research.From www.phy.nau.edu/~danmac/actionrsch.html

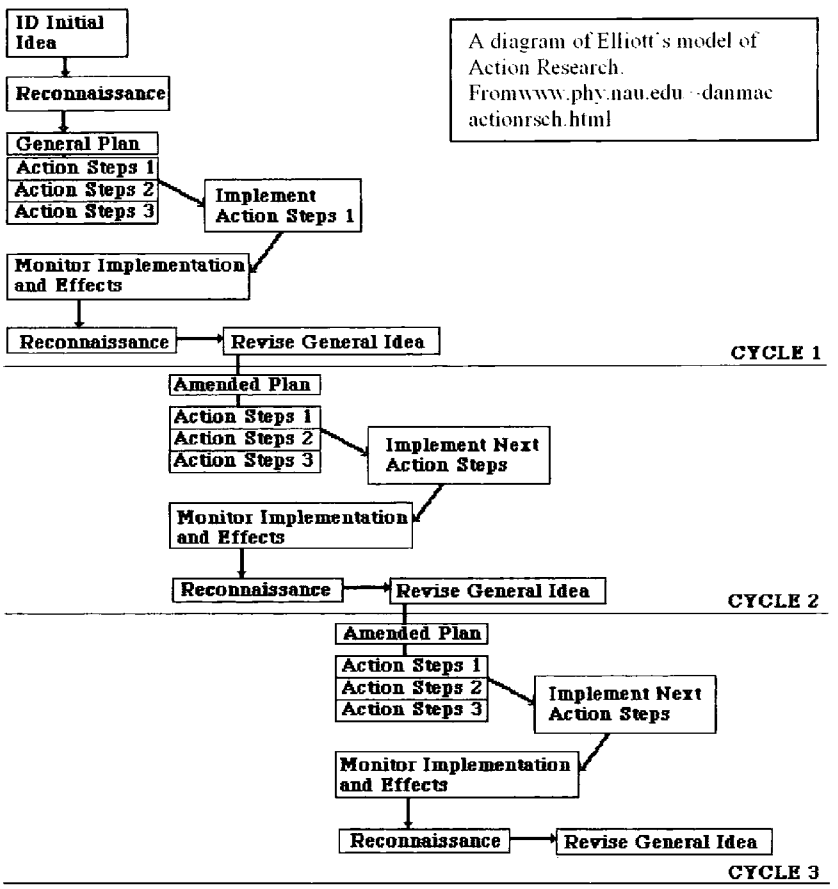
Elliott in Hopkins (1985) agreed with the cyclical process of action, reflection which was suggested by Lewin and Kemmis. However Elliott pointed out that with Kemmis' model,

'it can allow those that use it to assume that 'The General Idea' can be fixed in advance, that 'Reconnaissance' is merely fact finding and that 'Implementation' is a fairly straight forward process,'

and went on to argue that,

> 'The General idea' should be allowed to shift.'
> 'Reconnaissance' should involve analysis as well as fact finding and should constantly recur in the spiral of activities, rather than occur only at the beginning.'
> 'Implementation' of an action step is not always easy, and one should not proceed to evaluate the effects of an action until one has been monitored the extent to which it has been implemented. ' Elliott in Hopkins (1985) Pg 50.

The model that he proposed was somewhat more elaborate:

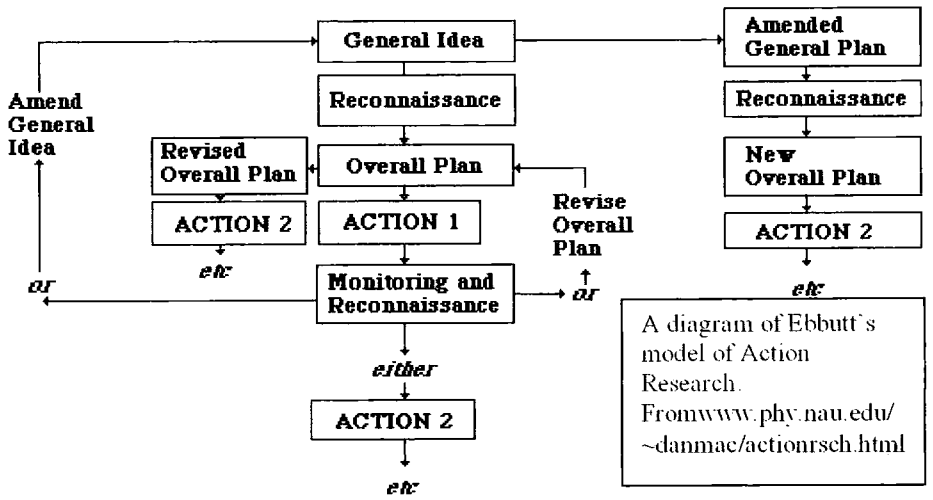


A diagram of Elliott's model of Action Research. From www.phy.nau.edu/~danmac actionrsch.html

Ebbutt claimed that the spiral was not the most effective model for action research. He advocated a spiral that had within it 'possibilities for the feedback of information within and between cycles.' However he continued to point out,

' Such a description is not nearly so neat as conceiving the process as a spiral, neither does it lend itself to diagrammatic representation.' Ebbutt in Hopkins (1985) Pg 51.

However Ebbutt did create the following diagrammatic representation of his model :



A diagram of Ebbutt's model of Action Research. From www.phy.nau.edu/~danmac/actionrsch.html

Educational Action Research

Kemmis defines educational action research as ' trying out ideas in practice as a means of increasing knowledge about and/or improving curriculum, teaching and learning.' It is

> 'concerned with everyday practical problems experienced by teachers, rather than the 'theoretical problems' defined by pure researchers within a discipline of knowledge. ' Kemmis and McTaggart (1982) Pg 6.

Many educators are concerned about the discrepancy between the educational problems that are defined by researchers and those that are encountered by practitioners. Action research tries to close this gap by creating a situation in which the practitioner can define and attempt to solve the problems that they encounter.

Action Research in education stems from the adoption of Lewin's ideas by educationalists and indeed Lewin's work with action research programmes with teachers. Despite the interest of educationalists in action research its popularity declined in the 1950's and re-

emerged in the 1970's under the influence of Stenhouse. Kemmis attributes this rise in popularity of Action Research to;

> ' 1. A strong interest among educational researchers in helping practitioners deal with problems of practice.
> 2. A broad methodological interest in interpretive or illuminative methods which attempt
> to define the problems of the field in ways which represent the understanding of the practitioners.
> 3. A growth of collaborative curriculum and development and evaluation work.
> 4. An explicit commitment to addressing social and political problems of education through participatory research carried out by practitioners on problems of immediate
> and more general public concern.' Kemmis in Kember (1994).

Yet in a realistic admission Hopkins (1985) makes reference to the workload that could stop teachers from undertaking research and to this end makes the following recommendations;

1. Research should not impinge upon the teaching commitment of the practitioner.
2. Data collection should not be too time consuming.
3. The form that the research takes must be sufficiently thorough to allow the teacher to develop a confident hypothesis that will inform their teaching.
4. The teacher must be committed to their area of research.
5. Careful attention must be given to the ethics surrounding the research.
6. The practitioner must have goals that are attainable but 'classroom exceeding.' Pg 57-60.

Yet as McNiff (1988) states the time is definitely right for this type of teacher led research for three reasons. Pg 47-52. The first is political. As Kemmis and McTagart (1988) suggest 'Action research is a political process because it involves us in making changes that will affect others Pg 25.' McNiff (1988) suggests that since the 1980's such initiatives as TVEI and funds injection for in-Service have encouraged schools to partake in research based school development and research based in-service. The second is professional. By way of definition of the difference between professional occupations and non professional occupations Carr and Kemmis (1986) suggest three criteria;

1. That 'the methods and procedures employed by members are based on a body of theoretical knowledge and research.' As we have mentioned, action research provides the practitioner with 'methods and procedures' that are pertinent to their

research setting, drawn from the 'need' that they themselves identified. But more importantly, that these methods can be modified and improved with reflection and discussion.

2. That 'the overriding commitment of their member is to the well-being of their clients.' In short, if a teacher did not care about the children in their care, why should they research to improve aspects of their schools life and processes ?
3. That they 'reserve the right to make autonomous judgments free from external non-professional controls and constraints.' By the very nature of action research teachers take on the mantel of researcher through an action research project and are ready to make changes and be autonomous (both in terms of the individual and the school.) They are firm in the knowledge that they can use their research, to bring about effective change within the school and for the school, irrespective of external 'pressures.' Pg 8.

To bring all of this together the following quote from Wolfe suggests what could be attained. 'Teachers often leave a mark on their students, but they seldom leave their mark on their profession.' Wolfe (1989) in Johnson (1993) The third and final reason for teacher led research is personal. There is a growing body of research that shows positive personal and professional effects on the researching practitioners Goswani and Stillman (1987) , Lieberman (1988) in Johnson (1993) and that practitioners participating in action research become more critical and reflective about their own practice Oja and Pine (1989), Street (1986) in Johnson (1993). Essentially once the teachers eyes have been opened as to the possibility of change and their own increased skills;

> 'Having made a discovery, I shall never see the world again as before. My eyes have become different; I have made myself into a person seeing and thinking differently. I have crossed a gap, the heuristic gap which lies between problem and discovery.' Polanyi in McNiff (1988) Pg 52.

Having considered how action research is an effective research tool in the educational context of this study, some consideration should be given to the ICT theme of the study. Therefore links between action research and ICT can be see through;

Current opportunities.

Somekh (1999) points the fact that the 'National Grid for Learning is very ambitious.' There may not seem to be an obvious link from this to action research but this ICT development on a National Scale creates the very reason for action research. The

Government's pledge through 'Connecting the Learning society,' DFES (1997) was for £700 million for hardware and software in schools alongside £230 million to train teachers in use of ICT. Such expenditure would be expected to have some implications for the Primary School pedagogy. Therefore the individual teacher has an opportunity to research the effectiveness of the implementation of the Grid. This leads us onto the next point that links ICT and action research through the fact that teachers have to be involved in this research in some shape or form, however slight or subliminal that research may be.

Necessity

With the implementation of such far reaching ICT changes, each teacher, however informally has to carry out some action research to see how these changes will affect their pedagogy. As Pachler (1999) in Mc Niff (2003) points out, any focused implementation of ICT causes changes in pedagogy. Through a similar ICT development programme Pachler stated that teachers experienced,

> " destabalisation within their tried and trusted pedagogies, because of the development of new insights into the nature of teaching and learning through ICT."

So whatever else the teacher in this situation does, they must adapt their teaching to accommodate the changes that ICT has caused. So they would *plan* how to use these new ICT changes, *act* upon the plan, *observe* what happens as a result of the plan and *reflect* on its effect. So however subliminally, the teacher has carried out a cyclical process,action research has been involved in the changes.

By its very nature

The action research process is very developmental by its nature. That is to say that it is adapted to the situations in which it is used. Its changes occur because they improve the application of action research in that situation. So because of this action research is something that is always changing. Similar comments could be levelled against the nature and development of the effective use of ICT in the classroom. No set ICT format will work

completely in a classroom. It needs to be tweaked and improved to make it fit that particular context. Equally, ICT within a classroom has to change to meet the needs of the children and the new hardware and software that has been developed. So ICT and action research share certain commonalities in their nature.

Because it has worked before.

Research has shown that action research can be used effectively to engender ICT development. The PALM project, in Somekh and Davies (1991), set out to research the role that ICT had in the development of pupil autonomy. Its results showed broad change in the pedagogical practices of the schools involved. Also research through the Grid in Birmingham, BGFL (2000), has shown that there has been improvement in the areas of, 'interactive whiteboards, Internet usage, software and supportive learning systems.' But equally as was mentioned before, teachers, use action research in whatever they do. Subliminally, they adapt and mould their teaching to incorporate a new idea. Then by reflecting on how well their new pedagogy worked, adapt and mould accordingly.

What does this literature review tell us ?

Action research is effective in the context of this research, i.e. understanding and improving the childrens' use of ICT in my classrooms and school. This is, as the literature review suggested, for the following reasons:

1. *The researcher wants to bring about social change. – I identified elements of ICT which I felt needed to be improved within school and have set about implementing systems to change and improve that sphere of school.*

2. *The method of research fits the context in which the research is to be carried out. – By the nature of classroom practice, the research has to be active. It involves me, as a researcher, implementing a method to improve ICT within the school and observing the effects that it has. Then adapting the approach and acting accordingly.*

3. *Following point two this research method then fits into the Kemmis model of action research. For by planning some method of ICT improvement, acting on that method, observing the effect it has and reflecting on those observations I will be addressing the key elements of Kemmis' action research model.*

Cycle One – ICT in context.

Initiating
Plan
SWOT Analysis of ICT in school.
Draft Survey
Action
Pilot study of surveys
Observe
SWOT analysis of surveys
Reflect
Evaluate SWOT and redraft surveys.

Implementing
Plan
Draft Hot Pencil
Draft In School Questionnaire
Draft Out of School Questionnaire
Draft Portfolio
Action
Implement Hot Pencil – 11th June 1999
Implement Portfolio – Sept 13th 1999
Implement In School Questionnaire – 19th May 1999
Implement Out of School Questionnaire – 4th / 7th May 1999
Observe
Results of Hot Pencil, portfolios
Compare results of In School and Out of School Questionnaire to pilot study
SWOT analysis of Hot Pencil 14th June 1999
Reflect
Evaluate Hot Pencil, SWOT and redraft.

Development
Plan
Draft ICT Targets
Draft ICT Questionnaire
Draft ICT Preferences
Action
Implement Targets – Jan / Feb / Easter / Summer 2000
ICT Preferences Jan 2000
Observe
ICT Targets Questionnaire Results
Reflect
Evaluate Targets / Questionnaire.

Consolidating
Plan
Parent Questionnaire
Hot Pencil
Action
Implement Parental Questionnaire May 16th 2000
Implement Hot Pencil May / June 2000
Observe
Results of Hot Pencil
Results of Parental Questionnaire
Reflect
Evaluate Hot Pencil differences
Evaluate Parental Questionnaires

The introduction to the research outlined the tensions that were apparent in the sphere of the Primary Classroom. It highlighted the tension between the Literacy and Numeracy hour and the use of ICT, the reality of the use of ICT in education and the need, but lack of time for meaningful assessment. This provides the national picture of the tensions that were affecting this context. So with the national picture in mind, the first action research cycle sets out to assess the current state of ICT within the target school. Elliot (1991) identifies the first stage of action research as 'identifying and clarifying the general idea.' Pg 72. Whilst Cohen and Manion (1994) state that,

> ' The first stage will involve the identification, evaluation and formulation of the problem perceived as critical in an everyday teaching situation.' Pg 198.

Essentially as they both affirm action research needs a firm base of fact to be effective. To move forward we first need to assess where we are, what the problem is and where we want to go. Direction is vital if we are to meet the eventual target and solve the problem. We had assessed the national picture and now focus on the target school. Therefore, the following tool brought about the identification of the problem:

SWOT Analysis

SWOT analysis is an,

'effective method of identifying strengths and weaknesses and to examine the opportunities and threats that you face.' Swot Analysis (1998)

It is a written framework or tool through which analysis of an issue can be performed. By identifying the strengths, weaknesses, opportunities and threats within an issue, analysis then improvement can be engendered.

As a precursor to this research 10 children were selected from 4 classes ranging from Year 2 (7 year olds) to Year 5 (10 year olds) to complete an evaluation of school and home ICT provision. Each of the children was selected for their reading and comprehension ability. This evaluation essentially generated written perceptions of ICT in school and at home, drawing out pertinent elements of ICT provision or its shortfall. Thus the analysis provided a picture of ICT from a child's point of view, at the key locations of school and home. In each instance the layout of the analysis was explained to the children. Each element was expanded upon, explaining what strengths, weaknesses, opportunities and threats meant. An explanation was also given as to how each element could be related to ICT in school and at home. The children were then encouraged to write at length, detailing as many points for each element as they could. The collected analysis sheets were then analysed. By reading through each sheet, it was noted that the children had had similar experiences with ICT. They had therefore written down similar comments within the SWOT analysis. When reading the sheets the similar words and phrases that the children used were noted. These key words were then highlighted on each sheet and like elements were collated for each element of the SWOT analysis. Since the SWOT analysis had been carried out and the results collated the following directions for research questions were apparent through analysis of the results. (See Appendix One to reference full results.)

Strengths

The children made reference to the fact that the main strength of both home and school was the software that they used. 14 children referred to software in school and 16 at home. Within these references to software, the children also specifically mentioned games as being a strength (4 in school and 7 at home.) Although this use of software is a strength, it also has to be noted that maintenance of current software provision is an opportunity for development.

Tentative Focus – Building on areas of confidence to increase independence.

Weaknesses

The children made references to their negative feelings towards computers. References made towards their embarrassment or difficulties when using ICT were quite indicative. Few threats were collated from the sheet, but of those that were, (14 and 12 respectively for school and home) referred to computer problems. It was quite alarming that such a high proportion of children felt threatened by such elements as . . .printing, pressing the wrong button, breaking something and not knowing what to do.

Tentative Focus – Increasing children's ICT confidence.

Opportunities

Through analysis of the home and school elements, software was highlighted as the main opportunity. In terms of home it could be imagined that children would wish for the latest software. However within school it was more apparent from the results that the software that we had was not being used to its full potential. Essentially we had the software but there needed to be easier access to it through a more user friendly, child and teacher orientated approach to the curriculum.

Tentative Focus – A more child centred approach to the curriculum where children have more responsibility for their learning.

Threats

The main reference to threats, were the problems that the children encountered when using the computers at home and school. Of the 14 mentions at school and 12 mentions at home, the children pin-pointed a variety of problems. These included problems with printing, crashing, pressing the wrong thing, breaking something, not knowing what to do, loosing work and shutting down. To this end, it was felt that an increase in children's ICT confidence would be beneficial.

Tentative Focus – Increasing children's ICT confidence.

Carrying out reconnaissance

Hopkins (1995) cites Ebbutt and Elliott's (1984) methods of action research, identifying the second stage in the process as reconnaissance. This is seen as a stage when 'an

understanding of the problem is developed,' which 'involves some degree of analysis.' Pg 45 Having identified the initial foci, each area was analysed to generate further research questions. That it to say questions that when applied will return pertinent information, with relevance to the research. Dick (1993) calls these initial research questions 'fuzzy questions,' Pg 9 which are refined through methodology. This idea of a fuzzy question reflects the action research spiral very well. As it is only through the continuing spiral that eventual direction and clarity is achieved.

Initial Research Questions.

1. Increasing children 's ICT confidence. / Children increasing their ICT independence.

- How often do children use ICT in school and at home ?
- Who motivates the children to use ICT at home and school ?
- Who helps the children solve problems at home and school ?
- Which ICT tasks do children enjoy / dislike ?
- What would motivate children to use ICT in and out of school ?

2. Children assessing and having more responsibility for their learning.

- How can children monitor and have more choice within their own learning ?
- Will giving children more responsibility increase their ICT independence ?
- What effect will developing evaluative skills have ?

3. Developing home / school / ICT links.

- What ICT work do children do at home and at school ?
- What would encourage children to complete ICT tasks at home as homework ?
- What are the children's perceptions of their families and their own ICT use at home ?
- What are the parents' perceptions of their children's ICT use ?

With these wider research questions in mind an initial method of research was needed to generate information about the foci of the research.

Cohen and Manion (1994) state that questionnaires,

> ' gather data at a particular point in time with the intention of describing the nature of existing conditions, or identifying standards against which existing conditions can be compared.' Pg 83.

As Cohen and Manion suggest the questionnaires could then provide a baseline by which subsequent changes in the children could be seen, assessed and quantified. These questionnaires could be re-answered at set times during the research period to provide an insight into the children's development over time.

Regarding the development of a questionnaire Cohen and Manion (1994) cite Honville and Jowell's (1978) stages of questionnaire development. First 'a specific central aim,' Pg 85 needs to be identified. In the case of this study the questionnaire was needed to generate data on the children's ICT perceptions about School and Home. The second stage, 'involves the identification and optimizing of subsidiary topics that relate to its central purpose.' Pg 85. To this end the 'initial research questions' provided an idea of what the focus of the questionnaires would take.

> 'The third stage follows the identification and itemization of subsidiary topics and involves formulating specific information requirements relating to each of these issues.' Pg 85.

What also must be borne in mind is that the children, who are co-researchers within this in school research, must understand the questionnaires. Not only do they need to be able to read the questions, but they need to be able to understand what it means and what it is asking. To this end questions need to be phrased carefully and all misconceptions that could be caused, need to be considered.

Therefore having taken all that into consideration, the questionnaires were drafted on the following topics.

In School Focus (See Appendix Two for In School ICT questionnaire.)

- Computer use / length of use / with whom.
- ICT programmes used, tasks completed, preferences of these tasks and what has been learnt from them.
- Feelings towards the computer.
- Who and what encourages the children.
- What problems they have encountered.
- Who helps with ICT problems.

Out Of School Focus (See Appendix Three for Out of School ICT questionnaire.)

- Number who have a computer with CDROM, internet access, games console.
- How often the computer is used for a particular task by a particular family member.
- How long the computer is used at weekends, weekdays.
- Which ICT programmes are used and which are favourite.
- Who helps with ICT problems and what they help with.
- Where they use computers the most.

The initial drafts of the questionnaires were evaluated and redrafted through discussions with a critical friend. Through analysis of the background research, each question was assessed on its merits to answer the research questions. Essentially, if it was perceived that the question would not provide enough data then it was discarded. The questionnaires were entitled In and Out of School depending upon their focus. The redrafted questionnaire was then tried with 30 Y5 children. When analysing the results the In School questionnaire was collated on a large sheet, noting responses from all of the 30 children. The open nature of the majority of questions meant that responses would be wide and varied. This method of collating data enabled a more qualitative and quantitative response, giving the opportunity to note commonality of ideas and opinions. The Out of School questionnaire was analysed using a pre-made sheet. This questionnaire had fewer open questions and of those open questions the responses were grouped under set headings. This gave a more quantitative set

of responses. Once the results were collated a second SWOT analysis was carried out with 6 of the Year Five children to analyse the questionnaires from their point of view.

Initial findings

In School Questionnaire (See Appendix Four to reference full results)

From the initial In School Questionnaire, the following results were obtained from a survey of 30 children. In the analysis that follows, the results have been compared with results from other research.

The majority of children use PC computers (21) with a partner (25) once a week for 50 minutes or less (22).

- The NAEP Reading Assessment Electronic Data Almanac Student Questionnaire of 1994 showed that the following percentage frequency of Grade 8 children use computers: 10% Daily, 16% Once / Twice a week, 23% Once / Twice Month, 51% Never. The increase in use over 5 years could easily be due to the saturation of computers in school. Indeed the UK number of computers per pupil has dropped from 20.3 in 1995 to 14.5 in 1999. PEN (2000).

They use a wide variety of software which is mainly CD based and is used for writing and finding out.

- This concurs with Glennan and Melmed (1996) who showed through their research that 12.5% of children's computer time in school is spent on word processing whilst 16.6% is used for English and 15% for keyboarding. This makes a combined percentage that outweighs the other different subjects. No mention is made of research activities or finding things out. However a report by the US Department of Educational Technology into Teachers use of Computers showed that, ' word processing or creating spreadsheets (were used) most frequently (61%) followed by internet research (51 %) Pg i. '

Whilst Campbell (1996) in Coley (1997) showed that of a sample of children 82% used the computer to write stories and 76% used it to learn things.

They have problems with saving and printing. 22 of the 37 responses show that children have a positive feeling when using computers. But interestingly three children commented that they felt negative about using computers In School because they were missing work.

- Barba and Mason (1994) showed that 'a stereotypical image of the teenage nerd emerged in the drawings of secondary students but not in elementary children's drawings. Pg 382' Thus a positive image towards computers is more likely in primary not secondary education. Whilst Christensen (1998) cites Shades (1994) view that 'Many researchers reported that children like computers and are positively motivated to use them.' Pg 3.

27 of children believe that they are primarily encouraged to use ICT by the teacher. Whilst 17 cite their partner and finally 17 themselves. However, 28 gain help with problems from the teacher then make similar amounts of references to, the teachers instructions (15), their partner (13) and then other pupils (12).

- The power of the teacher to make or break a subject cannot be underestimated. Lawton, and Gershner (1982) cite Simmons belief that, ' teachers are the key to any effective implementation of technological media.' Pg 52. A belief that is supported by Knezek cited in Christensen (1996) who states that, 'when you train teachers to start using computers in the classroom their anxiety is reduced quite quickly and the enjoyment level of the students also goes up very quickly.' Pg. 2. So it is not surprising that the teacher is identified as the main encourager and supporter of ICT tasks.

23 of the children feel encouraged to use ICT because they find it to be neater and 18 because they enjoy it more.

- Lawton (1982) showed that children were encouraged to use ICT because computers could enhance the spelling of the children. Pg 51. Whilst Kinnaman (1995) in Wellburn (1996) comments that the enjoyment factor of children's ICT use is due to the construction of 'new and richer contexts for teaching and learning.' Pg 7.

Out of School Questionnaire (See Appendix Five to reference full results.)

From the initial Out of School Questionnaire the following results were obtained from a sample of 29 children. In the analysis that follows, the results have been compared with results from other research.

26 of the children have a computer at home and 22 have a CD ROM. It is, however the minority that have internet connection (9). 10 of children use the computer for 30 or less, whilst 15 use it for more than 40 minutes. They use between 2 and 3 computer programmes during this time.

- Lawton et al (1982) shows that there has been an obvious increase in computer use and ownership at home since 1987 when 50% of households had a computer, Pg189. Lawton et al (1982) also comment that a 'factor influencing attitudes towards computers is the variety of computer programmes available.' Pg 32. Essentially the length of use could be due to the number of computer programmes used. This would make their computer use less sustained and more fragmented. It also raises the question as to why the children change their computer programmes. Is it due to a short attention span, or does the change of software mask problems that they are experiencing ?

Their choice of computer programme is split equally between game based and educational software. This is due to their enjoyment or because of the particular type of game.

- This is contradicted by Martin (1991), whose research with children showed that, 'the most popular use of home computers is playing games followed by using educational software.' Pg 189. Campbell (1996) also concurs showing that 86% of children use computers to play games at home. Pg 27. Whilst Christensen (1998) cites Shade (1994)

who comments that the type of computer application that children use affects their attitude towards the computer. In this case the more open ended game type of application gives the children more control. However it could be said that the more rigid structure of writing a story or desk top publishing doesn't make them feel in control because they don't have the skills to complete such a task.

25 of the children are helped by their parents with problems such as saving, printing, crashing and loading.

- Barba and Mason (1994) believe that 'children do not see computer technology as a product of science but as the use of technology in everyday life.' Pg 388. Could this then be the reason that the children have problems with such computer skills ? To adults the need to save work and print it out is essential but if, for children, the main focus of ICT work at home is to have fun, would such skills become peripheral ? Equally as Campbell (1996) shows that children's computer use is restricted to games, writing stories and learning things, Pg 27, then could these problems not be the most likely to occur ? Tasks that involve more ICT skills would obviously create more problems.

They use ICT mostly at home (23), then school (19) and least at their friend's house (18).

- Greene (Ed) (2000) supports this by showing that 'students were more likely to use computers and the internet outside the classroom than inside.' Pg ii. Whilst Campbell,J (1996) showed a more equal distribution of computer use with 50% using the computer at home and 43% at their friends. No mention is made of school in this instance.

SWOT Questionnaire analysis

The SWOT analysis that was carried out showed that the children had favourable opinions towards the two questionnaires. This was shown through comments such as 'it was interesting,' ' it was straight forward,' it was fun,' and 'it was easy.' They highlighted areas that were well set out, such as the yes no questions and the family ICT use chart in the Out of School Questionnaire. The SWOT analysis also showed that there was some room for

improvement. The children suggested some layout problems in that some questions needed to be spaced out. They highlighted questions 7 and 10 on the In School questionnaire as being too difficult to answer. Question 7 was then changed from, What successes or failures have you had using the computer linked to a) how you felt ? b) what you have learnt ? to How have you felt when using the computer ? Whilst question 10, What have you releamed about computers was omitted altogether. The Out of School survey remained unchanged as no significant problems were identified with it.

Where this takes us ?

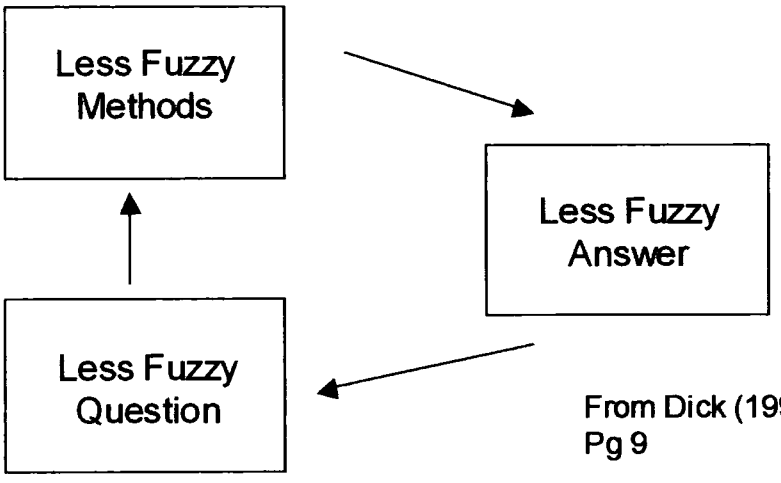
The initial cycle was completed with a clearer, yet still tentative set of research questions and tools that can address some of the research questions. However as Dick (1993) suggests,

> 'If you address a fuzzy question with a fuzzy methodology, the best you can hope for initially is a fuzzy answer.' Pg 9.

But with each cycle the question, methodology and answers become less 'fuzzy.' So long as the,

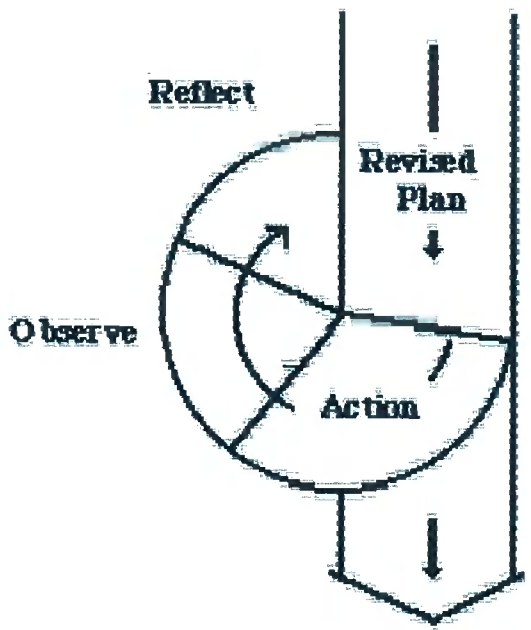
> 'fuzzy answer allows you to refine both questions and methods, you will eventually converge towards precision.' Dick (1993) Pg 9.

This is illustrated effectively in the following diagram. Obviously it should represent a spiral, preferably upward which would illustrate development and progression within the questioning, methodology and therefore the answers more effectively.



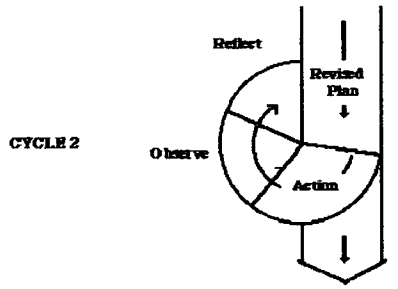
Therefore by refining the questionnaire we are developing less fuzzy methods of research. This will create a clearer set of results or less fuzzy answers and therefore less fuzzy research questions. This will lead to a more accurate problem definition. Furthermore, with regards to the next cycle, by continuing the questionnaire and creating and implementing more research methods we will continue to 'de-fuzz' the research process and develop a clearer picture of what will solve the 'problem' that we identified within this section. However in no way will the research methodology be completely refined within one cycle. As Dick (1993) suggests, methodology must be developed and its accuracy increased to elicit accurate answers to the research questions. Pg 3. Therefore in the next cycle another evaluation and redraft of the questionnaire will also be carried out.

Cycle Two



Generating Children's ICT thinking

Cycle Two



Generating Children's ICT thinking

Where have we come from ?

Initially, I established that the research has to follow an action research format, which the write up of the thesis reflects. Then I set the context of ICT within national schools at the time of the research, then set the context within my own school through a SWOT analysis. Also within the first cycle, two of the main tools of the research were developed, tested and trialled. Through the In School and Out of School Questionnaires I aimed to generate data of children's perceived use of ICT at home and in school. Then I would be able to use these perceptions to compare their changes over the coming months of the research in relation to the ICT development that I put in place.

Where are we now ?

Primarily, within the *Children and ICT Literature Review* I set the context of the relationship between children and ICT within a home and school context. I knew the current ideas behind ICT from the National picture through the *ICT in Primary Education Literature Review* and had developed an understanding of how this related to my own school by carrying out a *SWOT analysis*. So through this literature review I analysed the effect that ICT has had on the current generation in comparison to previous generations. Then I also considered what would be a typical child's reaction to ICT within the classroom, thus considering what affects children's ICT attitudes.

Then through the *Portfolio Literature Review* I wanted to find out whether this type of classroom tool would be effective to implement as part of a solution to the 'tensions' that I identified in the introduction. I looked at what a portfolio is, how it can be used and its benefits for classroom use.

Finally within *Cycle 2 – Generating Children's ICT thinking* I implemented the In School and Out of School Questionnaires which I had trialled in the previous cycle. I also designed a set of Hot Pencil Review sheets which allowed me to provide the children with a structure through which to analyse their week at school. This, I believed would over time, be another way of analysing the children's thoughts and expectations of ICT. Within this cycle I implemented the ICT portfolio that I had designed. I felt that this method of collating children's work would address the tensions that I had identified. Then armed with the results of the In School and Out of School Questionnaires, I was able to analyse the differences between the pilot class from cycle one and the two target classes from cycle two. This data then allowed me to refine my research questions and begin to answer them.

Where are we going ?

Within the next cycle I need to research why some children are confident with ICT and why others are not. I should look at what I could do to provide the children with more self-confidence to become more independent ICT users. Equally by implementing an ICT portfolio I felt that I was advocating a change in the way that I was approaching ICT teaching. So to address this I should look at different ICT teaching models. Finally, towards the end of this cycle I felt that the children had only had teacher led ICT experiences. They therefore needed more independent use of ICT, so I need to address that in cycle three.

Portfolio

What do we want to find out and why ?

Within the first paragraph I identified certain tensions which I felt were apparent in the Primary classroom. They were: The need for meaningful assessment, the need to increase the prevalence and effectiveness of ICT and the restriction of the Literacy and Numeracy hour on ICT. These ideas were confirmed when I began to carry out research within the classroom and performed a SWOT analysis with the children. Through this research it became apparent that I needed to build on the areas of ICT confidence that the children had to increase their independence. Their negative feelings towards ICT were prevalent and were a hindrance. Moreover that this development of independence would be possible if I developed a more child centred approach where the children were given more responsibility. To this end I wanted to find out whether an ICT based portfolio would address these issues. This literature review provides a review of the wide range of definitions of a portfolio. It suggests how a portfolio can be organised and presented. It considers the benefits of the use of portfolios both for teachers and pupils.

What is a portfolio ?

Olson (1991) defines a portfolio through the origin of the word. She states that it is a portable case for carrying papers. Loughran and Corrigan (1995) cite Bird's (1990) view that a portfolio has its origins in the collection of an artist or architect's work, which is 'designed to document ones achievements.' Pg 565. However the latter part of this definition takes us closer to its use in an educational setting. Grace (1992) quotes Arter and Spandel's (1991) view that it is, ' a purposeful collection of student work that exhibits to the student, or others, her efforts or achievement in one or more areas.' Indeed most agree that a portfolio is a collection of a child's work within some form of folder. However some would argue that such a definiton missed the point of portfolios. Varvus (1990) defines a portfolio as, 'a systematic and organized collection of evidence used by the teacher and student to monitor growth of the students knowledge, skills and attitudes in a specific subject area.' Varvus (1997)

However as QUEST (2000) and Grosvenor (1993) in NCREL, points out, the definition of the portfolio is dependent upon the actual type of portfolio that is in use in the classroom. They provide three suggestions for different types of portfolio;

Documentation or Descriptive Portfolio – This can be seen as a working portfolio, in which a student collects their work over time. It shows all work, including good and bad, but makes no attempt to evaluate it.

- This, we could surmise reflects the definition that a portfolio is a collection of childrens work.

Process or Evaluative Portfolio – This targets the actual learning process that the student follows, using reflective journals to analyse how the student integrates their newly acquired knowledge and skills.

- Whilst this type of portfolio would be defined more specifically through the process of the child's acquisition of skills or knowledge rather than the actual end product.

Showcase Portfolio – This includes only the best students work, through discussion between the student and teacher. It should also include analysis, which reflect the students thinking behind the inclusion of certain pieces of work.

- However this format of portfolio appears to combine elements from the two. It fulfils the fuller definition of a portfolio by combining the elements of analysis and collection of a child's work.

<u>How is a portfolio organised ?</u>

QUEST (2000) suggests a format for developing a portfolio, which involves three phases, from the planning to evaluation of childrens work.

Phase 1 – Organisation and Planning

This phase involves both students and teachers. As a collective group they need to decide what it is they are hoping to achieve, their aims or goals. Then they need to ascertain how these aims can be translated into real terms through the completed portfolio. Essentially as QUEST (2000) points out the teachers and children need to explore the questions that relate to the use of the portfolio. QUEST (2000) continues to state that this two way discussion process will help students to understand the purpose of the portfolio and its

status as a means to monitor and evaluate their own progress.' However, once the 'practicalities' are decided upon, the actual portfolio process needs to be discussed. Indeed as Mahood (2000) points out, the process of the portfolio needs to be described to the students more than once, using graphic representations where possible. But it would be foolhardy to expect the children to 'take' to the portfolio process immediately and in unison. Such a process has to be developmental. The process needs to be worked at and the children need to be guided. It is maybe foolish and detrimental to think otherwise.

Phase 2 – The Process

During this phase, the children collect the evidence and reflect on their educational experiences and the goals that they set. .Most importantly NCREL (2000) point out that as,

> 'the kinds of material collected are typical classroom tasks, assessment and instruction are joined together with curriculum. Time spent on this kind of assessment, then, is not time taken away from teaching and learning activities.' (Polakowski 1993, Tierney et al 1991 in NCREL (2000))

So the portfolio process should not be seen as something above and beyond normal classroom practice, but an integral part of it. Polakowski (1993) in NCREL (2000) suggests 3 management techniques that can aid this integration of the portfolio into the curriculum.

1 - Teacher directed. 2 - Child centred. 3 - Child selected.

To explain these three processes, they should be seen as a developmental structure, which the teacher works through. Firstly the teacher could work with the children, supporting the portfolio process and guiding their experiences. (Teacher directed) Then once the children are more familiar with the portfolio process, then they can progress on to work on their own, within teacher given activities. (Child centred – 2) Finally they could be given a broader focus which gives the children more independence to plan their own learning, but still with the element of teacher input. (Child centred – 3)

Phase 3 – Reflection

Stenhouse (1997) suggests that this phase is, 'the heart and soul of the portfolio.' It is the process through which the children evaluate their own work, based on the criteria that they

set at the beginning of the cycle. Quest (2000) suggests that this evaluation could take the form of,

> ' learning logs, reflective journals and other forms of reflections upon their experiences, the thinking processes that they have used, and the habits of mind that they employed at given points in time and across time periods.'

But as Arter and Spandel (1995) highlight,

> ' How does the student know whether to be satisfied, ecstatic, or dismayed [about their work] . . . To the extent that the criteria are shared, students are made a part of the evaluation and receive the power that goes with that specialised knowledge – power to recognise improving performance, power to identify problems in weak performance, and power to use criteria to change and improve performance.'

Effectively the children need to be involved in the process of deciding on the criteria that the portfolio should meet and then evaluate their work through these criteria. To this end Stenhouse (1997) suggests that a teacher should share their own evaluation criteria for childrens work frequently. They should make 'teacher talk' sufficiently 'criteria specific' to help the children to realise why they have done well or not and what they could improve.

Benefits of Portfolio Use.

1. For the child

Enjoyment

From a very simplistic point of view Howes (1996) comments that children like the idea that they own the portfolio and that it is a growing record of their achievement. Moreover he also states that they like being able to work on individual sheets and not be restricted to exercise books. By using portfolios he states that, 'there has been a sense of enjoyment in producing something which the pupils themselves value.' Pg 144.

Individualised learning

Quest (2000) suggests four areas in which portfolios encourage a style of learning that purposefully;

Encourages self directed learning.

Wade and Yarbrough (1996) cite research which stresses the relationship between portfolios, student choice and reflection (Pg 65 Bar 1991, **ton** ??
and Collins 1993, Biddle 1992, Biddle and Lasley 1991, Ford and Olhausen 1991, Olson 1991, Robins et al 1991, Stahle and Mitchell 1993, Stroble 1992, Touzel 1993.) As Sewell, Marczak and Horn [On line] suggest a portfolio can allow children to be involved in their own change and decisions to change. It can,

> 'promote a shift in ownership; communities and participants can take an active role in examining where they have been and where they want to go.'

Effectively Sewell, Marczak and Horn [On line] are suggesting that through their use of the portfolio the child should be given the opportunity to evaluate their learning and choose how they think their learning should develop. As Wohosky (1997 points out, through this process, 'students should then be able to take responsibility for the evaluation,' which then, 'becomes partially their responsibility.' She suggests that in this instance a portfolio allows students to monitor and assess their own progress and help them to be able to set goals for themselves as learners.

Enlarging the view of what is learned.

Mahood [On Line] states that portfolios allows students to use their full creative energies and potentials, they provide support for experimentation and risk taking. If a child feels that they want to develop their learning within one area, there are no restrictions because they are given the control to follow their own 'path.' Moreover it is not essential that a child 'gets it right' first time if they know that they aren't going to commit it to an exercise book for all to see. With a portfolio they know that developmental work will not be as good as the finished article, but that isn't important. What is important is the final article in the portfolio.

Fostering learning about learning.

Mahood [On Line] comments that the use of portfolios improves childrens critical thinking and evaluation skills. But as Olson (1991) points out it is not the actual portfolio of work that develops the child. But,

> 'the process itself forces the compiler to evaluate what goes into the portfolio, as a result of the portfolios purpose.' It 'mandates reflection, consideration in retrospect.'Pg74 .

Indeed Stenhouse (1997) agrees that the real value of the portfolio is the process. The final product is far less important than the change that takes place in how the children think about their learning. He believes that, 'the strategic impact of the portfolio process is self-awareness.' Furthermore Wade and Yarbrough (1996) believe that portfolios can be used as a means of developing reflective thinking. They cite the following research in support of their belief.

- Mills-Courts et al 1991 Paulson et al 1991 Sunstein 1992. - Portfolios show evidence of self-reflection.
- Biddle and Lasley 1991 – 'portfolios served as a mechanism for students to think through the connectedness of ideas and to construct meanings based on their own emerging understanding of the personal and professional dimensions of teaching.' Pg 65.
- Ford and Olhausen 1991 – portfolios assisted students in 'reflective thinking, self discovery, accountability and organisation.' Pg 65.

So by stepping back from the experience of collecting work and evaluating what they have done, the child is able to think more critically about what they have done and what they then want to do.

Furthermore through evaluation and the development of critical assessment of their work, children are not only developing their evaluative skills but they are appreciating and learning what a good piece of work is. By evaluating work against criteria children begin to appreciate what is required to achieve. Then as Portfolio News (1993) points out the portfolio can then emphasise the students role in constructing understanding. They comment that,

> 'Portfolios can provide structure for involving students in developing and understanding criteria for good efforts, in coming to see the criteria

as their own and in applying the criteria to their own and other students work.'

Providing a way for students to value themselves as learners.

Primarily, by evaluating their work and matching it to success criteria, that they may have even set, the child is able to see and celebrate their achievement. They are able to see that they have achieved something and also appreciate why. If we take Burns (1982) Pg 393 – 397 view of how to increase a child's self concept we can see that such a portfolio based approach could help the learner to value themselves.

Make pupils feel supported by the teacher.

The child will primarily feel supported by the process of collating developmental work for a portfolio. They are not restricted to get the work right first time but value the process of learning and developing their ideas. So by supporting this development the teacher is directly and indirectly through the portfolio supporting the child.

Make pupils feel responsible beings.

Within the portfolio approach children are encouraged to have the element of choice. They are responsible for their learning and the direction that it takes. They are responsible for the collation of work into the portfolio and often the criteria through which they select those pieces of work.

Make pupils feel competent.

By giving a child the opportunity to guide their learning, whilst still giving them the necessary support to overcome any difficulties they will soon experience success and feel competent and confident.

Teach pupils to set realistic goals.

The process of the portfolio encourages the children to set their own goals and level their own work against their criteria. Depending on the level of independence that they are given, the children will learn quickly how easy or difficult it is to achieve their goal. Naturally they will rethink accordingly next time.

Help pupils to evaluate themselves rationally.

By directing the child with their first evaluations the teacher is developing a process that will soon become the property of the child. As they set increasingly realistic goals the child will find it easier to evaluate if they have reached their goal or not.

Encourage realistic self-praise.

Similarly as the children set increasingly realistic goals and evaluate themselves more carefully, so they can praise themselves with more conviction. That is to say the child will then really know whether their praise is deserved because they can evaluate how well they have met their goals.

2. For the school / teacher.

Changing Classroom Practice.

Loughran and Gorrigon (1995) quote Knight (1992) who as a result of implementing portfolios, believed that both the curriculm and teaching in her classroom had changed and that she understood what and how she needed to teach to better help her students to learn. Pg 566.

Making the teacher more informed.

Quest [On line] suggests that the use of a portfolio creates an intersection between instruction and assessment. It allows the teacher to be more aware of what is going on in the classroom through how and what the children are learning. Arter (1995) suggests that teachers who use the portfolio approach get a broader, more in-depth look at what students know and can do.

Assessment.

Use of a portfolio gives the children and teacher the chance to discuss what they are going to do and what the expected outcomes are. Then as Sewell et al [On line] suggests, portfolios, 'provide a tool that can ensure communication and accountability to a range of audiences.' Parents, children, other teachers can see 'a more visual or experiential evidence of success.' Just as a child can see progress in their work, so their parents will see development, especially when it is given to them in a well presented form. Also to this end

the portfolio will also provide a way of assessing the more complex aspects of learning. It can provide evidence of a child's learning process and evidence of how they actually learned. Howes (1996) Pg 143.

What does this literature review tell us ?

In relation to this research, it was felt that the implementation of a structured ICT portfolio could address the apparent tensions that existed within the sphere of ICT in education. (See Introduction) This section has identified how, 'the need for assessment' can be satisfied for both the teacher and pupil alike. By creating a structure that teacher and child can follow, opportunities can be created for the more effective use of computers. This could address the discrepancies that were identified as the 'Off white heat of technology.' To this end, a structured ICT portfolio was designed and implemented as a main part of the research.

Children Attitudes towards ICT.

What do we want to find out and why ?

Within the Literature Reviews so far I have set the context of the National use of ICT and the comparative school use of ICT at the time of the study. This has obviously given me a picture, indeed an insight into what has been and should be happening nationally. Then this can be compared to what is happening within the local context of the school. However with the SWOT analysis came a lot of data which showed that the children were worried with their computer use. Essentially what I now had was the local picture of the relationship between children and ICT. Therefore to provide a comparative picture I needed to find out what the national context was.This review of literature considers the differences between the current and previous generations in relation to ICT. It focuses specifically on the current generation by suggesting the broad themes that epitomize this generation and their general attitude towards computers from a positive and negative point of view.

The differences between generations

Research has shown, that the development of mass media, through the generations, has had an effect on the way that each generation regards the current media. The generation of the1950s and 60s (the Baby Boomers) were seen as 'media consumers.' Harel (1998) believes that they were the generation that were introduced to television and could either take or leave the limited service that it provided. Whilst with increased technology, the generation of the 1970's and 80's (Generation X) became more selective. They were 'zapping TV channels and VCR's, picking videos and choosing games for their games consoles.' Harel (1998) However as Hankinson and Marco (1999) believe, this generation also bore the brunt of the negative aspects of the technological advancement of the Cold War. They illustrate this by saying,

> ' They were raised on computers out of control, from HAL to the Department of Defense computer in war games. They fear that computers will some day take over.'

However the current generation are seen by many to be a generation that has embraced the technology that surrounds them. As a result of this, they are blessed with a variety of nicknames;

- Digital Children (Hankinson and Marco 1999)
- The Clickerati (Harel 1998)
- The Net Generation (Tapscot 1998)
- Screenagers (Harel 1998)
- The Digital Citizens (Katz 1996)
- Generation X (Coupland in White 1997)
- Generation Y (Tapscot 1998)

It is within this generation that Katz (1997) believes that, in the USA he has seen the, ' birth of a digital Nation.' The difference that exists, then, between generations in terms of ICT capabilities is evident. Such a generation gap is then seen by Tapscott (1998) Pg 48 - 50 through four themes.

1. 'The older generations are uneasy about the new technology which kids are embracing.' – This returns superficially to Hankinson and Marco's (1999) belief that the previous generation grew up with the oppressive view of computers. But their concerns are more probably linked into the theme that follows.

2. 'Older generations tend to be uneasy about new media.' – which are coming into the heart of youth culture. – The parental concerns that are raised about the Internet in particular are well documented. But it is concerns like these that unchallenged have clouded their view of this new media and will be discussed later in the study.

3. 'Old media is uneasy about new media.' – It is understandable that the media from the previous generation, that being print and broadcast, are concerned by the increase in lost viewers and readers to the Internet. But when this concern is compounded by the newsworthy concerns of parents, shown in theme 2, these concerns compound themselves.

4. 'The digital revolution, unlike previous ones, is not controlled by adults.' – So whilst the parents and the old media is expressing its concerns, the irony is that short of banning the current generation, they cannot stop their child's development.

So to bridge this generation gap Harel (1988) suggests '6 new rules for understanding, communicating and connecting' with the new generation.

1 – *Parents just can't be gatekeepers.* – By helping and sharing with a child's access to technology both parties develop.
2 – *The Clickerati do not see 'high tech' as a category.* – Parents see technology in terms of cost and complications. The new generation just question whether the technology will have sufficient 'use value.' It has to bring about more possibilities, more questions or more learning opportunities.
3 – *New communication technologies require new learning and cognitive skills.* – In addition to the three R's new skills are needed in this age of hyper linked media. Every time the new generation access the internet they are exercising the three X's. That is *exploration* of the wide variety on the Internet, *expression* of themselves and *exchange* of ideas and information through the medium of the Internet. So this will have an effect on the teaching and learning relationship.
4 – *Learning is cool.* – By taking charge of their learning children are empowered to learn. They need no incentive to learn because they enjoy the Internet based model that they are employing.
5 – *The best learning experiences are integrated with nature.* – Learning happens more effectively in a culture that promotes and supports learning. So by encouraging children to think that 'learning is cool,' the Internet is actually creating a culture which promotes learning.
6 – *Mind width is more important than bandwidth.* – Technology can be limiting but the opinion that we must wait until these technological problems are solved is more limiting. Irrespective of the limitations children are using the technology to the full and this should be supported.

The New Generation.

The 'NGen' to use Tapscott's (1998) term are seen to be unique. They are claimed to be the first generation to grow up in digital surroundings, the first to grow up immersed in computers. Many parallels have been drawn to illustrate how computers form a central, innate part of the lives of this new generation.

- Tapscott (1999) believes that they are ' so bathed in bits that they think technology is part of the landscape.' Pg 7.
- Coco Conn, co-founder of the city space project believes that technology is such an innate part of their lives that, 'It doesn't exist, it is like the air.' In Tapscott (1998) Pg 39.
- Harel (1998) also points out that technology is 'as basic as food or sleep,' it is 'the fifth food group.'

To further illustrate the centrality of technology to the NGen, a portrait of the 'NGen' has been drawn by collating relevant claims and research. This portrait suggests the broad themes that are said to epitomize this generation.

I want to be me, sometimes !

Harel (1998) believes the NGen are fiercely independent and are 'accustomed to controlling their media experiences.' He believes they access what they want on the Internet, challenge what they feel to be incorrect and publish their feelings and opinions the web. Moreover the Internet provides the opportunity for the NGen to adapt. They are given the chance to change themselves. They can have a new age, identity and stand up for their beliefs when communicating over the Internet. This gives them the confidence of being 'undercover' and the increased self-esteem of feeling good about their new selves. It means that they can be taken seriously and their views will count. Furthermore when they are not on-line Tapscott (1998) believes this morphing, 'helps them to assert their (real) personalities when communicating in social settings.' Pg 68. Effectively they are said to have 'personalities for all seasons' Turkle in Taspcott (1998) Pg 97 which not only allow

the NGen to controll their independence on-line but develop their independence in the 'real world.'

I want more and I want it now

By independently accessing the Internet the NGen are shown as being constantly in search of something different, something new. Harel (1998) suggests that they are always looking for 'hard fun.' Once a problem is solved they look for the next. Rheingold in Tapscott (1998) points out that 'The online world is like an empty canvas.' Pg 70. The only limitations for the NGen is their own ambition. Moreover the world that they do create will be seen in 'real time' and not 'time delay.' That is because the NGen want everything to happen immediately. As Harel (1998) illustrates, time is of the essence and within their world,

> ' the radio is on, they are surfing the web, there's a Tamagotchi by the keyboard. If they have to download something, that's enough time to play a level on the Nintendo. Not a moment is wasted.'

I want to find it for myself

For the NGen curiosity is portrayed as a common trait and everything technical has as a potential challenge. As Taspcott points out, 'In the NGen culture you look under the hood – you investigate.' Pg 72. Effectively they are able to control and adapt what they are doing and find the independence that they crave. Furthermore by having independent access to the web they continue to surf to find out what they believe the truth to be. As Tapscott (1998) confirms, ' because of the anonymity, accessibility, diversity and ubiquity of the Net, children must continually authenticate what they see or hear on the web.' Pg 75. So by is very nature the Internet is encouraging the NGen to find out for themselves, make their own decisions and draw their own conclusions.

I want us all to be together

Following on from the theme entitled 'I want to be me, sometimes !' the internet is also said to encourage the NGen to be more tolerant and accepting of each other. This is primarily because race, colour, creed or ability is not the first thing that it noticed when communicating via the web. Tapscott (1998) cites a cartoon in the New Yorker that states, 'on the internet no-one knows you are a dog.' Pg 86. So it is such diversity that the Internet obliterates.

Research into children's attitudes towards computers

As a background to the research into children and computers Martin, Heller and Mahmoud (1992) illustrate that in the 1970's and early 80's research looked more at the fears of adults than the attitudes of children. (Lee 1970, Zoltan et al 1982, Morris 1988.) Then as computers found their way onto college campuses, studies into students attitudes were carried out. (Gardner et al 1989, Morrison 1983, Loyd and Gressard 1984, Gwynne 1987 and Koolang 1989) However, most of these studies focused on the use of the computer in relation to the gender of the user. (McCord 1984, Collis 1985, Lockeed 1985, Clark and Chambers 1989.) The findings of these studies repeatedly reported that computers were a male dominated domain. Also the research showed that there was a positive relationship between computer use and favorable attitudes towards computers. However researchers did not really study childrens attitudes towards computers until computers reached elementary schools in the early 1980's.

In a 'Review of the literature on attitudes towards computerized instruction,' Lawton and Gerscher (1982) state that, research showed that children found computers to :
' a) have infinite patience, b) never get tired c) never get frustrated or angry, d) never forget to correct or praise and e) to individualize learning.' Pg 50.
Be self paced, not embarrass children who made mistakes, give immediate feedback, leave a general feeling that they learn better with a computer. Pg 51.
Whilst the researchers claimed that computers were: Impartial to ethnicity, good motivators, good for drill and practice, structured to teach in small chunks and good at enhancing spelling. Pg 51. Indeed as Martin et al (1982) point out,

> ' early studies found that negative attitudes and fears about computers were exhibited mostly by teachers, not children.' Pg 157.

However the most frequent study of computer attitudes is linked to gender. Wilder, Mackie and Cooper (1987) reinforced the view that computing was a male domain and whilst girls did have positive attitudes towards computers, the boys liked computers more. Elliot (1988) in Martin et al (1993) showed that 'girls and boys were already seeing the use of computers in society as a male –orientated activity.' Pg 250. Whilst Martin (1991) cites the following studies to support his view that 'males tend to be more in favor of computers than females.' (Collis and Ollilia 1986, Collis and Williams 1987, Drambrot, Watkins-Malek, Silling, Marshall and Garver 1985, Harvey and Wilson 1985, Moore 1985, Fife-Schaw, Breakwell, Lee and Spencer 1986) Pg 188.

Interestingly Barba and Mason (1994) used the Draw A Computer User Test (DACUT) to assess the computer attitudes of American and British children. They showed that is was difficult to reinforce that computer usage was a male domain as children frequently draw human figures of their own gender in drawing tests. However whilst Martin et al (1992) agree that children will draw a child of their own gender in such a test, it is interesting that they recorded 93.4% of American children drawing a male helper in their picture. Pg 173. Whilst Barba and Mason (1994) showed that with elementary children female figures were more prevalent. Pg 387. Moreover Barba and Mason (1994) did illustrate that fewer young children had a negative image of computer users or Nerds than older children. Indeed that -

> 'the emergence of the negative stereotypical image of a computer user, the nerd, occurs at a time in life when children are making the transition from childhood to adolescence.' Pg 388.

Finally, from a more negative point of view, research has shown that techno phobia is another attitude that children are displaying towards computers. Brod (1984) calls this 'technostress,' 'a disease of adaptation caused by the inability to cope with the new computer technologies in a healthy manner.' Brod (1984) in Figueiredo (1994). It is generally seen as a fear that is generated towards technology and its use. Spresser (1998) states that there are two forms of techno phobia: cognitive and anxious. Those who suffer from cognitive techno phobia ' often frustrate and scare themselves internally when they

have to use technology or even imagine using it.' Spresser (1998) Indeed research by Glass and Knight in Figueiredo (1994) showed that individuals that were prone to this form of techno phobia were people that were highly anxious about computers, exhibiting negative thoughts about computer use. They had low expectations about their computer abilities and were aware that they got stressed when using a computer. Glass and Knight in Figueiredo (1994). Anxious techno phobia, however, is said to affect the individual more physically. In real terms, statistics show that over half of all Americans are technophobes (Weil 1998 in Spresser 1998) whilst this figure reduces to one quarter of the British population. (MacLeod 1999)

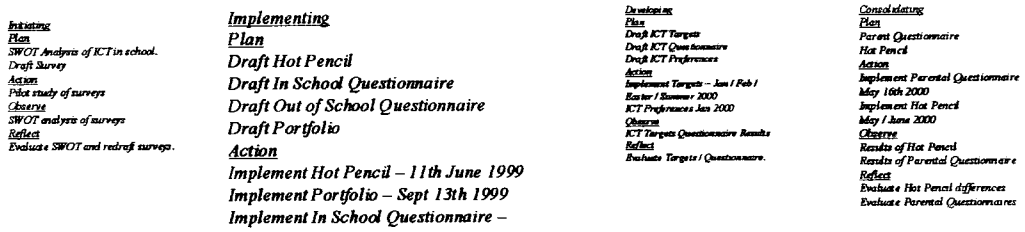
It is however understandable to think that of this proportion the majority is adult. Yet it does not appear to be accurate that if 'you were born on the right side of 1970, you should have no problems.' Spresser(1998). It is illuminating that Hankinson and Marco cite one child's response to their feelings of computer use as, 'I feel like I'm burning in Hell.' Whilst another when asked what makes one computer better than another said, 'Nothing, they all deserve to be smashed.' Furthermore research by Brosnan on techno phobia in Japan, Hong Kong and Britain has shown that 50% of the 5 year olds in the study were computer anxious and didn't want to use computers at all. Whilst of the 18-year-old students, the same computer-phobic levels were seen. (MacLeod 1999)

Such attitudes can be attributed to several factors:
The influence of the 'introducer.' Whoever introduces a child to technology is bound with influencing their views greatly. Indeed Spresser (1998) sees this as the highest predictor of whether or not a child is going to be techno phobic.
Technophobic Teachers. Yet it is not surprising when 45% of all elementary and secondary schoolteachers are techno phobic themselves that children are receiving negative experiences of technology. Rosen and Weil 1998 in Spresser (1998).
Caring Parents. ' Parents buy computers because they are afraid of depriving their children. But the children get anxious because their parents cant show them how to use them. Once they get to school, anxiety rises with the competition and pressure.' MacLeod (1999).

What does this literature review tell us ?

In terms of this research, a contrasting picture has been created of the attitudes of children towards ICT. Within a classroom, the teacher could potentially have a mix of children with contrasting ICT attitudes. On one side, children who embody the 'new computer generation' that Tapscott (1998), Harrell (1998), Katz (1996) and Hankinson and Marco (1999) portray. One the other, the technophobic individuals that Spresser (1998), MacLeod (1999) and Figueiredo (1994) have idendtified. To this end, it was felt that the structured ICT portfolio that this research promoted, could serve both parties. Supporting the technophobes by building on the skills that they are taught in the classroom, encouraging them to apply what they know and take their understanding further. Also extending and challenging the 'new computer generation' by allowing them to apply what they have learnt in their own way, giving them the opportunity to follow their learning direction.

Cycle Two - Generating children's ICT thinking.



The initial action research cycle identified and piloted one of the tools to be used within the study; that is a set of questionnaires that generated children's perceptions of ICT use at home and at school. This method of data collection will provide an insight into the children's ICT views and activities over the length of the study, in order to compare their ICT perceptions over a given length of time. Therefore having piloted and refined one of the research tools, it could then be used in cycle two on a group of target children. Moreover more reconnaissance could be carried out to refine and begin to answer the research questions by designing and initiating two more research tools.

1. Out of School Questionnaire

The Initial Out of School Questionnaire was administered to 90 children from Year Two to Year Four. As with The pilot study, the structure of the questionnaire was explained to the children and they were given help with their comprehension of the questions. Upon analysis of the returned questionnaires, it was immediately obvious that it was too difficult for Year Two. As a class, they struggled with the reading, comprehension and understanding of the questions. It was therefore decided not to continue to survey this class.

Whilst the survey was being carried out with the Year Four class certain interesting comments were made by the children which led to further amendments in the structure of the questionnaire;

Question 5 originally asked about the frequency and types of computer work that the children do, asking them to pick from: Basic Computer Skills, Word Processing, Spreadsheets, Database, Internet, Games or Other. The children pointed out that this selection didn't reflect the drawing, music making, card making that they did on the computer. So another choice was added under the title of Creative Work.

Question 6 originally asked how long was spent working on the computer. The children asked to make a distinction between computer use at the weekends and weekdays because there were differences in the time spent.

Question 9 originally asked who helped with computer problems. The children pointed out that it 'depends on who is around,' and wanted to be given the opportunity to add other adults such as Aunties.

2. In School Questionnaire

The In School Questionnaire was then administered to the remaining 60 children, with 30 each from the Y3 and Y4 classes. Again whilst the survey was being carried out with the Year Four class the comments that were made by the children which led to amendments in the structure of the questionnaire;

Question A8 asked what the children had learned to do using the computer whilst question 9 asked what they had learned about the computer programmes that they had used. The children found it difficult to distinguish between these two concepts and therefore question 9 was removed.

Question B5 asked whose instructions helped the children. They commented that it would be better if they could rank who helped them most because they didn't just get help and support from one area.

3. *Hot Pencil Review Sheets* (See Appendix Six for Hot Pencil Sheets)

The second research or data gathering tool that was designed was a 'Hot Pencil' review sheet. The 'Hot Pencil' term was used so that the children concentrated on getting their ideas down onto paper and not restricting themselves with the normal rudiments of spelling, punctuation or grammar. The two different hot pencil sheets that were designed, gave structure for Year 3 to help scaffold their ideas and freedom of expression to Year 4.

Year 3 were asked to write down; the activities that they remembered doing during the week, ticking the ones that they chose to do. They wrote down their favourite activities and what they did, the activity that they enjoyed the most / least and what they would like to continue to do the following week.

Year 4 were asked to write down the activities that they remembered doing during the week. Then from those activities they were asked to evaluate them, reflecting on; How it could have been better, what they have learnt, what they chose to do, what the worst/best bit was and what they would like to continue next week..

The children were not only asked to write down an academic evaluation of the week but one which also reflected social aspects of the school. Effectively if anything from that week was important for them, then it could be included in the Hot Pencil review.

The rationale behind the design of this tool was two-fold.

Gathering information

By getting the children to evaluate their week they were writing down what was important for them. This gave another insight into, the emphasis that children placed on aspects of

learning, how they viewed certain subjects, how they saw themselves. It generally gave access to the children's thoughts and encouraged reflection and metacognition.

Evaluating their learning

By asking children to think about what they have done, how they thought it went and what they want to do next we are casting them into the role of an active learner. If they are able to actively control their learning and make decisions regarding its development they should enjoy it more and have a more positive approach towards it. As Towler and Broadfoot (1992) point out

> 'reflective writing or discussion then provides an opportunity and a means by which the learner can control his own language strategies, putting old familiar experiences into words in order to see new patterns in it and making sense of new experiences by finding ways of relating them to the old.' Pg 138.

Having completed the design, the Hot Pencil sheets were carried out with the two classes for two consecutive weeks. Six children from each class then evaluated the structure of the sheets using a SWOT analysis. Their responses were very practical and appeared to make the sheets more accessible for them. Generally the children's reactions to the sheets were very positive. One child commented 'You don't have to get your spelling write, your writting donent have to be net.' However they disliked the lines that were on the sheets, they were said to ' make you think you have to write on all of them,' so they were removed. The Hot Pencil Icon that dominated the center of the sheet was 'in the way,' so it was also removed. The children also commented that they found it very difficult to think of 10 things that they had done during the week and then to evaluate five of them. So with discussion they agreed to write down and evaluate 5 things that were important. Finally the icons on the Year Four Hot Pencil sheet, that were used to prompt the evaluation of the weeks important events, were moved to the top of the sheet so they could be seen more easily.

4. ICT Portfolio (See Appendix Seven for ICT Portfolio Sheet)

The third and final tool that was designed within this research cycle was a 'structured ICT portfolio.' It could be described as a portfolio because; it would be a collection of the children's work within one folder, the children would only be placing ICT work within it and it would guide the children into collating the correct pieces of work, giving them a structure for recording. This would be when / where the work was completed, what aspect of ICT it covered and which work received which reward.

The ICT portfolio was based on the ICT scheme of work that was within the school at the time of the research. The scheme of work was set out in such a way that it detailed the skills / knowledge and activities that the children were to be taught during the specific year group. At that time the children were not shown this document, nor did they have any knowledge of the relationship between what they were being taught and what they had learnt or were going to learn next. So as Newton (2000) suggests, this portfolio approach,

> 'includes a capacity to explain, justify, think carefully and in certain circumstances, to predict and control events. Pg 7- 8.'

Essentially, the children were being given the opportunity to make connections within their learning. They were able to see how what they had learned connected to what they were going to learn or would like to learn.

Next the content of the current scheme of work was rewritten within the framework of the ICT portfolio. The structure was such that the portfolio was made up of two main sections. The first section related to the ICT skills that the children had achieved. The second related to the evidence that they had collected to support their acquisition of skills. Each section was demarcated to show the different aspects of ICT such as: general skills, word processing, Desk Top Publishing, World Wide Web and Internet etc. Furthermore by circling a smiley face that corresponded to the appropriate skill or piece of evidence the child could identify what they had done. Within the evidence section there were spaces for the children to enter when and where the evidence was completed. Moreover there were spaces within the evidence section for the children to enter their own activities.

The design of the portfolio was such that it was hoped to achieve the following;

Increased ICT skills and independence. – The whole idea hinged on giving the children ownership of their ICT curriculum. The portfolio and its contents became the responsibility of the child, it reflected their individuality as they picked activities to illustrate the skills that they have learnt. The portfolio showed the children the connections between the skills that they have learnt and what this allows them to do. It then allowed them to think what they could learn and achieve next. It provided them with a record of their achievement, to illustrate how they have progressed.

An assessment structure. – By asking the children to note down when they completed a certain piece of evidence or a certain ICT section a structure is being developed that shows how the individual child is developing. Moreover by keeping their work progression can be seen within the classroom, providing a collection of pieces of work for further assessment purposes. Indeed Olson (1991) cites a Vermont State Department of Education Committee who reinforce this by stating that portfolios provide beneficial means of assessment because they, 'give a complete picture of students individual achievements,' 'contain a record of work for parents and students.' Pg 76.

A curriculum structure for the staff. – The previous scheme of work was difficult for any teacher to follow. It gave a generic activity for each set of objectives and occasionally suggested an outdated piece of software that could be used to address the objectives. By using this portfolio approach, a more structured approach to ICT is developed. By grouping like activities, giving prescriptive activities, linking them into the wider curriculum, teachers could follow it in a very linear, structured almost 'parrot like' way. Although this isn't really the best approach and it is preferable for individual teachers to adapt any given structure, this approach gave a structured approach when it was needed. This could give support for the staff who found it difficult to teach ICT.

Developing opportunities for home-school ICT. – At that point within the school, no celebration was made of the work or development of ICT skills that the children attained at home. Within this ICT portfolio, the activities could be completed both at home or school with the only proviso being that they indicated on the portfolio where the work was completed. Furthermore this would allow the children that were interested to carry on with

a chosen area of their portfolio at home, thereby increasing their independent learning skills.

Furthermore as Hannon and Jackson (1987) and Epstein (1987) point out in Bourmina (1995).,

> 'parental involvement activities have been found to affect not only the children's achievement but also their attitudes and to improve their motivation.' Pg 148.

Having completed the structure of the portfolio the next consideration was a format for rewarding the children's efforts. Within the school there was a 'merit' award system that rewarded the children with stars, contributing towards a certificate. The reward format for this ICT portfolio had to be accumulative to show the children how far they were progressing. Moreover if it noted down when the children completed one section of the portfolio, that is when they were rewarded, it would develop into a assessment of their ICT progress. After drafting several ideas the 'What a star' sheet was developed. This sheet of stars on a space theme allowed the children to stamp a merit stamp over one of the stars when they had completed a section of the portfolio. Then they could write over the top the name of the completed section and the date. Thus making an accumulative reward structure that kept a record of their progress.

This reinforces the 'natural motivation to be in charge of myself,' Fox (1993) Pg 112, which will encourage the intrinsic form of motivation that will be encourage the child to complete and enter their tasks. But it also provides a more external, tangible reward structure in the form of the merit awards. Following the key strategies that Hammer (1974) in Fox (1993) identified for the effective use of rewards, they need to be;

Appropriate – This reward structure fits into the schools merit award system, using the same gold stars to identify the reward.

Be clear – The children agreed that the format was visually and conceptually clear. The structure of the portfolio sheets and reward sheets provides visual clues and reminders as to what the children have and need to achieve.

Be contingent – Everyone is working towards the same goal and must complete the same tasks to achieve those goals.

The portfolio was implemented at the beginning of the new academic year with the target class. The children were given a copy of the portfolio skills, activities and a reward sheet. The basic structure was discussed with them, relating skills to activities and activities to rewards. To begin with the children were engaged in activities that were solely organised and decided upon by the teacher. But the ICT activities that they worked on were taken from the portfolio sheet. The children were encouraged to put their work into their folders and mark off the appropriate skills and activities with the relevant date and place of completion.

Initial and comparative results

Collating all answers on a large sheet and noting commonality helped to collate the results in the same way as the pilot study with Year 5. The pilot results from the Year 5 class were then compared with those of the first Year 3 Questionnaire to assess the how similar the children's perceptions were. The Year 3 class was chosen because they would be within the researcher's Year 4 classroom the following year. This would make the implementation of the next stage of the study much easier.

After analysis of the questionnaires, the following areas of comparison were noted between the two classes of children;

In School Questionnaire

A complete analysis of this questionnaire is presented in Appendix Eight. Here, just the highlights are presented.

Thirty questionnaires were completed by both the Y3 and Y5 class. From this their responses the following can be seen;

Similarities. The majority of Year 5 and Year 3 used the computer once a week with a partner. They had problems with printing and saving but generally felt positive about the use of computers. They felt that they were mostly encouraged to work by the teacher, their partner and finally by themselves. Moreover that it was the teacher or the teachers instructions that helped them the most.

Differences. Year 5 believed that they spent more time on the computer in one session, 45 minutes compared to 30 minutes. Whilst Year 3 used both the PC and Acorn computer, not just the PC computer that Year 5 used. Year 5 used a wider range of CD based software than Year 3. (Y3 mentioned use of an encyclopaedia, whilst Y5 mentioned Rivers, Egyptian, Multimedia, Encyclopaedia, Map skills and Castles CD based programmes.) (Binomial Test, $p<0.0001$) Both classes commented that they felt positive about computer use, but more Y3 children had positive responses. 15 of the children in Y5, compared to 27 of the children in Y3 actually made positive comments (Binomial Test, $p<0.0001$). This should not necessarily be seen as negative, particularly if the level of the children's ICT work is taken into consideration. It could, legitimately be said, that the more complex the work, the more the children will have negative feelings about it. Similarly, a higher number of children in Year Five were encouraged to work by the teacher (Y3 – 15 and Y5 – 27) (Binomial Test, $p<0.0001$). This could, equally, highlight the need for more teacher input to accompany the higher level of ICT work.

Out of School Questionnaire (See Appendix Nine to reference full results)

Thirty questionnaires were completed by both the Y3 and Y5 class. From their responses the following can be seen;

Similarities A similar number of both Year 3 and Year 5 had a computer at home with a CDROM (Y3 – 49, Y5 – 48) whilst 9 had it connected to the Internet. They used this computer to play mainly game based software because of the enjoyment factor. A parent or family member generally helped them with problems such as saving, printing and loading. Following on from the In School differences it is interesting to note that the Y3 and Y5 children used the computer for a similar amount of time. Similar numbers indicated that they use the computer for 45 minutes or more in one session (Y3 – 16, Y5 – 17). Equally

both classes indicated that they used the computer most at home, then school and finally at their friends.

Differences Whilst both classes cited parents and siblings as their main source of support, only 17 of the Y3 children indicated parents and 25 of the Y5 children. (Binomial Test, $p<0.0001$). Indeed although both classes indicated that they use the computer for the same amount of time, they used different amounts of programmes in that time. 9 of the Y3 children but only 2 of the Y5 children indicated that they used 4 or more programmes in one session. (Binomial Test, $p<0.0001$). This could suggest that if the children were using fewer programmes, they were either; using them more fully and thus spending more time using them. Or they were solving their own problems and were able to use them for longer.

Hot Pencil (See Appendix Ten to reference full results)

Analysis of the Hot Pencil sheets was more difficult than the questionnaires. The questionnaires had a simple set of quantifiable data. However the completed Hot Pencil sheets provided very rich data. They contained a lot of comments and observations from the children regarding their work or thoughts over the week. So to begin their analysis each Hot Pencil sheet was read. Having read through the week's sheets certain areas of commonality could be seen to emerge. Comments that were made by one child were usually echoed or contradicted by another. So to focus more specifically on the information that was relevant to the study, the comments that were considered to be important were identified with a highlighter. Obviously the focus of the research influenced which comments were noted and which were discarded. As a result of this influence the comments could then collated under common headings such as self-concept, perceptions of subjects and references to ICT. From the first three Hot Pencil reviews the following themes were collated;
(The references in brackets relate to the child's name and date of the reference.)

Choice It was surprising how little choice children perceived that they had within the classroom. Only three references were made to them actually having an element of choice within activities such as Reading (11/6/99 SM), PE (11/6/99 DM) and craft (FK 11/6/99).

Plans Again it was surprising how few children made reference to what they would like to do in the following week. Only three references were made to activities such as, 'finishing the Viking heads,' (MH 18/6/99) 'going on maths blaster,' (ES 18/6/99) and doing 'more science.' (SH 18/6/99)

Perceptions of Subjects There appeared to be no real pattern as to which subjects children liked or disliked and it was dependent upon the individual child's preferences. The references showed that some children liked subjects because of the reward. This was illustrated by comments such as 'Me and Emma got lots of points in PE,' (11/6/99 SH) ' I liked Maths Blaster, I got my reward,' (18/6/99 EG) or ' I got my ten step award, hooray for me,' (25/6/99 WW) Whilst others enjoyed more practical aspects of school for various reasons; 'PE was good, it helps to build your muscles.' (MH 11/699) 'I enjoyed PE cos you don't have to write.' (JS 18/6/99) 'The Yard was good it was a break from work.' (MH 11/6/99) The references also showed that subjects were not enjoyed as much by some children, 'Handwriting was hard.' (PG 11/6/99) 'Didn't like literacy – too hard for me.' (SD 18/6/99) and practical activities were not enjoyed by others, 'I don't like to sing,' (LG 18/6/99) or 'I didn't like making the Viking heads, it was to messy.' (SM 25/6/99)

It appears from some of the comments that when the children like a task they are motivated to achieve within that task. When they dislike a task there is less motivation there. This may be because they perceive that they are not capable or because they do not see the value of the task. As Child (1983) points out,

> 'sometimes the learner interest in some aspects of school work is sufficient to arouse the children . . . but often it will be necessary to apply external stimuli.' Pg 44.

Reward may well engage the children in the task but as Newton (2000) points out learner interest could also depend on,

> 'what a task offers in terms of satisfaction of curiosity, interest, an understanding of the world in its broadest sense, and enhanced feelings of competence.' Pg 148.

Essentially, as Covington (1992) in Newton (2000) points out, what we would aim was 'for learning (to become) valued for what it can do to benefit the individual. Pg 20.' However

Deci et al (1991) believe that children are self motivated and self determined when they are in control and able to develop the task in the direction that they wish it to take, in Newton 2000 pg 149. To this end the lack of planning and choice that the children have mentioned will not help them to feel in control. The children appear to be passive not active learners, aware of where their learning is going and why.

Portfolio

Although no analysis of the actual work in the children's portfolio was planned a SWOT analysis was carried out with the 6 children from the target class to gauge their perceptions of this tool. (See Appendix Eleven to reference full results) The analysis of their responses highlighted the following;

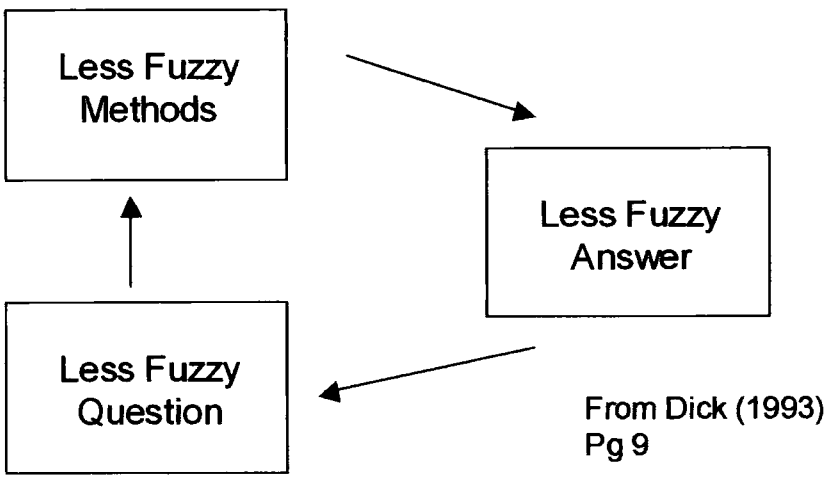
Reward system – The children liked the merit stars that they could achieve if they completed a section. 'If you finish it all you get a merit stamp on the stars which means you get a merit !' FK. If you do a secshn you get a merit in the star.' DM. They also liked the fact that you circled smiley faces when a section was complete.

Reminders – They liked the fact that the sheet showed all of the skills that they had achieved. Moreover that this reminded them what they could do. 'it reminds you which ones you have done so you don't do it again.' EG You 'learn something and say you now how to do it.'SR.

Technical Terms – The main weakness that some children identified with the ICT portfolio sheets was the ICT specific vocabulary that was used. They commented 'when you don't know some of the words and some bits you don't know what to do,' WW and 'some time I don't have a clou.' DM. However others, as was hoped, soon found that as they progressed they understood more. They said, 'at first you don't understand the words but you get the hang of it. But I don't understand the things that we haven't learnt yet,' FK and 'it first it is a bit hard but when people explain it to you, you start and get the hang of it when you have done a few of them.' EG.

By December of that academic year the children were given time to check that their portfolio was up to date and the relevant information entered onto the portfolio sheet. Although most of the children had the correct amount of work in their folder only a few of them had entered information onto the sheet. As a result we spent some time as a class reviewing each piece of work that they had completed. With each piece of work we reviewed, which activity it was, which skills it covered, when it was completed and where. Although this took a lot of time it was worthwhile in that it reinforced the processes that were involved with the portfolio.

Where this takes us ?



The above diagram will form as a basis for reflection on the achievements and directions from cycle two onwards.

Less Fuzzy Questions

Within cycle one several research questions were formulated as follows;

1. Increasing children's ICT confidence. / Children increasing their ICT independence.

- How often do children use ICT in school and at home ?
- Who motivates the children to use ICT at home and school ?
- Who helps the children solve problems at home and school ?

- Which ICT tasks do children enjoy / dislike ?
- What would motivate children to use ICT in and out of school ?

2. Children assessing and having more responsibility for their learning.

- How can children monitor and have more choice within their own learning ?
- Will giving children more responsibility increase their ICT independence ?
- What effect will developing evaluative skills have ?

3. Developing home / school / ICT links.

- What ICT work do children do at home and at school ?
- What would encourage children to complete ICT tasks at home as homework ?
- What are the children's perceptions of their families and their own ICT use at home ?
- What are the parents perceptions of their children's ICT use ?

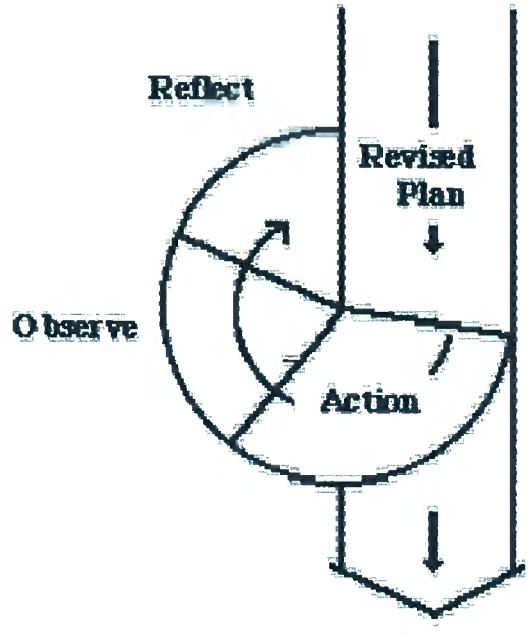
With reflection it is not that these questions have changed. It is more the case that the methodology that is and will be employed to formulate answers to these questions is being developed carefully.

Less Fuzzy Methods

By redrafting and rewriting the In School and Out of School Questionnaires we have developed a tool that can be used to gauge the children's ICT development over time. Within this cycle this tool was administered and provided a base line of the children's ICT perceptions. Each subsequent time that the surveys are administered, the children's change in attitude can be measured against the baseline. Similarly the hot pencil sheets will provide data from the children regarding their perceptions and attitudes. Development or changes in these areas can be measured against the themes that came from the analysis of the initial Hot Pencil reviews. Furthermore, the Hot Pencil sheets are asking the children to reflect on their week. They will, like the ICT Portfolio, place emphasis on the child, to make decisions and hopefully increase their independence. Moreover, the ICT portfolio will

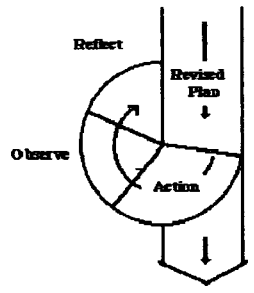
continue to be added to and hopefully be developed to include more home / school ICT work.

Cycle Three



Targeting ICT development

Cycle 3



Cycle Three

Targetting ICT development

Where have we come from ?

In the previous research cycle I continued setting the context by researching the relationship between children and ICT within a home and school context. I also established that the use of a portfolio was an effective tool to address the 'tensions' that I identified in the introduction. As a result of this affirmation, I introduced the portfolio with the children. I also set about introducing a new data gathering tool which I called 'Hot Pencil.' This provided me with more data of the children's changing perceptions towards ICT. Through the In school and Out of School questionnaires from the target classes, I generated a new set of data which I compared with the previous pilot class. This enabled me to answer elements of some of the research questions.

Where are we now ?

Firstly, within the last research cycle I noted that I wanted to see why some children were confident with ICT and others not. Indeed that some were quite confident to work individually whilst others were not. So within the *Self Concept Literature Review* I looked at the external factors that affect a child's self concept. Also to find out how to help to improve the children's independent ICT work I considered how to promote an individuals self concept.

Through the *Computer Models Literature Review* I reflected on the ways of using computers in schools that had been used in the past and were in use at the moment. I had, in the previous cycle, noted that by implementing this form of portfolio, I felt that I was changing the way ICT was being used and taught. Before the implementation of the portfolio, ICT was taught as a 'bolt on' activity. Without an ICT suite and only one PC computer in the classroom it was difficult to have an effective ICT lesson. Indeed I felt that each ICT activity had to be fitted around the Literacy and Numeracy hour in the morning and as a complement to the other subjects in the

afternoon. So this Literature Review considered which model, if any, was most effective for this form of ICT delivery.

In a continuing attempt to promote the children's use of the portfolios I began to set them tasks or ICT Targets over the holidays within Cycle Three. This, I felt, would begin to give them the opportunity to develop their ICT independence. Equally it would provide another insight into their thinking behind their ICT decisions and beliefs. To add to this developing picture of the children's ICT context, I devised two further questionnaires. The ICT Preferences Questionnaire asked the children to identify whether they would prefer to work individually, in pairs or in a three on various pieces of software. They were then asked to give a reason for their choice. Following on from this, the Portfolio Questionnaire gave the children the opportunity to evaluate their use of the portfolio so far. Again, as with the other cycles, the data from this research cycle was compared with other data from other cycles. With each cycle I began to build up a bigger picture of the children's use of the ICT portfolio and its effect. Indeed with each new piece of data more of the research questions were being addressed and previous thoughts confirmed.

Where are we going ?

Cycle Four was going to be the final research cycle within the study. This meant that all of the elements that I had introduced over the research project had to be drawn together and completed. With the completed portfolios I should look at the assessment element of this tool. So far the children had created a lot of work but I needed more information on how it could be used. So further research on the literature of assessment is necessary. By way of bringing this project to a conclusion, I needed to repeat the Hot Pencil Sheets, the In and Out of School Questionnaires. This would enable some form of comparison from the beginning to end of the study. Equally I wanted to find some way of triangulating what the children had said so far and give me an external source to make comparisons with. To this end I would like to create something that their parents could carry out. But as a guiding theme for the next cycle overall results need to be brought together and conclusions drawn.

Self concept

What do we want to find out and why ?

As the research progressed I began to see a picture of children who lacked the necessary confidence for independent ICT use. This picture had developed through the first and second cycles. In the first cycle, the initial SWOT analysis showed that within the sample of children that I surveyed, a large proportion of the children were worried or embarrassed about their ICT use. Then the subsequent In School and Out of School ICT questionnaires developed this worrying picture further. It was then important to research how to increase a child's self concept. Indeed, more importantly, to identify the factors that improve a child's self concept so they could be promoted in school through the research. This review of literature begins by considering the concept of the self. It reviews how the term was developed and details the characteristics of the self. In relating this to self concept, the review provides definitions of the term self concept with particular reference to education. It considers how self concept can be developed in school and suggests the effect that school and home have on its development.

The Self

William James believed that the self was divided up into four parts; the physical self, the spiritual self, the social self and the material self and Lawrence (1981) Pg 245 stated that James saw the development of these parts was 'a wholly conscious origin.' This contrasted sharply with Freud's view of the unconscious 'instinctive' development of the self. According to Fox (1993) Pg 71 Freud believed that, 'personality depends on the critical stages of development that a child goes through.' Freud broke the self or psyche down into 3 processes. The id, which is the inherited energy that is present from birth, the ego, referring to self-concept, self-control which is determined by peoples experiences and the superego or conscience which is influenced by parents and the wider environment. However it was with Mead's definition of the self as subject (I) and object (Me) that research began to refer specifically to self-concept, or rather the picture that I perceive of myself. In the following years Allport 1937, Mead 1934,Symonds 1951,Maslow 1968, Cooley 1902 and Rogers 1951 all developed different aspects of the self but agreed with

James' definition of the self concept as a hypothetical construct which is reflexive.' Lawrence (1981) Pg 245.

Maslow (1954,1956) analysed the basic needs of an organism with relation to the development of the self. He believed, like his forerunner Goldstein that the process of self-actualisation could only occur when all basic needs were met. He contrasted this to an organism that had unfulfilled needs, which then became pre-occupied with 'bodily preservation.' Furthermore in 1977 Rogers defined the organism as the total person with basic needs such as emotions, feelings, sensations, and social needs. He said that if these needs were met then the organism would develop a self, which was in 'congruence' with the organism. But if the needs were not met then he believed that this 'incongruent self was prone to mental health problems. In Fontana (1995) Pg 255.

Rogers (1977) in Fontana (1995) Pg 255 also discussed the term 'Ideal Self.' Like Combs and Soper (1977) Rogers saw the ideal self as a picture that everyone carried of the kind person they would like to be. For Allport (1961) the achievement of the ideal self was the ultimate goal which the individual strived towards. As a result he believed that the achievement of the ideal self 'defined ones goals for the future.' Like Allport, Horney (1950) stated that by revealing their notion of their ideal-self, an individual was showing their innermost wishes and aspirations. However he stated that if the ideal self could be an unattainable goal which the individual couldn't reach. Then if this were the case then 'its unhappy posessor (would be) dragged down with depression through its unattainability.' All paragraph references In Burns (1982) Pg 26.

Characteristics of the self.

The self is learned. Canfield and Wells (1976) Pg 2.

> 'The average child identifies first with his parents for they are the adults whom he knows best and whom he first respects and admires. As he grows older, he cultivates his parents power and competence in perspective for he meets and hears about other adults with qualities that surpass those of his parents.' Kagan (1971) Pg 17.

Canfield et al (1976) state that from birth we begin to accumulate data and perceptions about our world. When the immediate needs of food, warmth etc are met, then the developing self becomes 'a perceptual screen through which subsequent impressions must pass.' Pg 2. Indeed Purkey (1984) points out that 'the ingredients of the self are primarily social, obtained through countless interactions with persons, places, policies and programs.' Pg 27. Essentially whatever and whoever we come across influences the self.

There is little question as to the effect of significant adults on the perceptions of a child. However what is under question is the means through which the self is developed within the individual. Researchers such as Kelley 1973, Purkey 1970, Rosenburg 1979, Sonby 1971, Webster et al 1974 in Purkey (1984) Pg 27, believe that the self is a product of the reflected appraisal of others. But they reflect more specifically that significant others are seen to have a distinct influence on the formation of the self. Effectively this is similar to the development of a child's self-concept, in that positive appraisal from a significant adult will develop a positive self, with all the positive self-beliefs that this brings. Whilst negative appraisal will be detrimental to the formation of the self. However in contrast is the modelling theory from Bandura (1963). In Burns (1982) Pg 171, Bandura's theory is that, ' a child acquires most of his behavioural characteristics, and from these his attitudes, through the process of imitating various others in his environment.' Bandura agrees that significant adults play a large role in the formation of the self. However he focuses more specifically on the behaviour of the significant adult and not their appraisal of the child. For it is this behaviour that the individual will model.

The self is organised and multifaceted. Shavelson and Bolus (1982) Pg 3, Purkey (1970) Pg 8.

Purkey (1970) by way of a composite definition, states that the self is, ' a complex and dynamic system of beliefs which an individual holds true about himself, each belief with a corresponding value.' Pg 7. He represents the self as a spiral, which is made up of lots of sub spirals which represent the individuals beliefs. The closer the sub spirals are to the centre of the main spiral the greater relevance the belief has to self. This multifaceted view of the self is supported by Fernandes 1978, Flemming et al 1980, Piers and Harris 1964, Michael et al 1975, and Shepard 1979. In Shavelson et al (1982). Furthermore the more

closely the belief is held, the more difficult it is to change that belief. Lowe 1961 and Horney (1939) in Purkey 1970 Pg 9. Consequently, due to the inter-linked nature of the self, success and failure is generalised within the system. That is to say what effects on belief will have effects on other beliefs. Maeh (1967) likened the process to a bell ringing in one belief and the echo effecting all other surrounding beliefs. In Purkey (1970) Pg 9.

The Self is consistent. Canfield et al (1976) Pg 2.

Due to the resilience of such central tenets, the self remains stable. Balester (1956), Roth (1959), Engel (1959), Lecky (1945) in Purkey (1970) Pg 11. As Canfield et al (1976) Pg 2 point out, new experiences are taken on board and integrated into the self, only if they are consistent with what the individual believes. If such experiences are not consistent with the self then they are ignored. Furthermore as Festinger (1962, 1967) points out, it is only when individuals take action that is incompatible with their beliefs that dissonance occurs. As a result, changes to the self are,

> 'extremely difficult because to significantly change anything requires modification of the whole system in order to retain consistency of the self.' Canfield et al (1976) Pg 3.

The Self is unique. Purkey (1970) Pg 9.

With so many individual beliefs, relating back to each individuals first experiences there are an infinite variety of personalities that could and do exist.

The Self is a dynamic vantage point. Shavelson et al (1982) Pg 3, Purkey (1970) Pg 10.

'We cannot stand outside our own skin and perch on some Archimedes point, and have a way of surveying experience that does not itself depend on the assumptions that one makes about the nature of the man, or the nature of whatever one is studying.' Combs and Snygg (1961) in Purkey (1970) Pg 10.

As with self-concept the self is instrumental in influencing how an individual acts. All that an individual does is referenced through and influenced by the self. Spears and Deese

(1973) in Purkey (1984) Pg 29 comment that if an individual has learned to see himself as a troublemaker then his inner self will seek to reinforce this. Consequently the individual will continue to portray and maintain this troublemaker image.

Self concept - A mixture of definitions.

Although definitions of self concept may vary, they, in essence agree that self-concept is directly related to the self. Moreover that self concept is a collection of perceptions and beliefs that make up the self. Kutrick and Rogers (1990), Shavelson et al (1982). However it is within their definitions of such perceptions that there is some disagreement. Definitions suggest that self concept is made up of; 'beliefs, values and attitudes, Fox (1993) Pg 65, 'self confidence, self esteem, stability and self attitudes,' Kutrick and Rogers (1990) Pg 71 or 'an array of self attitudes,' comprising of the self as I am – cognised self, the self as I want to be – ideal self and the self a I think other people perceive me – other self. Burns (1982) Pg 24. But of all definitions, for its simplicity and relevance to the educational sphere Shavelson's definition of self concept is most appropriate. Shavelson et al (1982) states that,

> ' self concept, broadly defined, is a persons perceptions of him or herself. These perceptions are formed through ones experience with and the interpretation of one's environment and are influenced by significant others, and ones attributions for ones own behaviour.' Pg 3.

The Multidimensionality of Self Concept

When considering a definition of self concept, its multidimensional nature cannot be overlooked. For it was the organisation of self concept into this form, that became the key for modern self concept research.

Marsh (1989a) points out that early theoretical accounts of self concept emphasise its multidimensional nature but that it was early empirical studies that, 'emphasises a general self concept rather that more specific facets of the self.' Pg 417. In addition to this Mash (1989b) illustrates the wealth of research that has shown how self concept research was restricted by an 'unmanageable array of instruments used to infer the construct,'

'limitations in the quality of these instruments,' and 'methodological shortcomings in empirical research.' Pg 57

As a direct attempt to solve these problems Shavelson et al (1976) proposed a multidimensional, hierarchical model of self concept. This model proposed that general self concept should be subdivided into academic and non-academic self concepts. Then these two divisions were further subdivided in a hierarchical form. Such classification of self concept allowed for more focussed research. Marsh (1989b) suggests that this, 'emphasised the domain specificity of self concept while still recognising a general construct.' Pg 57. Initially Shavelson, Hubner and Stanton received little empirical support for this new way of explaining and researching self concept. However as Russell-Bowie et al (1999) point out, recent research has provided support for their model. (Byrn and Gavin 1996, Marsh et al 1997, Marsh and Yeung 1997, 1998) Whilst Jin et al (1998) illustrate that the multidimensionality of self concept has been confirmed through research on numerous occasions. (Byrne 1984, 1988, Marsh, Barnes and Hocevar 1985, Marsh and O'Neil 1984, Mash, Parker and Barnes, 1985)

Therefore as Marsh (1998) suggests, it is far more desirable to consider self concept in its multidimensional form as it,

> 'can lead to a better understanding of the complexity of the self in different contexts, to more accurate predictions of the wide variety of behaviours we well as appropriate outcome measures for diverse interventions, and a deeper understanding of how self concept relates to other constructs.'

Relevance to education.

Shavelson et al (1982) states that, ' enhancement of students self-concept is valued as a goal of education,' Pg 3. Whilst Marsh and Smith (1982) cite the following research to reinforce the idea that self concept is 'an important educational variable;' Moran et al (1978), Shavelson et al (1976) and Wylie (1974,1979). But this then begs the question, why is such a hypothetical construct as self-concept seen as important within education ?

Child (1977) points out that, 'the way an individual perceives himself influences the way he behaves in interactions with his physical and social environment.' Pg 219. As Spears and Deese (1983) in Purkey et al (1984) Pg 29, point out it is not the self concept does not cause 'bad' behaviour but rather that the self concept acts as a reference or anchor point. So if the child perceives himself to be – say - a trouble maker and if these perceptions are confirmed by the teacher, then he will act as a trouble maker. Indeed if we look at a composite picture of the successful and unsuccessful student we see the harmony and discourse that self-concept can bring. The following résumé of research provides that composite picture.

The successful student

- Has high opinions about himself and is optimistic about future performance (Purkey 1961)
- Has confidence in his/her general ability (Taylor 1964)
- Has confidence in his/her ability as a student (Brookover 1969)
- Needs fewer favourable evaluations (Dilles 1959)
- Feels s/he works hard, is liked and is generally polite and honest. (Davidson and Greenberg 1967) All references above in Purkey (1970) pg 19,20.
- Respects himself for what s/he is. (Rosenberg 1965 Pg 31)

The unsuccessful student

- Has a negative self concept (Goldberg 1960, Shaw 1961, Bruck and Bodwin 1962.)
- Feels less adequate and is less accepted (Combs 1963)
- Has a lack of self reliance, sense of self worth and feeling of belonging. (Durr and Schak 1964)
- Has continued feelings of worthlessness that are a characteristic of an unhealthy personality. (Fromm 1941, 1947.) All references above in Purkey (1970) pg 20,21.
- Is characterised by self rejection, self dissatisfaction, self contempt.' (Rosenberg 1965 Pg 31)

However self concept is not just related to behaviour. Indeed its strongest connection to education is through its link to academic achievement. As Rogers and Kutrick (1990) point out,

> 'pupils who are confident of their learning abilities and feel a sense of self worth display greater interest and motivation in school which enhances achievement.' Pg 74.

Much research has shown that school achievement is related to self concept; Fink (1962) in Purkey 1970 Pg 16, report a significant correlation between self concept and academic achievement, with particular reference to boys, and Brookover, Thomas and Patterson (1964) in Purkey (1970) Pg 17, showed a positive correlation of the analysis of grade point average to self concept.

However the most interesting and relevant explanation for this link between self concept and school achievement comes from Canfield et al (1976) His poker-chip theory states that the self concept should be seen as a stack of poker chips. Every day children are entering into the 'learning game' with their set of these chips. If they enter into learning they are risking these chips due to the 'cost' of success and failure. If a successful child is said to have a high self-concept they can risk a lot of chips and sustain any losses that occur. Whilst a child with a lower self concept and fewer poker chips will be cautious and reluctant to enter into the 'learning game' because they may loose what little chips or self concept they have. So it appears to be a desirable goal that educators increase the self-concept of children in their care. For it would be through this medium that there would be an increase percentage of well behaved, enthusiastic, positive, motivated, children with increased academic achievements.

How do we increase childrens self-concept within education?

As Burns (1982) points out, children have the ability within themselves to change their self-concept. It is just a matter of finding the right environment and approach. He cites Rogers (1974) who states,

> 'The individual has within himself vast resources for self understanding, for altering his self concept, his attitudes and his self directed behaviour and that these resources can be tapped into if only a definable set of facilitative psychological attitudes can be provided.' Pg 393.

Burns (1982) goes on to suggest 6 approaches, which would encourage and facilitate the increase of a child's self-concept.

Make pupils feel supported by the teacher. – As Fontana (1995) Pg 78 states ' by building good relationships between vulnerable pupils and their peers, the teacher can significantly affect pupils development.' RolloMay (1969) in Purkey et al 1984 defines this form of support as 'intentionality.' In his opinion it is a statement of conviction and commitment, which 'enables the educator to be dependable but not narrowly predictable.' Whilst Canfield et al (1976) puts it simply by saying that the teacher must be 'in all ways a friend.' Pg 6.

Make pupils feel responsible beings. – Burns (1982) cites the following research as a reinforcement of such an approach, one which he believes would be brought about if children were given; 'adequate choice and decision making within a framework of accepted rules.' (Lepper and Greene 1975, Maehr 1974, Mahoney 1974.) Authoritative and democratic rather that authoritarian enforcements. (Baumrind 1968, Coopersmith 1967) Emphasis on reward rather than punishment. (Skinner 1953) Moreover Purkey et al (1984) go on to say that is should not only be the children that should be responsible. But by giving children the potential influence to chance their development, the teacher should accept the responsibilities involved. He goes on to state that the teacher needs to respect the right of the child, because they are responsible, to 'accept, reject or hold in abeyance any messages received.' Pg 45.

Make pupils feel competent –

> ' The absence of student threatening authoritarianism, the refusal to regard the students as competing with each other or with the teacher; the refusal to assume the professor stereotype and the insistence on remaining as realistically human . . . , all of these created a classroom atmosphere in which suspicion, wariness, defensiveness, hostility and anxiety disappeared.' Maslow in Canfield et al (1976) Pg 5.

Or as Canfield et al (1976) put it, the teacher must maintain a, 'you can do it attitude.' Pg 6.

Teach pupils to set realistic goals – Kay (1972) in Burns (1982) believes that children with a low self-concept set goals that are either too high or too low. They therefore will either fail or reinforce their belief that they cannot achieve. But that those with a high self-concept are able to set goals and maintain their self-concept irrespective of the outcome.

Whilst Canfield et al (1976) go on to say that once goals are achieved the teacher needs to relate and link the successes. For this serves to 'strengthen the impact of any enhancing experience by relating it to the others the student has had.' Pg 4.

Help pupils to evaluate themselves realistically – Jersild (1963) in Burns (1984) Pg 396, points out that most children judge themselves on unattainable goals of perfection. This, he believes will reinforce low self-esteem. But whilst it is important for evaluations to be realistic and therefore negative it is up to the teacher to provide the focus that is necessary to make it a beneficial experience. This, Purkey (1984) believes is termed 'direction.' Pg 45.

Encouraging realistic self-praise. – Burns (1984) states that by setting realistic goals and carrying out realistic evaluations, it is finally the job of the teacher to encourage credit where credit is due. For this success will be the most powerful force for moulding a positive self-concept.

But as Canfield et al (1976) point out, all of the above ' isn't easy, change takes place slowly, over a long period of time.' Pg 4.

Two Influences on self-concept.

The most important influence on a child's self concept is seen as being from 'a significant adult.' As Purkey (1970) points out 'behaviour of significant people that causes a young child to think ill of himself, to feel inadequate, incapable, unworthy, unwanted, involved or unable is crippling to the self.' Pg 33. Effectively, feedback from any significant adult will have an effect on the individuals self concept, this is supported by Videbeck (1960) and Guthrie (1938) in Burns (1982) Pg 176. Furthermore children who develop 'secure attachments' with significant adults are said to be 'more competent cognitively, emotionally and socially,' Compos et al (1983) and, are more popular, have higher self-esteem and are less aggressive to their peers. Sroufe (1983). All references in Fontana (1995) Pg 73. Whilst children who develop 'insecure attachments' are more vulnerable to difficult circumstances later in life due to increasing insecurity and are more likely to have

insecure relationships as adults. Fontana (1995) Pg 73. Of these significant adults the most important within the child's domain are the teacher and the parent.

Parental Influences.

Research into the relationship between a child's self-concept and their parents perceived self concept of their child lead Monis (1958) to conclude that they are closely linked. Indeed similar findings were found by Davidson and Lay (1960), Shaw and Dutton (1965), Brookover et al (1965) and Meyers (1966). All references in Purkey (1970) Pg 32. So to promote a positive self-concept Fox (1993) suggests that parents should offer 'unconditional self regard – the need to feel loved by just being yourself.' Pg 66. Whilst Coopersmith (1967) believes that firm, fair yet high standards using reward not punishment will promote a high self-concept. Whereas permissive parents, who are punitive and unfair, showing little interest in their children are aiding the development of a child with a low self-concept. A view that is supported by Macoby (1980) who in Fontana (1995) describes the positive process as the 'warmth in the parent child relationship.' Pg 264. He adds that secure attachment to a significant adult is equally indicative of high self-concept..

School

Purkey et al (1984) state that, 'schools probably exert the single greatest influence on how students see themselves and their abilities.' Pg 28. This is hardly surprising when a child spends approximately 6 hours a day at school and until Secondary school under the influence of one teacher at a time. Consequently Fontana (1976) comments that the attitude that the teacher has towards an individual frequently become the attitude that the child possesses themselves. He believes that this 'picture' that a teacher has of a child is very quickly internalised by the child. The child is then bound to act and behave according to this picture of their self-concept. Pg 265. On a very sobering note Canfield et al (1976) believe that there is no question that a child's self concept is influenced by a teacher. They state that the fact is that 'you have a choice of what kind of effect you will have.' Pg 4. To this end Burns(1982) defines a teacher as,

> 'an inviter who sends invitations, through formal and informal, verbal and non verbal, conscious and unconscious ways to students, to see themselves as able, valuable and acceptable.' Pg 232.

Assessing Self Concept.

Lawrence (1981) comments that the two most frequently used methods for assessment of self concept are; the semantic differential and the verbal method, such as the self-report questionnaire. The former, semantic differential is credited to Osgood (1951) in Lawrence (1981) pg 246. The child is presented with a concept, such as school, home or self and is given a range of contrasting pairs of adjectives. They tick within a 5 or 7 spaced gap in between the adjectives to show how much each pair applies to the concept.

The latter, self report or self-descriptive questionnaire is derived from Shavelson. In Marsh et al (1984). It measures 3 areas of academic self-concept, (Reading (READ), Maths (MATH), and School Subjects (SCHC) from which the total academic self concept is taken. (ACD) Also 4 areas of non-academic self-concept are measured. (Physical abilities / sport (PHYS), Physical Appearance (APPR), Relationship with Peers (PEER) and Relationship with parents (PRNT) from which the total non-academic self-concept is taken. (NACD) Then from an amalgamation of the original 7 the total self-concept can be calculated.

In their work with self-concept research Marsh and O'Neill (1984) showed the 'lack of theoretical basis and the poor quality of measurement instruments used.' Pg 940. Their answer to this problem was to use a self-descriptive questionnaire that they believed 'provided stronger evidence for other aspects of the construct validity of self concept than is typically found with other multidimensional instruments.' Pg 940. However as Burns (1984) points out that to obtain accurate results the self report format depends on; the clarity of the individuals awareness, the availability of adequate symbols of expression, the willingness of the individual to co-operate, social expectancy, an individuals feeling of personal adequacy and the feeling of freedom from threat. Pg 28. Interestingly the negative form of the last two conditions accurately describes a person who has a low-self concept. So if a person was feeling inadequate and under threat, or if they had a low self-concept then such a technique wouldn't work.

What does this literature review tell us ?

Firstly, research confirms that children with a positive self concept are more optimistic Purkey (1961) and confident Taylor (1964) and Brookover (1969). The main purpose of the research was to promote more ICT independent children. Such qualities as confidence and optimism can be seen as beneficial in the development of independence. Whilst secondly, when we consider Burns (1982) 6 markers for promotion of self concept, shown earlier, they illustrate quite strikingly how the use of a portfolio based approach could help learners to value themselves. Therefore, it could be said that such a portfolio based approach to ICT should have an effect on the self concept of the children using the portfolio.

Computer Models- Theory and Practice

What do we want to find out and why ?

As a direct result of implementing an ICT based portfolio, I felt that the way that I taught ICT was changing. There was a shift of 'control.' As a teacher, I could still influence what the children did because I set the tasks. But as a result of the portfolio, I felt that I didn't have as much influence over the way the children carried out their tasks. Although this increased child ICT independence was an obvious goal, it did bring about a question. How does this type of approach to ICT affect an overall model of ICT use ? In this literature review a definition of knowledge is suggested first. It then considers a variety of computer models that have been suggested for three distinct learning theories. By considering behaviourist, congnitivist and constructivist theory, the review presents the benefits and criticisms of such computer models in the classroom.

To learn an individual needs knowledge. Of the plethora of knowledge types that exist, the following are particularly relevant within the context of computer learning. These are declarative knowledge, procedural knowledge, and structural knowledge.

Declarative knowledge

A person who has declarative knowledge can display knowledge of what something *is*. As Scheffler (1965) in Star (2000) suggests, this knowledge can be 'of proposition or facts.' Pg. 83. But as Farnham-Diggory (2000) points out, this knowledge, in no way, involves 'understanding, practical application or logic.' In other words, this form of knowledge is quite simple, a person 'declares' that they know 'about things.'

Procedural knowledge

This form of knowledge is more indicative of application and process. Ryle (1949) in Star 2000) cites Ryle's (1949) description that this knowledge is 'knowing how,' which contrasts to declarative knowledge as 'knowing that.' Pg. 80. An individual applies their declarative knowledge and 'does.'

Structural knowledge

Therefore to bridge the gap from declarative to procedural knowledge is structural knowledge. According to Diekhoff (1983) in Ritchie and Gimenez (1995) it is knowledge of how concepts are interconnected or linked. According to Ritchie and Gimenez (1995),

> 'structural knowledge can be thought of as a network of mental connections or relationships between pieces of.. knowledge.' Pg 222.

In terms of their application to a computer context, Makonnen (1997) suggests; Declarative knowledge would represent basic factual or conceptual knowledge. This could be what a computer is, what the parts of a computer are called. Procedural knowledge would represent the use of instructions or independent learning to facilitate the use of the computer. Whilst the structural knowledge would enable the connection between the two, allowing their knowledge of the parts of a computer to be harnessed with the 'how to' aspect.

In progression to formalised learning theory Bigge and Shermis (1992) suggest,

'When teaching moved from the mothers knee to a formalised environment designed to promote learning .... Then, professional psychologists and educators who critically analysed school practises found that the development of more or less systematic schools of thought in psychology offered a handy tool for crystallisation of their thinking. Each of these schools of thought has contained, explicitly or implicitly, a theory of learning.' Bigge and Shermis (1992) Pg 4

Furthermore Crook in Gill (1996) suggests that such learning theories influence the use of computers within the classroom. Pg 78. From his models of computer use we can illustrate the following learning theories and their corresponding computer frameworks; Behaviourism – the computer as tutor, Cognitivism – The computer as pupil, Constructivism – The computer as fabric and evidence of which computer model could be seen as the most effective.

<u>Behaviourism – The computer as Tutor</u>

Behaviourism is not concerned with the mind or human consciousness, it 'only focuses on objectively observable behaviours and discounts mental activities.' (www.funderstanding.com/behaviourism.cfm). Its roots lie with psychologists such as Pavlov, Skinner, Thorndike and Watson. Their work with animals, in the main, led them all to a version of the stimulus, response theory through conditioning. That is to say whatever behaviour is required should be repeated and correctly rewarded if the behaviour is to become innate. As a result Teachers following the behaviourist view of learning do not need to focus on how the child learns but on how 'they can present their task (the input) and reinforce the pupil after learning (the output.)' Fox (1993) Pg 183. Learning is said to occur if there is a change in what the behaviour that the child exhibits as a result of this 'instruction.' The process is very much based on the practice of teaching and not that of learning. Furthermore Behaviourist teaching is epitomised in part by the authoritative 'listen and you will learn' theory. Through this traditional method of 'chalk and talk' teaching 'the learner is seen as a tabula rasa, a passive blank space into which knowledge is passed by a suitable qualified adult.' Pollard (1990) Pg 7. This 'traditional', 'didactic' model of teaching is, then, based on such behavioural psychology. As Craft (1996) points out,

> ' the aim of schooling is to transfer the substance into the minds of children. The activity and context in which the learning takes place are this . . . merely ancillary to learning .' Pg 105.

Skinner took such an idea and adapted it, he presented the first linear teaching programme in 1954. Through this format of learning, the computer or 'teaching machine' optimised the process of 'knowledge transfer' by presenting the child with a small amount of subject matter, with a relative question, at a relatively slow pace. (Stimulus) The child then answers the question, (Constructed Response) and the 'teaching machine,' immediately gives information as to the accuracy of the response. (Feedback) Child (1973) Pg 103.

Criticisms

Generally Behaviourist teaching and its inspired computer models can be criticised for their narrow focus on learning. Funderstanding (2001) believes that behaviourism does not account for all types of learning or all needs of a learner as it does not take into account the

activities of the mind. More specifically within education, a child could easily fail to learn because the teacher focus their teaching on one type of learning and ignore the very method of how a child needs to learn. Children learn from their mistakes and the feedback from a linear model of learning such as the teaching machine does not provide sufficient error diagnosis and consequential strategies to meet this diagnosis. Shorrocks-Taylor (1998) Pg 21. But with the associated costs of any form of technology such a model of learning does not appear to realise 'value for money.' For as Hypermedia in Education (1997) illustrates, within behaviourist teaching the computer is reduced to an auxiliary tool that only supplements the teaching that is already going on in the classroom. It does not use the computer to its full potential or explore new methods for learning. Furthermore as Poljak (1985) in Hypermedia in Education (1997) states, the student is forced to follow the learning path that the computer is programmed with, allowing no individualised learning. Indeed there is an obvious criticism that such a structured way of learning does not encourage any form creative thinking or indeed individuality.

Davies (1997) goes so far to state that behaviourism controls the individual to such an extent that they 'behave like machines which can be switched on and off and generally pushed around.' And as a result of this control, we are led to control others and steer them in the direction that we want. Davies (1997) cites the work of Glasser, which also argues that this 'theory of the world' is responsible for the breakdown of families and failure of schools. Pg 1.

Cognitivism – The computer as pupil

Cognitivism by its name follows a more cognitive, mental approach to learning. As Fox (1993) suggests it, 'emphasises the internal mental processes that the pupils use to respond to the teaching situation.' Pg181. It is also characterised by a saying attributed to Confucius, ' I do and I understand.' For cognitivism places emphasis on 'direct experience and interaction with media, artefacts, people and places.' Pollard (1990) Pg 8. In simplistic terms, just as behaviourism believes that learning is a passive process so cognitivism sees learning as an active process. Much cognitive theory stems from the work of Piaget. Piaget's work with children led him to emphasise the individual learners place within the learning process. That is to say that children are 'builders of their own intellectual

structures.' Scrimshaw (1993) Pg 15, they are able to 'learn without being taught.' Vogelzang (1997) Like Piaget, Bruner believed that,

> 'the focus of teaching should be on developing the internal thought process of pupils and their cognitive representations of the world.' Fox (1993) Pg 181.

Therefore children should be presented with opportunities for learning not controlled and forced to adhere to one approach. They should partake in experiences, be placed in environments that would allow them to become involved and then accommodate and assimilate what is to be learned. Effectively they are making matches between what they already have, cognitively, and what is around them. Thus they achieve equilibrium between themselves and their environment. Then through this progress they would reach new 'stages' or phases of thinking.

Immediately the relationship between the teacher and child has to change. In a behaviourist setting the children are seen very much as receptacles to be filled and their behaviour shaped by an experienced individual. Within cognitivism the teacher is almost 'inviting' learning. They are providing these stimulating experiences within a comfortable environment for their children.

Behaviourist influence made computers control and almost stifle children's learning by being very prescriptive in terms of how and in what order learning takes place with the goal of communicating knowledge through the computer. Cognitive psychology equally has this goal of knowledge transfer. But whilst a behaviourist would break down a task into small parts to shape a learners behaviour, a cognitivist would analyse a task, break it down into small chunks and then use this information to develop a method of instruction that moves from the simple to the complex, building on prior knowledge. (Mergel 1998) So from this point of view there is not a vast change in methods of computer learning. However cognitivists have also influenced a form of computer based learning that gave control, very much, to the child. Seymour Papert designed a language, LOGO, that allowed children to programme computers. He wanted to make the computer more accessible to the children and give them the control that they needed. Vogelzang (1997) His ideas were directly influenced his work with Piaget at the University of Genva. His theory and work reflects

the view that the computer should be a 'childrens machine.' Papert (1992). For Papert, the computer became very much a tool that should be 'taught' to do things by the child. LOGO used the sphere of Maths to allow the child to programme the computer. But more recently cognitivists have shown that by making the computer reflect the curricular area that you want the child to learn in, the child can 'teach' the computer within different areas. The children are then developing 'their own learning environments or 'microworlds,' through this process of exploration and diagnosis.' Shorrocks-Taylor (1998) Pg 27. The computer is then inviting the child to experiment, not working to 'get it right,' but 'isolating and correcting 'bugs,' the parts that keep the program from working.' Papert (1980) Pg 23. Or within an educational perspective, the child needs to continue to work and thus increase their understanding by solving the problems that they encounter.

Criticisms

Piaget has been criticised for the fact that his theory only explains limited aspects of cognition. (Bruner in Vogelzang (1997)) Whilst, some critics believe that his stages of development are too neat and do not allow for all stages of cognitive development. Mergel (1998) states that although cognitivism encourages the learner to learn their own way to accomplish a task, it may not be the best way to complete such a task, or their strategy may not be adaptable to other situations. Gill (1993) points out that research has shown that learning from such 'micro worlds' does not occur spontaneously and requires support in two forms. Firstly motivation, 'to derive an urge and some initial direction for the computer based explorations,' Pg 81.Secondly interpretation of their micro-worlds. That is to say whilst they are learning they encourage an individual to assimilate what they are learning into 'broader frameworks of knowledge.' Pg 81. Essentially we are still unable to ignore the importance of the social aspect of teacher – learner interaction from the learning equation. Furthermore, in a study to test the potential of applying such cognitive strategies of computer aided instruction and expert system in schools, Hofmeister (1990) observed that,

> 'the individualised instruction approach was found to be inadequate for several reasons. First, the technology was not sensitive to, and could not anticipate, the

> kinds of responses that must be made in the application of study and meta cognitive strategies. Secondly, the technology did not provide useful models for the application of strategies. As the field tester observed, it failed to provide the process experience of learning to think through content.' In Hopson, M (1998).

Influences on a modern model

Crawford (1996) comments that there are significant tensions between traditional forms of educational practice and educational technologies. Perhaps this is compounded by tension from industry, which traditionally has been a haven of retrieval and storage of data and not constructive technologies that produce new systems of knowledge. Privateer (1997) Pg 83.

Ramirez (1994) in Hopson (1998) points out that current research in fields of cognition and brain theory point towards a learning environment which engenders;

> 'Interaction rather that isolation – knowledge and expertise develop when students have a chance to interact with resources that include peers, teachers, experts from various fields, and print and electronic texts and databases.'

Also that such research advocates active sustained, meaningful, challenging learning, based on real problems, in individual and group settings. In Hopson (1997).

Furthermore Schwen, Dorsey and Goodrum (1993) concluded that,

> 'learning is far more of a social process than we have conceded in the past and pedagogy should emphasise; a) active participation by all learners (teachers and students) b) community of and for learning, c) jointly constructed knowledge by the community, and d) a more democratic relationship between those labelled students and teachers.' Pg 5.

In a survey carried out in UK Primary school, Jackson, Fletcher and Messer (1986) concluded that the pattern of computer work within schools involved either small group or paired work. . Whilst this may seem the norm Light in Scrimshaw (1993) cites observational studies that show how children usually only work on joint learning projects when they are on a computer and points out that such interaction increases 'opportunities for group based and socially interactive learning.' Pg 42 . Light goes on to cite research to reinforce the validity of paired computer work;

Sheingold, Hawkins and Char (1984) - When working on computers children interacted more, regarding the learning task and called on each other more for help.
Hughes (1990) – Children working on a Logo task showed high levels of spontaneous, task reflected interaction.
Hoyles and Sutherland (1986) - Logo promoting and sustaining a high level of discussion between learners. Pg 42.

In conclusion, any model of computer use that would fulfil these needs should be;

Social – Interaction with others through all aspects of media available is essential.

Active – Learners need to be actively involved in their learning.

More than just computer skills - Develop not only computer skills but thinking and learning skills.

Motivating - Needs to engender an individual that is motivated and interested to learn.

Constructivism - The computer as fabric

Phillips in Perkins (1999) Pg 7 identifies three distinct roles in constructivism; those of active learner, social learner and creative learner, characterised as follows;

Active learner – Knowledge and understanding are actively acquired. – 'children discuss, debate, hypothesise, investigate and take view points.'
Social Learner – Knowledge and understanding are socially constructed. – we do not construct knowledge in isolation, it is a highly social experience, it is created 'in dialogue with others.'
Creative Learner - Knowledge and understanding as created or recreated. – 'learners create or recreate knowledge for themselves.' In this situation the teacher assumes the role of a guide.

To this end Von Glaserfeld sees the teacher as 'a midwife in the birth of understanding as opposed to being the 'mechanic of knowledge transfer.' Whilst others describe the teacher as guides, the children as sense makers, (Mayer 1996) or the teachers as co-ordinators, facilitators, resource advisors, tutors or coaches.(Gergen 1995) (All references In Murphy (1997)) The role of the teacher then is completely different to that within the behaviourist or cognitivist learning theories. Within constructivism,

> 'The role of the authority figure has two important components. The first is to introduce new cultural ideas or cultural tools where necessary and to provide the support and guidance for students to make sense of these for themselves. The other is to listen and diagnose the ways in which the instructional activities are being interpreted to inform further action. Teaching from this perspective is also a learning process for the teacher.' Driver, Asoko, Leach, Mortimer and Scott (1994) Pg 11.

Effectively the teacher must adapt and modify lessons, as the children develop to meet their ever-changing needs. Indeed as Driver et al point out this process engenders not only child but also teacher development. Furthermore the teacher does not stipulate what the children should learn. They negotiate and guide, agreeing with the principle that, 'the search for meaning will take a different route with each student.' Brooks and Brooks (1999) Pg 21.

Brooks and Brooks (1999) also illustrate five central tenets of constructivism.

1 – Constructivist teachers value their students points of view and comments.

2 – Teachers structure lessons to challenge their students.

3 – Teachers appreciate that the curriculum must be relevant for their pupils.

4 – Lessons are structured around large, not small, pieces of information.

5 – Teachers assess a child'slearning as part of the daily classroom setting not as something separate to it.

Jonassen [On line] points out the difference between constructivism and congnitivism in terms of their respective computer models. Congnitivists, he states, have a pre-determined course which learning follows, they map a predetermined concept of reality into the learners mind. Constructivists, however do not predict the learning outcomes, they merely foster the learning. It would then be impossible to predict or map how a learner would

progress and use a computer to 'control' this. Yet Constructivist learning theory encourages a model of computer use that is very similar to that of Papert. Perkins (1991) states that

> ' information processing models have spawned the computer model of the mind as an information processor. Constructivism has added that this information processor must be seen as not just shuffling data but wielding it flexibly during learning – making hypotheses, testing tentative interpretations and so on.' In Mergel (1998) Pg15.

Scrimshaw (1993) comments that within this model less emphasis is placed on the relationship between the individual learner and the computer and more on the computer as a medium to communicate between the teacher and pupil. Computers, he states, have the potential of 'reorganising instruction within the classroom and making possible the extension of education beyond the classroom.' Pg 23.

To this end, the technological advantages of the 1980's and 1990's have shown a move towards more constructivist models of computer use. Hypertext and Hypermedia allow for branched design rather than linear, giving more scope to leaner control, which is crucial for constructivists. However it would be easy to say that a learner could become lost within the mass of hypertext that exists. To address this, Jonassen and McAlleese point out that each phase of knowledge acquisition relies on different types oflearning and that initial knowledge acquisition in this sphere should be characterised by 'predetermined learning outcomes,' 'sequenced instructional interaction,' and 'criterion referenced evaluation.' MacAleese (1993). Then once this has been completed the learner can be given freer reign to explore within a more constructivist model.

Criticisms

Firstly, Kledzik (1999) admits quite rightly that constructivist thinking can not always apply to every element of the classroom. Such basic facts as maths, spelling, rules have to be learned in some way, shape or form. Whilst it would be wonderful for all elements to be 'discovered,' the constraints of time, class size and budget do not always allow this to happen. She also points out that with certain learning disabilities, behaviourist teaching is far more successful. Merril (1992) in Duffy & Jonassen (1992), argues that constructivism,

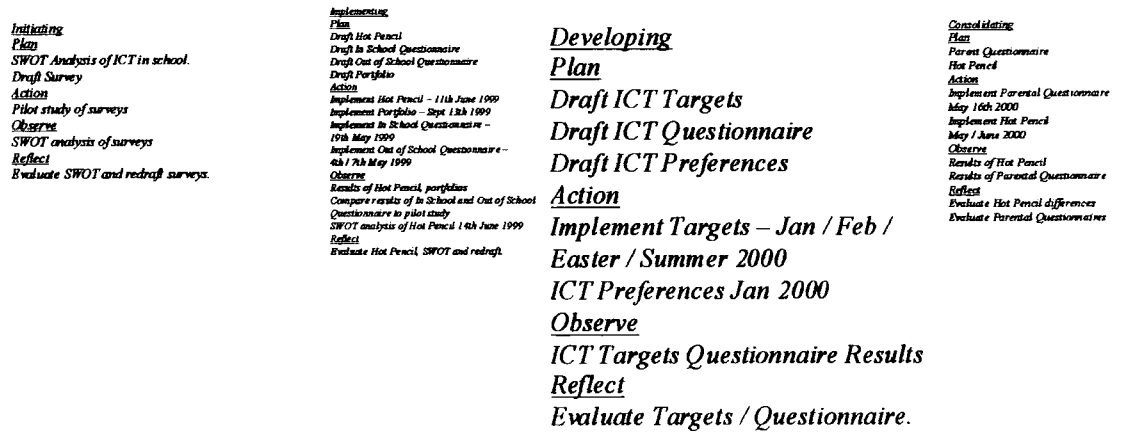
in isolation, is an unrealistic method of learning. By stating that 'all understanding is negotiated,' Merril argues that individuals will find it difficult to accept the elements of society that are not at all 'negotiated.' Pg 107-108. In a similar vain to Merril, Kledzik (1999) argues that elements of society, particularly rules, and elements of education, particularly basic facts cannot be 'negotiated,' but have to be accepted. So one approach, in this instance is not advisable. Similarly, Mergel (1998) comments that such divergent thinking and action is excellent, until a situation arises when conformity is required. Students need to be encouraged to both conform when necessary and explore when appropriate.

Battista (1999) points out that without proper control and commitment from staff and students constructivist learning could be seen as 'a type of non rigorous intellectual anarchy that lets students pursue whatever interests them.' Battista (1999) in Brooks and Brooks (1999) Pg 22. Furthermore Brooks and Brooks (1999) point out that the teacher needs to have the conviction to stick to their curriculum and not to completely follow the learning direction of the student. None the less there is no disputing that, 'organising a constructivist classroom is difficult work for the teacher and requires the rigorous intellectual commitment and perseverance of students.' Pg 23. Brooks and Brooks (1999) So it is not only the teacher that needs to be convinced that such a teaching method is beneficial. Without the support of the students, the teacher will find their job doubly difficult. Equally, that constructivism, with is open endedness can mean a lot more preparation for the teacher.

What does this literature review tell us ?

In relation to this research, of all three models the constructivist computer model appears to be the best suited for the modern primary classroom. However in no way could or should the other models be discounted. For as with all methods of teaching there is a time and a place for everything. Indeed the recent influence that research into different types of learners, should encourage the maintenance and use of all different types of learning experience. Then there will have been a match between the type of learner and the learning experience.

Cycle Three - Targeting ICT development.



The second research cycle allowed further testing, redrafting and implementation of the three main tools that would provide data through the length of the study; that was the In School Questionnaire, Out of School Questionnaire and Hot Pencil review sheets. As the 'fact gathering' tools were in place, the children were then introduced to the main element of the research, in the form of the ICT portfolio. During the first term the children's use of the portfolio was somewhat restricted. Whilst the children participated in a lot of ICT tasks, such tasks were largely teacher led. During the third cycle this discrepancy was addressed. To give the children the choice that they needed, some ICT 'homework' was arranged, this homework took the form of 'ICT Targets.'

ICT Targets (See Appendix 12 to reference ICT Targets sheet)

The children were told that they were going to be given some ICT homework over the Christmas holidays. The first hurdle was to arrange ICT provision for those children who had no computer at home. Some agreed to share computers, whilst others opted to use one of the school's portable Apple E-Mate computers. Having ensured that all children had some access to a computer they were then told that this homework would form part of their ICT portfolio and that they would have to choose their activities from the portfolio. They were then asked how many ICT activities they would like to be given. After some discussion the class decided upon four. So the children were set the task of finding four activities that they would like to complete over the holiday. A lot of discussion then ensued

as to which activities they would choose. Once they had decided the children committed their choice to a piece of paper and agreed to try to complete their activities and bring back the evidence after the holidays. The rationale behind this approach was;

To give the opportunity to increase the children's' ICT independence.

It had been an aim of the research to increase the children's ICT independence. So by giving the children a choice with their ICT homework activities, we were primarily giving them the opportunity to choose and have the opportunity to pick what they wanted to learn and then independently learn it. At least that was the theory. Indeed, it would equally be interesting to see how the children approached such a task. Therefore, by analysing each child's progress from the picking of the tasks to their completion we would learn a lot more about the children's approach to ICT learning. As Sewell et al (2000) point out, a portfolio is indeed most useful for, ' allowing individuals . . . to be involved in their own change and decisions to change.'

To increase portfolio 'ownership.'

So far the portfolio had been teacher led and the children were only familiar with it because it had been part of their ICT curriculum and their everyday ICT tasks had been taken from it. Initially the children were given the opportunity to look through the portfolio, with a view to selecting homework activities. Through this simple activity, they were familiarising themselves with the activities in the portfolio. Indeed when selecting activities, many children asked the teacher to clarify what certain activities entailed. Furthermore, by giving the children the chance to work on activities at home and then enter in their activities themselves, this would personalise their portfolio. Furthermore Sewell et al (2000) believes that a portfolio does promote, ' a shift in ownership; participants can take an active role in exchanging where they have been and where they want to go.'

To increase the scope of the assessed work.

Arter [On line] states that one of the benefits of using a portfolio is that it allows the assessor to, 'get a broader, more in depth look at what the students know and can do.' To

this end the ICT tasks meet these requirements by allowing the child to choose the activities that they feel are suitable and persue them at home. This gives the assessor a truer picture of what they can do. This is not only through the evidence that they produce, through their approach to an activity but through their choice of activity in the first place. To this end the assessor is getting a picture of the child's choice, approach to and end product of their ICT tasks.

To link home, school and ICT

When developing ICT skills in school, we suspect that the children are not going to use them outside. Indeed as the first Out of School survey suggested, children were more likely to use a computer for games than other activities at home. So by asking the children to complete activities at home we were encouraging them to develop and apply the skills that they learnt in school and perhaps engender some change in their ICT home use. Moreover, it would be hoped that the children would get some support and/or encouragement from their parents whilst undertaking these ICT tasks. As Pachler in Leask et al (2000) comments, such homework could be used to 'supplement, extend and /or differentiate what happens in the classroom and *(more importantly)* it can reinforce or consolidate work carried out in school.' Furthermore he comments that, 'pupils can benefit from the attention given to them by 'significant others' e.g. their parents, guardians at home Pg 238.' So it was with great enthusiasm that the children left for their Christmas holiday. As one girl commented, ' this is like homework, but its different because its fun.' RF.

ICT targets questionnaire (See Appendix 13 to reference ICT Targets Questionnaire)

Upon return from their Christmas Holidays in January 2000, the children were given time to enter their work into their portfolios and mark off what they had accomplished. A questionnaire was designed with the following rationale.

To analyse their choice of activity and which activities they had completed. – It would be beneficial to analyse the child's choice of activity for this could give more indication as to which activities the children were naturally motivated to complete and why. Then by

analysing which activities were actually completed, we could see more easily, which children had completed their work or not and why. This could give a further indication of which children were motivated and which were not.

To analyse their approach to the ICT task and which strategies were used to complete the task. - It would be beneficial to analyse how each child completes the task, what problems they encounter and who helps them to overcome these problems. From this information we will be able to see; what the children do when the encounter a problem, who helps them if they ask for help and what sort of problems they are helped with. Essentially we are seeing similar questions through each element of the research to try to provide a multiangulation to support the answers to the research questions.

To this end the design of the questionnaire drew on elements from the Out of School questionnaire; asking about who helped the children with their work, what problems they encountered but also focused specifically on the children's choice of activities from the portfolio. Thus a cycle began, that each holiday the children were given ICT tasks to complete. The number of tasks depended on the length of holiday, but each time they returned, they were expected to enter their own work into the portfolio and complete an ICT targets questionnaire.

Portfolio Indicators.

By the end of the first term in February the children still found it difficult to enter their own work into their portfolio, unless they had chosen the activity themselves. After discussion with the children it became apparent that this was because they were very unaware of the link between the ICT activity that was going on in the classroom and their portfolio. Although the objective of each ICT task was explained at the beginning of the task, it could potentially be a fortnight before all the children had worked through the task. To meet this difficulty a label was placed on the wall next to the two classroom computers. They read quite simply 'We are -_____ on the PC computer,' and 'we are _____ on the Acorn computer.' The objectives of the lessons were inserted into the blanks and the onus was put on the children to enter their work into their folders. As Nickerson (1985) in Newton (2000) comments this assimilation of information can be seen as, 'the connecting of facts, the

relating of newly acquired information to what is already known,' and 'is the weaving of bits of knowledge into an integrated and cohesive whole.'Pg 15 Furthermore he comments that this process of understanding and connecting of knowledge is often seen as an unconscious process. However he argues that a teacher should, 'make it a subject of conscious thought.' Pg 15. Effectively, by drawing the children's attention to the skills involved in what they are doing and by stating the objective of the activity the process of understanding is being made more explicit.

ICT Preferences Questionnaire (See Appendix 14 to reference ICT Preferences Questionnaire)

The first sets of ICT targets were very successful, with the majority of children completing the chosen tasks. However during the February half term a lot of the children didn't complete their activities. One reason that was identified as a possible 'stumbling block' for the success of such tasks was computer groupings. Within the classroom, the majority of children work in pairs on an ICT task. Indeed a survey into computer use in the primary school showed that computer use was organised into paired and small group activities. (Jackson, Fletcher and Messer 1986) It could be suggested that this is due more to the need to 'get them through' the activity than because it is the best organisational strategy. To this end the children were given a set of ICT activities and asked whether they would prefer to work alone, in pairs or in groups of 3+ and why for each activity. By analysing the results it was hoped that the effects of such pairings on the children's approach to different ICT work and/or homework. could be seen.

ICT Portfolio Questionnaire (See Appendix 15 to reference ICT Portfolio Questionnaire)

Finally in March after the second term of using the portfolio, the children were asked to complete an evaluative questionnaire about their portfolio use. Although the children had used the portfolio for two terms, this was really the end of the first term in which they had used the portfolio independently. The questionnaire was intended to give some feedback as to the children's perceptions of the process of the portfolio and analyse if any changes could be made. The questionnaire drew on a lot of questions from the other surveys that

had been carried out, looking at their ICT problems, solutions, perceptions. But also asking them to analyse the skills that they had acquired and how they had acquired them.

Initial Findings

ICT Targets Questionnaire (See Appendix 16 to reference full ICT Targets Questionnaire results.)

As with the In School questionnaire, all 30 returns from this questionnaire were analysed by entering them onto a large sheet. From this sheet, areas of commonality were noted. From this the following elements are worth highlighting from the first questionnaire;

- The children's choice of activity was rather limited. From the wide range of activities on offer, the majority chose activities that had been part of the classroom curriculum, picking mainly word processing activities such as making a list, instructions, poem, story or card. As was mentioned earlier, it had been hoped that the children would use the activities that they had already encountered to give them support and some familiar ground to start from. So in this instance they used the security of what they know.
- Of the 77 references made 32 referred to the fun element or to the fact that the task was easy as their reason for choosing it. From the responses there was only one child that mentioned that they picked an activity to fill in one set of activities and therefore get a merit. So it could be said that because the ICT homework was still 'novel,' the children enjoyed doing it.
- The main problem that the children encountered during their ICT activities was printer based. Obviously any technical problem will mean that the children struggle. Perhaps the problems required additional resources or it was a software problem. Irrespective, this will obviously cause frustration at this late stage in the task.
- When the children came across problems relating to the computer, 13 of the children cited parents or siblings as helping them, however there were an equal number of children that pointed out that no one helped them. Whilst it cannot be assumed that these children didn't have problems it could be suggested that they

solved the problems themselves. However, there were two children who explicitly highlighted themselves as the problem solver. The same results were seen when the children came across problems relating to the ICT task.

- Of the software that the children used, the 17 referred to word processing or associated software. This was, however, not surprising due to the nature of the ICT tasks. This will expand once the children choose different tasks.

ICT Preferences Questionnaire (See Appendix 17 to reference full ICT Preferences Questionnaire results.)

The children were presented with 9 different programmes, which they had used during the course of the ICT curriculum to date. The programmes were are follows;

Mad about Maths, a game based way of improving understanding and application of fractions, decimals and number facts.
Logo, an on screen control programme which is directed using Logo language to create patterns.
Data Sweet, a data handling programme.
Tudors, a bank of historical knowledge about the Tudor period, interspersed with games.
Castle Explorer, a problem solving game set in a Medieval Castle.
Tudor CD ROM, a multimedia programme about the Tudors.
Style, a word processing package.
Prime Art, a drawing package.
Page Plus, a DTP package.

To analyse the results the responses for the different types of programmes were collated. Then an average was found of the sample. An average enabled a comparison to be made between the different types of programmes even though some had more responses e.g. Maths has 3 programmes to collect responses from, whilst Expressive programmes only had two. From the returns that the children gave, their comments suggest that they prefer different working groups for different programmes.

Maths programmes (Logo, Data Sweet, Mad About Maths) – Work in Pairs because the enjoy it more, have help with their ideas and the problems that the encounter. (Pairs – average of 19 responses) (Binomial Test, $p<0.0001$).

Expressive Programmes (Prime Art, Page Plus) - Their opinion was divided between individual. (Individual – average of 15 responses) (Binomial Test, $p<0.0001$) and paired work (Pairs – average of 12 responses) (Binomial Test, $p<0.0001$). It could be suggested that some prefer the chance not to take turns, to be able to do their own thing, to express themselves. Whilst others like the support that paired work gives.

Explorative Programmes (Tudors, Tudors CD ROM, Castle Explorer) – Their opinion was divided between individual (Individual – average of 13 responses) (Binomial Test, $p<0.0001$) and paired work (Pairs – average of 12 responses) (Binomial Test, $p<0.0001$). Those that said they preferred working individually suggested that this was because they had free choice to do what they wanted to do. Whilst those individuals who preferred paired work said that this was because they could get help, advice and have more fun.

When pressed to decide on their favourite working group their opinion was divided again. Half the children preferred to work in pairs, whilst the other half preferred to work alone.

Overall, these results are not surprising. An activity such as mathematics, which the children would perceive had a right and wrong answer, (particularly in the context of these ICT programmes) would be seen as threatening. So to support them, they would choose to work in pairs. Whereas work that can be more easily worked through, one which allows for creativity and individuality, it would be perceived, would be better done alone.

ICT Portfolio Questionnaire (See Appendix 18 to reference full ICT Portfolio Questionnaire results.)

The results from this questionnaire were collated and of the 30 returns that were collected the following trends were analysed.

The children are positive about the use of the portfolio and enjoy the portfolio homework.

Generally the children responded positively to the portfolio, mentioning 40 positive elements of the portfolio, in comparison to only 22 negative comments. Of the positive comments; 8 children made reference to the fact that they were able to keep a record of their ICT work or that they were able to keep track of what they had done. 12 children made reference to the fact that the process was enjoyable and of those comments, 6 children specifically mentioned that as a result of the work, they were able to access their home computer. Whilst only 4 children's comments made reference to the fact that the portfolio work allowed them to gain merits. Of the negative comments the main criticism was that is was boring. Similarly the children responded positively to questions about the ICT homework, saying that it was 'good' and that they 'liked it.' To support their views the majority stated that they enjoyed it because they were able to use the home computer more. Others referred to the fact that they enjoyed it because they got merits, because they learned a lot, because the tasks kept them occupied or simply because they had fun.

The children experience few technical problems but some have 'people' problems.

This positive trend continued when the children were asked about computer problems related to their ICT work at home. The majority experienced no technical problems and of the 14 that did, 11 children referred to a printer fault !
However some of the children did perceive that they had some difficulty with people when doing their ICT work. Of these 'people' problems, 11 children referred to their parents as the source whilst 10 children referred to their siblings. Of these 21 references 10 were as a result of someone else using the computer.

On the whole the children are associating ICT with more positive feelings.

26 out of the 33 emotions that were mentioned in the questionnaire were positive and related to the children feeling confident or excited about ICT use. This positive feeling was attributed to the fact that they enjoyed doing computer activities or, more importantly, that they knew what to do in relation to the ICT task. Of the 7 negative emotions the majority of the children commented that they were nervous. They attributed this to the fact that the work was new, that they didn't know what to do or that they couldn't do it.

The children have learnt new skills, some with help and some independently

All of the children were able to identify at least one new ICT skill that they had learnt. When asked how they learnt such a skill the majority saw themselves as the initiator. However only 6 of the 19 children that tried a task themselves, continued independently, solving their own problems. The other 13 commented that they asked for help when the encountered a problem. The other children stated that they learnt such skills by being shown what to do. Of the people that the children highlighted as helping them, the majority mentioned their family. From the 42 references to family figures that were mentioned the most common was the father.

Where does this take us ?

With reference to some of the initial research questions we can see that from the research to date, some tentative but relevant points have been highlighted.

1. Increasing children's ICT confidence. / Children increasing their ICT independence

- Who helps the children solve problems at home and school ?

From the portfolio questionnaire, the father has been highlighted as the main person that helps with ICT problems. But the other comments, equally, did make reference to other people within the family unit. Similarly the ICT Task I Questionnaire identified both parents and siblings as people who would help with both hardware and task problems. However within the portfolio questionnaire the majority of children pointed out that they believed that they had learnt by initiating learning themselves and then, when they were stuck, asking for help. This would appear to indicate that the individual child is becoming the first person to attempt to solve problems. Similarly, the ICT Task I Questionnaire identified half of the respondents as saying that no-one helped with their task or hardware problems. Whilst it is difficult to state categorically that the children themselves solved problems, it does suggest that they are not appreciating that they are successfully solving problems as they carry out the tasks.

- Which ICT tasks do children enjoy / dislike ?

The ICT Task I Questionnaire collated the tasks that the children chose to complete for their homework. The children, as had been hoped, picked activities that they had already carried out in school. To this end, it could be suggested that the children enjoy doing this sort of activity because they feel comfortable with it and understand what has to be done.

- What would motivate children to use ICT in and out of school ?

Although no hard and fast ideas have been identified it is worth commenting that in both the ICT Task I Questionnaire and the portfolio questionnaire, reward was mentioned as a reason for pursuing an activity. In this instance the reward was a merit, part of the schools reward system. Never the less, their motivation was linked to a reward. However, quite conversely, a lot of references in both questionnaires were made to the fact that it was not that the children were unmotivated to use ICT at home. But rather that the ICT tasks gave them the opportunity, indeed the license to use the computer at home, over their siblings or parents.

2. Children assessing and having more responsibility for their learning.

- How can children monitor and have more choice within their own learning ?

The initial work within the ICT portfolio was not as successful as had been hoped. It took a lot longer for the majority of the children to enter their own work into their portfolio. However by placing the onus on the children through the ICT tasks, the children appeared to be more eager to enter their own individual work into their portfolio and indeed share their work with others.

Within the cycles of research the tools that have been developed and will progress in the following way.

Out of School / In School Questionnaires – As surveys that will show change over time, the questionnaires will continue at set intervals.

Hot Pencil – Due to the time constraints of this research tool, it will only be carried out at the end of the study for a short period of time to provide a comparative sample.

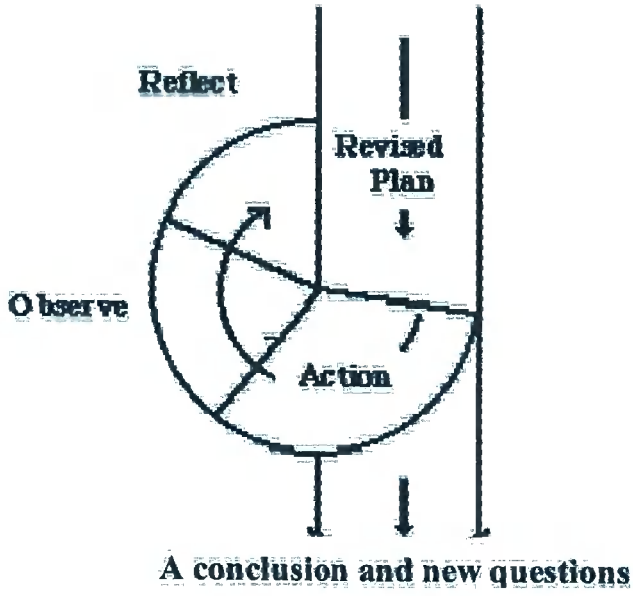
Portfolio of ICT work. – As the ICT curriculum continues within the classroom, the children will be carrying out certain ICT activities. Once completed, the emphasis on the entry of their work into the portfolio is on them.

ICT Tasks. – To continue to give the children some independent work, they will be given ICT homework each holiday period. The onus will then be on them to choose the activities that they deem to be appropriate and then once completed enter their evidence into the portfolio.

ICT Task Questionnaire – To help to analyse the development of the children's choice of tasks and their approach to these tasks, this questionnaire will help to evaluate after each set of homework tasks.

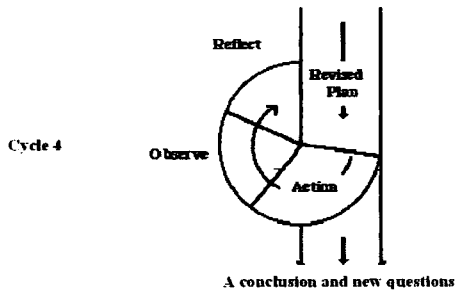
However as the research draws to a close within the final cycle, it would be hoped that to corroborate the children's input into answers to the research questions, so some form of parental survey can be carried out. This would equally would provide their opinions regarding computer use and access.

Cycle Four



Crossing barriers to ICT

Cycle Four



Crossing barriers to ICT

Where have we come from ?

In the previous research cycle I considered why literature on Self Concept gave an insight into the promotion of the independent use of ICT in the classroom. I also reviewed literature on computer-based models of learning to see how the different approach that I am using in the classroom can be married to a particular model of ICT use. Further to this I created three more questionnaires to inform and guide the research project. The Targets Questionnaire encouraged the children to carry out ICT homework thus encouraging their independent use of ICT. The ICT preferences questionnaire looked at the children's choices for individual, paired and group work on computers. The Portfolio questionnaire gave the children a chance to evaluate the portfolio approach to ICT that I implemented.

Where are we now ?

This cycle reflected the final part of the research project. This then was be a cycle in which attempts needed to be made to answer the research questions that were identified in the very first cycle. It was a cycle which drew all methods of research to an end and made final comparisons. To this end, the *Assessment Literature Review* considered the contribution that the portfolio will make to the current climate of assessment that exists within schools.

To draw some form of conclusion, I repeated the Hot Pencil Review sheets to see how the children's attitudes towards ICT had changed. Similarly I repeated the administration of the In school and Out of School Questionnaires. These comparisons would give me a picture at the beginning and end of the study. Finally, the Parental Questionnaire was designed to give the confirmation that I wanted for my results. All of the tools that I had used relied very heavily on

the children. To give some affirmation to my conclusions, this questionnaire would confirm or obstruct their views.

Where are we going ?

It is wrong to say that the research is complete even though this cycle is the final piece in an action research jigsaw. Conclusions may be made as a result of the data from this cycle but that will only answer one set of research questions. Indeed these are questions that I created at the beginning of the study. They reflected the agenda that I had in terms of tensions that I perceived in my classroom. Yet despite that, the study has come up with an insight into the development of an ICT portfolio within a particular classroom. But due to the nature of an action research project and the changing nature of the primary classroom, there will always be further developments that can be carried out. No two classes are the same, no two years are the same. As the old aphorism states, 'what works for one, doesn't work for another.' So adaptation is definitely key. Changes that come through this adaptation form more cycles within further pedagogical development.

Assessment

What do we want to find out and why ?

At the beginning of the study, I identified the need for effective, purposeful assessment as one of the tensions that had caused me to embark on the research. The resulting tool which I developed to address this and other tensions was a portfolio based approach to ICT. This was an approach that was different to the current forms of assessment within school. Such changes needed to be valid and effective. It was therefore important provide an overview of the effective assessment. This literature review considers the reasons for assessing in school. It suggests the most pertinent types of assessment that are used in school and their relative benefits and shortfalls. It finishes by recommending how assessment can be used most effectively within an educational context.

By way of a definition.

Assessment, since the report of the'3 wise men,' (Alexander, Rose and Woodhead 1992) has become more visual and overt in Primary Schools. Before the implementation of the National Curriculum Eisner (1993) believed that assessment was 'more an aspiration than a concept. Pg 219.' In other words, teachers did assess, but only on an informal basis. As a result of this informality, they made mental notes about the children that needed supporting or stretching as a result of their classroom observations or class tests. However, since the implementation of the National Curriculum, assessment according to Harlen, Gipps, Broadfoot and Nutall (1992) has lost its intuitive aspect and has become, 'the process of gathering, interpreting, recording and using information about pupils responses to an educational task. Pg 217' Formal records of children's progress through observations or tests are written down, checked and the information used and shared.

Why do we assess ?

> 'Promoting children's learning is a principal aim of schools. Assessment lies at the heart of this process. It can provide a framework in which educational objectives may be set, and pupils progress charted and expressed. It can yield a basis for planning the next educational steps in response to children's needs. By facilitating dialogue between teachers, it can enhance professional skills and

help the school as a whole to strengthen learning across the curriculum and throughout its age range.' Sutton (1991) Pg 2.

If teachers are to promote and develop children's' education then they need to find out what problems they are having. Pollard (1990) sees this task as a form of diagnosis. It is obvious that if teachers do not know how the children's achievement is progressing then they won't truly be able to plan for further improvement. As Pollard points out this diagnosis is essential, 'so that new learning tasks can be pitched at an appropriate level of challenge.' Pg 43 If new learning is too hard, then the children won't be able to cope with the work, if it is too easy they wont be challenged and will become bored or despondent. Indeed Harlen et al (1992) go further to state that assessment also gives the teacher feedback on the success or failure of their methods of teaching. By reflecting on how well the children have performed, this will suggest to the teacher, how well their teaching has met the needs of the children.

Generally as Wragg (2001) comments, in this instance assessment, 'should put the teacher *and* pupil in a better position to move ahead.' Pg 28. So as Wragg (2001) points out, assessments, whilst providing feedback for the teacher, can also provide feedback for the learner. By providing feedback the teacher can motivate the child. This can be, either by providing them with their grade or performance and congratulating them on a 'job well done,' or by encouraging them to look beyond the grade at what they did well and what they can improve on next time to increase their grade.

To further develop the idea of assessment helping the individual child Stobart and Gripps (1997) Pg 13,14 suggest how such assessments influence childrens learning:

1 – Assessment provides motivation to learn. – As was mentioned assessments can provide the success that children need to increase their self confidence. They can equally provide the challenge that is needed to improve.
2 – Assessment helps students (and teachers) decide what to learn. – Whilst it was mentioned that teachers can then see what they need to address, it is also important for children to see what they need to learn next. The teacher, or child can assess their areas of weakness and target learning to meet these needs.
3 – Assessment helps students to learn how to learn. By a continual process of work, assessment and reflection, the process should begin to influence a child's choice of learning strategies and encourage self monitoring skills.
4- Assessment helps students learn to judge the effectiveness of their learning. By assessing their learning, children should be able to see the interconnectedness of their learning and develop a broader understanding of what they really know .

Furthermore, assessment not only provides direction for the teacher and child within the school, but information and feedback to external agencies. As Child (1986) illustrates,

'teachers need to know something about pupils attainment because parents, other teachers, education authorities, employers and other institutions to which a pupil is transferring want to know.' Pg 98.

Parents obviously want to know how well their children are performing and assessments can provide an illustration of what a child needs to do to improve. Other teachers need to be party to assessments from previous years to ascertain at what level the children are working and what methods of teaching best suit the class. Whilst the education authorities can use assessment for 'temperature taking.' Eisner (1993) Pg 225. By comparing the performance of individual schools, districts or the country they can ascertain how well certain areas or schools are performing.

Main types of assessment.

As was mentioned earlier, the national curriculum and the 'Three wise men' report changed the face of assessment in Primary Schools. It was through the national curriculum in particular, however, that provision was made for both formative and summative assessment.

Formative assessment.

Teachers that made mental notes of children's progress throughout their learning career were making formative assessments. By noting down what was happening they were analysing what needed to be done next to develop the individual child. As James (1998) points out, formative assessment is, 'the process of identifying what the students have, or have not, achieved in order to plan the next steps in teaching.' Pg 171. However the difference between pre and post national curriculum is that formative assessment is now explicit not on an ad hoc basis. Generally use of formative assessment is 'sensible.' It takes the child as the starting point for the learning. It uses their needs as the basis for teaching.

As Harlen et al (1992) Pg 220 suggest, good practice in the use of formative assessment should reflect;

- *The gathering of assessments in a number of relevant contexts.* – In other words, the teacher should not rely on one form of assessment. If they were mainly relying on evidence from written work, it would be advantageous to use oral or observational assessments to give a truer assessment. Or rather than rely on individually completed assessments, it would be prudent to also use assessments from group or whole class situations.
- *Criterion referenced and related to a description of progression.* – Assessments need to reflect what they are attempting to illustrate. If a teacher is trying to find that a child can add to ten, then the assessment should reflect exactly that. Furthermore, the criteria for this assessment should be taken from a set of criteria, which illustrate how a child has or will develop over time. Not only does this show what a child has learned but it gives the teacher the opportunity to know what has gone on before, see what is to come and reinforce or extend as is necessary. To this end, both the Literacy and Numeracy strategies both show excellent examples of such lists of such criteria.
- *A basis for deciding what further learning is required.* – If a teacher, through their formative assessment, has evidence that a child has learnt certain skills but not others, it would then be easy to plan learning to meet that child's needs.
- *The basis for an ongoing running record of progress.* – By recording formative assessments and keeping a record of a child's progress a teacher has a record of their progress. Indeed this is further reinforced, if the record is linked with the criteria for that child's learning in a particular subject.
- *Shared by both pupil and Teachers* – As was mentioned earlier, assessment is usually a teacher-dominated domain, it was argued that children need to experience feedback from the assessments that they perform to engender true development.

Dann (1996) however argues that pupil self-assessment has, equally, to be an integral part of formative assessment. Pg 56. Murphy (ed) (1991) believes that some teachers introduce self-assessment because the teacher cannot physically assess all the children individually whilst others introduce it because they believe that self-assessment is essential if pupils are to take responsibility for their own learning. Pg 126. Through a discussion of self assessment, a clearer definition should emerge.

<u>Self-assessment.</u>

Towler and Broadfoot (1992) see self-assessment as a process of reviewing which,

'involves reflecting upon past experience, seeking to remember and understand what took place and attempting to gain a clear idea of what has been learned or achieved.' Pg 137.

However as as Stobbart and Gripps (1997) point out, such assessment must be accompanied by some form of 'looking forward.' Pg 17. Once a child knows what they can do or have achieved, then they need to be able to decide how to move themselves forward. Some form of target setting, in this instance, is essential.

To encourage the development of this difficult skill James (1998) suggests that students should have;

Access to criteria – She states that, 'students should have an understanding of what would be regarded as mastery or desired performance in an area of learning.' Pg 174. Teachers need to discuss the criteria for assessment with the children, they need to make them an explicit part of their teaching, making reference to them at the start and end of a lesson and display them in the classroom as an aide memoir for the children.

Access to assessed examples – The children should have access to exemplars in the form of portfolios of work. Pg 176. So that not only do the children know the criteria that they are aiming for, but they are able to see examples of work that meet these criteria.

Opportunities to set their own tasks – James believes that, 'their motivation will be increased and thinking through what kind of activity would meet the criteria will, in itself, contribute to learning.' Pg 176 so by being involved in creating assessment activities, the children will develop further.

However these are not the only benefits of implementing and using self-assessment.

<u>Benefits of Self Assessment.</u>

Motivation

This is seen as perhaps the biggest benefit of using self-assessment techniques in the classroom. As Ager (1998) points out,

> 'if children know what is expected of them, then they are in a better position to plan and organise their way to get there. It is also more motivating for many children if they know that the final outcome of the activity is likely to be. By having an achievable target, many especially motivated children will make great strides themselves.' Pg 56.

If assessments are shared with the class, the lower achievers are often seen as exactly that. In this situation they have the opportunity to see their improvement and feel positive about it before they tell everyone else. Indeed Boud (1995) reinforces this. He cites Broadfoot (1979) who argues that use of self-assessment can encourage 'less able' students by illustrating the mutuality of the teacher / student in the learning process. Use of self-assessment encourages children to have a good self-concept, by thinking positively about their learning. It helps the student to see that there is value in what they are doing and as a result take responsibility for their learning. Pg 17.

Consolidate learning

As Ellington, Percival and Race (1993) point out self-assessment gives the individual the opportunity to 'make sense of their learning experiences and of the feedback that they gain.' Pg 145. By reflecting on what they have learnt, the child has the opportunity to make links between the fragments of learning that they have and consolidate what they really know. Furthermore as Boud (1995) illustrates self-assessment also allows for more scope within teaching. It is obviously worrying to give children the opportunity to pursue their own learning if it cannot he consolidated at the end. Self-assessment provides the opportunity for teacher or student led learning which can be brought together and consolidated at the end. Pg 19.

More teacher time

If pupils keep their own records and assess their own efforts then the teacher will be freed up to spend more time setting targets with the children. Towler and Broadfoot (1992).

Academic Increase

In a Portugese study, Fontana and Fernandes (1994), showed that self assessment increases academic performance. They monitored two groups of children who had equal amounts of maths tuition on similar topics. By testing them at the beginning and end of a 20-week period they showed twice the increase in academic performance for the group that practiced self-assessment. They did, however, emphasis that as part of the self-assessment practice, they taught the group to understand the learning objectives and assessment criteria that were necessary.

Non Competitive

Klenowski (1996) in Stobbart and Gipps (1997) comment that self-assessment focuses the individual on what they are doing. It 'restricts' students thoughts to their own performance and not that of others. For it is their improvement that is their goal, other pupils have no bearing on that. Pg 18.

Summative Assessment

As part of the Education Reform Act this form of assessment is seen primarily as, 'a means of reporting pupils' levels of achievement.' Pg 45. Pollard (1990) So by sharing grades or other assessments over time, with children, parents or other interested parties, in the form of reports or simple oral feedback, is summative. It is supposed that linking summative and formative assessment, the teacher could monitor the children formatively over a period of time, using any appropriate method and share their assessments in a summative way. As Harlen et al (1992) comment, 'its prime purpose is not so much to influence teaching but to summarise information about the achievements of a pupil at a particular time.' Pg 222. To access the information that is to be reported Harlen (1991) suggests two distinct ways, 'summing up' and 'checking

up.' 'Summing up' is the analysis and presentation of data to interested parties, through records of formative assessments. 'Checking up' is the collection of new information about what the pupil can do at the end of the period of time, usually in the form of a test. However, whatever ways assessments are carried out, certain problems have been highlighted with any form of assessments.

Problems with assessment

The prejudicial aspects of assessment

Rowentree (1977) believes that assessment can be prejudicial. He states that, through assessments, children are given 'labels.' If a teacher gives credence to the assessment system, then by seeing a particular child's grades, they are making assumptions, possibly before they even meet them. Similarly, as Keddie (1971) illustrated, pupils within certain 'streams' are seen to have different expectations by their teachers. In Rowentree (1977) Pg 37.

Assessment as a 'self-fulfilling prophecy'

Wragg (2001) believes that examination can convince a child that they have a label. Irrespective of how hard they try they cannot get rid of this label and as a result, they aspire to reinforce their label. So once they attain their level, as reflected in their label, they believe that they can learn no more. Pg 27. As the children know what their level will be, because of their label, their assessment is, a 'self fulfilling prophecy.' Using the same term, Insel and Jacobson (1975) in Rowentree (1977), state that once a child knows what the teacher thinks of them, they will perform accordingly. So once a child has been given a label, they will act to meet and reinforce this label, whether it matches their actual ability or not. In a similar vain to Insel and Jacobsen (1975) they believe that once a child knows that they are being observed they can change their behaviour to reinforce or contest the teachers expectations. They call this the Hawthorne Effect. Pg 40.

However Wragg (2001) goes further to state that assessments can not only affect children whilst at school, but later into life. As we saw children do not always see or

appreciate how assessments are carried out. An assessment that is deemed to be unfair by a child, can leave them with a sense of prejudice. As Wragg (2001) states, it,

> 'can leave a deep and long lasting sense of resentment, which people are still able to recall and recount with bitterness well into adult life.' Pg 29

Indeed as Satterly (1989) states, assessments have an effect on two important 'expectancies,' one of which regards how children see themselves. Pg 26. So, the teacher's assessments and testing can influence a child's self-concept and in the early development of the self-concept, affect the child, causing a greater negative self-image. Therefore, by way of conclusion, certain researchers and educationalists express concerns about the way in which assessments effect how children see themselves.

The effects of assessment on the nature of learning

Research can show that use of assessments, in particular examinations, can encourage a form of learning that is not particularly desirable or effective. Boud (1995) states that research on traditional assessments has shown:

- Assessments focus on areas that are easy to assess which leads to an emphasis of memory or lower level skills (Black 1969)
- Assessments encourage children and teachers to focus on areas that are to be assessed at the expense of those that are not. (Elton and Laurillard 1979)
- Assessments influence the nature of the learning (Ramsden 1998b)
- Students give precedence to assessments that are graded. (Becker et al 1968) Pg 38.

Satterly (1989) expands this criticism of the way in which children learn when faced with assessments. He believes that by gaining 'the knack of test taking,' or practicing for a test, teachers are inhibiting the development of other skills. Pg 30. Furthermore, that by 'teaching to the test,' we do not see an accurate representation of the child's achievement in an assessment. What we do see, however, is how successful they are at taking a test. Pg 30. Satterly (1989) however, believes that tests mould the curriculum of the school and inhibit the teachers from developing a curriculum that reflects the children's interests. Pg 28. Indeed, if a teacher has to teach a set curriculum for a test, they cannot digress until the children have successfully learnt the necessary information. (Which is usually two weeks after the test date !)

In an excellent parallel to examinations and assessment, Rowentree (1977) likens them to a courtroom. An individual is summoned to trial for an offence. However, they do not know the precise nature of the offence. They arrive at the court-room only to find it empty, save for a tape recorder and instructions to defend themselves against the charge. Once recorded, their plea for innocence will be heard by a group of unknown individuals. They will hear of their fate, once decided, in due course. Pg 57. Although this is an extreme example it mirrors perfectly the uncertain nature of some examinations and assessments. What Rowentree (1977) is showing that unless the reasons for the testing and the objectives against which the assessments are matched are shared with the children, then they will not understand what is going on.

Bureaucracy

Perhaps the most potent side to the bureaucratic aspect of assessment is the political importance that it has now achieved. As Governmental success is measured by increases in test scores, assessments have gained a very important emphasis for both schools and government alike. As Wragg (2001) points out pupils progress in assessments have become a political issue and a lever to criticise the party in power. He cites league tables as a perfect example of this. Pg 16.

So to counter the problems that research has shown regarding assessments, assessments should demonstrate the following desirable characteristics:

Validity

Ellington et al (1993) define validity in terms of the extent to which an assessment assesses what it is supposed to assess. The activity that is undertaken to make the assessment should be, 'one which accurately measures the behaviour described by the objectives under scrutiny.' Pg 123. Whilst Murphy (ed) (1991) comments that to aid students, the conditions of assessment should mirror the students actual working conditions. To this end he believes that objectives for each year group do not translate well from year to year. By mirroring working conditions and creating truer 'generic' assessment tasks this will bypass the need for specific year group objectives and show true development from year to year. Pg 101.

Reliability

Essentially an assessment, if it is to be effective, needs to possess few flaws in its implementation. Wragg (2001) believes that this consideration should begin with the construction of the activity to ensure that all its elements measure the same objective and do not cause any conflict. Pg 22. Whilst Lambert and Lines (2000) believe that we should extend the reliability of assessments to cover not only the child that is being assessed but, the assessor themselves. Pg 10. With in-school assessments, it would be prudent for the teacher to consult school based levelled work to ensure that they are 'in-line' with their assessments. Whilst external assessments are moderated and screened to ensure work is marked in accordance with guidelines.

Fairness

Ellington et al (1993) believe that if an assessment is to be fair then it must reflect the objectives of the course. Murphy (Ed) (1991) states that an assessment should not disadvantage an individual because of the language that is involved. Essentially, if a test is for Science, then it should test a child's science knowledge and not their ability to read. Pg 102. Indeed this could be extended to the social aspect of language. That is to say that an assessment should not disadvantage someone because to understand it a child has to be a member of a certain social class or ethnic group.

Usefulness

'All assessment should be undertaken primarily to aid students.' Murphy (Ed) (1991) Pg 103. No assessments should be undertaken merely for the sake of it. If it does not help the child, then it is not useful. As Ellington et al (1993) state, an assessment is only useful if the teacher and child engage in sufficient feedback and discussion to engender development. Pg 123. To this end Eisner (1993) believes that the teachers and children need to reflect not only the outcome of the test but be able to analyse how each problem was solved. For it is only then that they will really see true understanding. So therefore to be effective for both teacher and pupil, assessment should be;

Integral

As Ellington et al (1993) state assessments need to be,

> ' a continuous part of the teaching and learning process, involving pupils, wherever possible, as well as teacher in identifying next steps.' Pg 123.

Murphy (ed) (1991) extends this belief by stating that assessment should be simple, natural and, 'on the fly, as part of an individuals natural engagement in the learning situation.' Pg 100.

Communicative

Assessments are not as effective if their results are 'the property' of the teacher. As we have seen, they should be shared and analysed with the children. However as Harlen et al (1992) comment, assessments should equally be communicated effectively with parents. They argue that once the parents are aware of the needs of their children then they will be able to support their learning. Pg 219.

Practicable

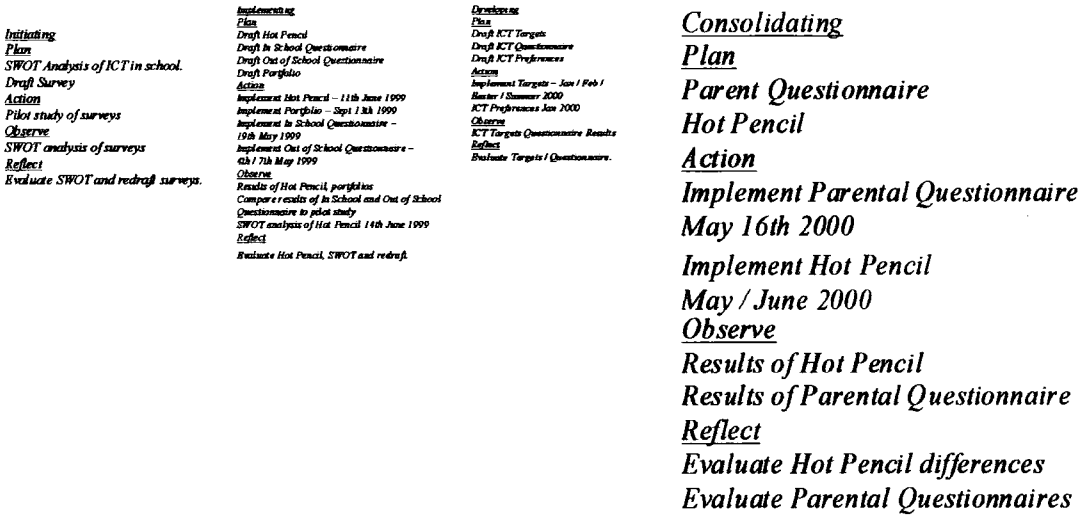
Yet amongst all of these desirable characteristics for assessment, Ellington et al (1993) point out that we must not forget the practicability of assessments. Cost, time taken and ease of use all need to be taken into consideration when considering which form of assessment is most useful. These considerations need to be weighed up against the others and a 'best fit' achieved.

An idyllic picture of the use of assessment in education is one that meets the needs of children, teachers and government, one which is not obtrusive or false, but useful yet simple. Unfortunately, the bottom line with assessment in education is that it is statutory and certain statutory elements, if taken at face value, do not match this idyllic picture. Whether teachers agree with this or not is unlikely to change national practices. What is up for discussion is the method of assessment that teachers use. It requires individuals, with the support of their schools to be innovative with their assessments so that their methods ease the teacher's workload and improve the successful learning process for the child. Yet whilst still meeting the governmental requirements for assessment. When we consider the benefits of such an approach to assessment, then this goal is definitely worthwhile.

What does this literature review tell us ?

In terms of this research, assessment was identified as one of the apparent tensions that existed within the sphere of ICT in education. (See Introduction) But as was highlighted in the introduction, time for meaningful assessment is limited and time for children assessing themselves is similarly scarce. Therefore it was one of the goals of the implementation of an ICT portfolio to ease this tension and create opportunities for assessment that fulfilled the assessment requirements for both pupil and teacher.

Cycle Four – Crossing barriers to ICT improvement.



Lewin and Kemmis cite the fourth element of an action research cycle as reflecting or reflection whilst Elliott and Ebbut cite it as monitoring. In McNiff (1988) Pg 23 – 33. Irrespective of the vocabulary used, they are eluding to the purpose of the final process within the action research cycle. Kemmis and McTaggart (1988) see with a dual purpose. Primarily the last process should be reflective, evaluating, asking,

> 'action researchers to weigh their experience- to judge whether effects (and issues which arose) were desirable, and suggest ways of proceeding.' Pg 13.

But equally the process should be descriptive,

> 'it allows reconnaissance, building a more vivid picture of life and work in the situation, constraints on action and more importantly, of what might now be possible.' Pg 14.

So effectively whilst the purpose of this part of the action research cycle is to evaluate, looking back on what has been done, it should equally be a time to look forward and suggest where to go next.

Within cycle three, the children were given more independence to work within their portfolio. They were given the opportunity to choose work from their portfolio to complete for homework. At first they were given some guidance but as the time progressed they were

encouraged to pick their own tasks and complete them independently. Equally the onus was placed upon the children to keep their portfolio up to date within the classroom and enter their own work in when brought in from home. To monitor the process a task questionnaire was implemented. This evaluated the children's approaches to their homework and the problems that they encountered.

The rational of the fourth cycle of research was then;

To further evaluate the children's attitude and approach to ICT.

Having used the portfolio for a full two terms, the children had been 'exposed' to a different way of developing and using ICT skills and knowledge. As Grace (1992) illustrates use of portfolios can have wide ranging consequences. Grace states that,

> ' use of portfolios can stimulate a shift in classroom practices and education practices towards schooling that more fully meets the range of children's developmental needs.'

Therefore any resulting change in their attitudes and approach to ICT had to be investigated. The In School, Out of School Questionnaires would provide some detail of the children's changing perceptions but would provide little scope for unstructured reflection on their ICT thoughts. So to compliment these surveys, the Hot Pencil sheets were reintroduced and some ICT work evaluations were carried out with the children.

To generate data to support the findings from the child based questionnaires.

So far the research tools had very much been very 'child based.' Although a lot of the points that had been thrown up by the research tools were very interesting, they lacked the support of another party. To address this a questionnaire was sent to the children's parents. This would give a further set of evidence with which the children's ideas could be compared.

Parent Questionnaire (See Appendix 19 to reference Parent Questionnaire)

The Parent Questionnaire was drafted during May 2000, then sent to the parents of both Year 3 and Year 4 (the target class) during the June of that year. It drew certain question themes from the In School and Out of School questionnaires that had been used with the children throughout the study. That is to say, this questionnaire, like the child-based questionnaires, asked the parents general questions relating to the computer that they had at home, the problems that their children encountered using the computer and who solved these problems. Essentially this was to confirm the results that had been analysed from the Out of School questionnaire that the children answered.

The main purpose of the questionnaire, however, was three-fold.

To ask the parents to gauge their child's ICT development over the year.

The research that had been carried out to date showed some evidence of development of the children's ICT skills during the period that they used the ICT portfolios. However by asking the parents opinions it would be interesting to see if they had noticed a change in relation to their childs ICT use over the year. Equally, Merttens and Newland (1996) Pg 18 point out this would provide some feedback on how many parents had been instrumental in 'providing much needed support,' for their children when involved in ICT work. Whilst some children are generally honest and admit to the support that they receive, this could confirm or deny the results that have been returned from the children's questionnaires.

To provide a snapshot of a 'control' group.

By using the questionnaire with the parents of both Year Three and Year Four classes there would be two sets of comparative results. As the Year Four class had worked with the portfolio and the Year Three class hadn't, a form of control was being introduced into the research. The results would provide a control group against which any development or changes could be gauged.

To gain further data relating to the target class in relation to other children within the school.

When implementing the ICT portfolio, it was evident that there was variety in the children's approaches to ICT work. Tapscott (1998) pointed out that, 'the older generations are uneasy about the new technology which kids are embracing.' Pg 48. Although this is a generalisation it does illustrate that some parents will be wary of their children becoming 'too familiar' with ICT. The questionnaire was then an attempt to provide further answers as to the home background of each child and the influence that that may have on the children's attitudes towards ICT.

As a result of this rationale, the rest of the questions within the parent questionnaire focused on;

- How many people used the computer in the home and their relationship to the child.
- The parents perceptions of the childs frequency of computer use and the activities that they were engaged in.
- The parents perceptions of the change in the childs computer use, problem solving skills and approach to homework over that year.
- How the parents allow their children to use the computer.

Whilst an age difference existed between the children, it was considered that it would not affect the questionnaire returns significantly. Essentially, the parents were being asked about changes to their children's ICT behaviour. Such behaviour, it was felt, would not be affected so much by age, but more by the effect of the research.

The questionnaires were returned by the end of the academic year and analysed by noting the parents responses to the questions on a large sheet, noting areas of commonality.

Hot Pencil (See Appendix 6 to reference Hot Pencil Sheet)

The Hot Pencil review sheets that had been carried out in cycle two of the research were very useful in collecting rich data about the children's perceptions of all aspects of school. However because of their very nature, they were time consuming and their use had to be limited. As a result, the review sheets were stopped after a month's use at the beginning of term. However, what this meant was that by this point the Hot Pencil review sheets had

recorded qualitative data about / from the children about their perceptions of school; at the end of their school year 1998-1999 and at the beginning of their school year 1999 – 2000. So it was decided that by using the Hot Pencil sheets again at the end of the school year 1999 – 2000, there would be a rounded picture of the children's developing attitudes towards and perceptions of school. This would also give a picture of the children's attitudes before, during and after the implementation of the ICT portfolio. As a result, the Hot Pencil review sheets were implemented for five weeks, from May to June 2000. To collect the results, areas of commonality were highlighted on the children's sheets and were then collated on a sheet.

Results.

ICT Parent Questionnaire (See Appendix 20 to reference Parent Questionnaire Results).

Once the Parent Questionnaires were analysed, the following could be concluded;

*From the 22 **returns from the** Y3 parents.*

20 of the households have a computer with a CD ROM, however only 15 of the returns said that they had access to the internet. 10 of the computers were bought for parents use, and are used by 3 or 4 people in a communal part of the house. Equally 9 of parents perceive that the children use the computer 2-3 times a week using games or word processing software to write, colour, desk top publish or play games. The parents perceive that they allow their children to use the computer when they ask or when they want. However they are unsure as to whether their children's use of the computer has increased over the year, whether their approach to ICT homework or solving ICT problems has changed. The parents main problems with software have been the purchasing and installing of programmes whilst they have had no main problems with hardware or internet use. On the whole the majority of hardware and software problems are solved by the parent or sibling of the child. The parents perceive that it is the minority of children that solve their own problems.

From the 26 returns from the Y4 parents.

25 of the households have a computer with a CDROM and internet access. 11 of the parents bought their computer for business use, whilst 17 put it in a communal part of the house, where 3 or 4 people use it. The majority of the parents perceive that their children use the computer 2 or 3 times a week, using games, word processing or research pieces of software to word process, desk top publish, surf the internet or play games. The parents also perceive that they can use the computer, equally, when they want or when they ask. But 7 do mention that this use has to be shared with their siblings. The majority of parents perceive that their children's computer has increased over the year, however one parent did comment that this could be due to more computer homework ! However only 6 of the parents think that their children are keen to do and indeed only 5 enjoy ICT homework. However 2 of parents did comment that their children needed increased help because of the homework. Moreover 11 of the parents did comment that they thought that their children had started to solve more of their problems themselves. The majority of parents have had no main problems with software, hardware or internet use. However when their children do have problems, the parent or sibling of the child solves them. 9 of the parents perceived that their children solve their own problems.

What this shows when comparing the Year Three to Year Four class.

To analyse the similarities and differences between the Year Three and Year Four responses the questions with pertinent results were converted into percentages to show a comparison of different return amounts.

1. More Year Four children have the computer in a communal part of the house. (Y3 – 54%, Y4 – 65%) (Binomial Test, $p<0.0001$), where it is used by the whole family, including the parents for leisure and business use.

2. Year Four children have more internet access. (Y3 – 68%, Y4 – 96%) (Binomial Test, $p<0.0039$).

3. Year Four parents perceive;

- An increase in computer use when Year Three parents make little mention of it. (Y3 – 7%, Y4 – 46%) (Binomial Test, $p<0.0001$). The year four parents comment that in relation to computer use, their children; 'always want to spend longer,' spend 'more short spells with a purpose' and 'more independent time, not just on games.'

- That their children have a more positive attitude towards homework than the Year Three children. (Y3 – 13%, Y4 – 42%) (Binomial Test, $p<0.0003$). Moreover five parents commented that their children were capable of managing themselves.

- Increased independence when solving problems with almost one half of returned questionnaires stating that the children solved their own problems. (Y3 – 4%, Y4 – 42%) (Binomial Test, $p<0.0001$). Indeed when responding to a question as to who helps with software and hardware problems in the house, a greater number of Year four parents cited their children as 'self helpers.' (Software Y3 – 13%, Y4 – 34%) (Software - Binomial Test, $p<0.0057$.) (Hardware Y3 – 4%, Y4 – 30%) (Hardware - Binomial Test, $p<0.0001$.)

- A greater use of generic pieces of software. More Year four parents mention their children's use of Word (Y3 – 21%, Y4 – 46%) (Binomial Test, $p<0.0303$), the internet (Y3 – 8%, Y4 – 23%) (Binomial Test, $p<0.0265$) and reference material (Y3 – 4%, Y4 – 26%) (Binomial Test, $p<0.0001$).

- A greater application of these pieces of software in word processing and desk top publishing tasks (Y3 – 26%, Y4 – 39%) (Binomial Test, $p<0.0172$), and games ! (Y3 – 18%, Y4 – 38%) (Binomial Test, $p<0.0037$).

Hot Pencil (See Appendix 21 to reference full Hot Pencil Results)

From the last five Hot Pencil reviews the following themes were collated;
(The references in brackets relate to the child's name and date of the reference.)

Learning – It was interesting that the children made a lot of references to what they had learnt. Some references were simplistic, referring more to what they had done. 'How to work better at maths' (19/5/00 JS) 'To play rounders better.' (27.5.00 CW) However some were far more subject specific, making reference to what could be called the objectives of the lesson. 'That the baseball bat hits the ball the longest.' (19.5.00 ES) 'How many beats there are in a word.' (27/5/00 RF) 'How to swim backwards with one float.' (23/6/00 MH) 'That you can do a divide sum a different way.' (23/6/00 SD) 'About Cragside house and the Power Circuit.' (23/6/00 MH)

Time – The children are conscious of the lack of time that they have in their school day. ' If we had had more time to write.'(9/6/00 JS) 'Better if we had more time.' (23/6/00 LS)

Motivation – The children were motivated by reward and placed a lot of emphasis on their marks / scores in a test. 'the best bit was getting 10/10.'(27/5/00 FK) 'The best bit was getting the spellings right.' (27.5.00 SM) 'The best bit was when I got 55/55.' (23/6/00 RF) Moreover that they like to be singled out, to perceive that they are 'the best.' 'I was the only one who got mine all right.' (9/6/00RF) 'I wasn't out during the whole game.' (16/6/00 JS)

Perspiration ! - No matter how hard a teacher works to plan a school trip, there is no guarantee that the children will be interested in what you want them to be. 'The best bit was the ducks at Lunch.' (23/6/00 SM)

Where this takes us

With reference to some of the initial research questions we can see that from the research within this cycle, further tentative but relevant points have been highlighted.

1. Increasing children's ICT confidence. / Children increasing their ICT independence.

- Who helps the children solve problems at home and school ?

It appears, primarily, that Parents perceive that their children do not solve their own ICT problems. Within the Parent Questionnaire the parents cite both themselves and their child's siblings as the main computer problem solvers. However when asked to comment on how the problems that their child faced had changed over the year, 1/3 of the Year Four parents commented that their children now solved their own problems. It could be suggested that this tells us that it is only the minority of children that solve their own problems whilst the rest rely on support from their family.

- Which ICT tasks do children enjoy / dislike ?
- What ICT work do children do at home and at school ?

The majority of parents' perceive that the children do activities beyond those of game playing. Most cite a mixture of word processing, desk top publishing, fact finding and, of course, game playing. Some mention specific programmes that their children use. Once we look beyond the generic pieces of software, such as Word or Publisher, only the Year Four parents mention that their children use software that has been used in school.

- What would motivate children to use ICT in and out of school ?

It is interesting that the half of the year four parents stated that their children enjoyed doing the ICT homework that they had set for themselves through their portfolio. When asked to comment on the time that their children spent on the computer, 1/2 of the Year Four parents said that their child's ICT time had increased. Indeed this was clarified with comments that equally illustrated their child's increased interest and motivation towards ICT tasks.

- What are the parents perceptions of their children's ICT use ?

Here we see a divided picture between Years Three and Four. The general feel of the returns from the Year Three parents seems to portray a picture of ICT use that is rather unstructured and generally rather unfocused. They appear to perceive that there is no real structure and therefore no real purpose to the activities that their children are involved in. Equally this could illustrate that the parents are not as involved with their children's ICT

work as the Year Four parents. For this set of parents are far more specific about what their children are doing and how their children are involved with their ICT tasks. Obviously this is initially as a result of the ICT tasks that they have been involved in.

Overall Results and Conclusion

Overall Results

The main crux of the research was the implementation of the ICT portfolio and the development of the children's use of this learning tool. The children were given a more focussed ICT curriculum within an ICT portfolio. Then through the classroom use of this portfolio and focussed tasks to complete at home, it was hoped that beneficial changes within the children's ICT use would result. Furthermore more onus was placed upon the children to be responsible for their work and its organisation within the portfolio. Again, it was hoped that this would result in changes to the way that they viewed and used their ICT knowledge. To this end once the research was completed, analysis of the many surveys and questionnaires ensued. Through analysis returns from parents and children, what was evident, was that changes had occurred in a number of dimensions;

Independence.

Child (1977) points out that, 'the way an individual perceives himself influences they way he behaves in interactions with his physical and social environment.' Pg 219. Through the implementation of the portfolio-based approach to ICT, it was hoped that there would be a change in the way the children felt about their own ICT ability and consequently their self-concept. It was felt that if a child were more confident about their own ability then they would be more independent. Burns (1982) suggests 6 approaches to increasing a child's self-concept that bear relevance to the use of this ICT portfolio in particular.

1. Make pupils feel supported by the teacher. – When the portfolio was initially introduced to the children they were guided and shown what to do. The activities that they were engaged in were chosen by the teacher to be simple to complete and draw on skills that the children already had. This teacher support was very structured to begin with. As the children's use of the ICT portfolio developed, the teacher support was slowly withdrawn. Obviously the support that the children needed varied. Indeed in some cases, the children needed help right until the end of the study. But none the less, although teacher support was made available if the children required it, there was a steady reduction in direction from the teacher over time. As Vygotsky (1987) stated,

> 'what lies in the zone of proximal development at one stage is realized and moves to the level of actual development at the second. In other words what the child is able to do in collaboration today (he or she) will be able to do tomorrow.' Pg 211.

Thus as we have seen, children acquire the necessary skills to have their teachers support reduced over time.

2. Make pupils feel responsible beings. – The portfolio was the responsibility of the children. To begin with, the children had little control over the activities that they were engaged in, but they still were responsible for *their* portfolio. They had to enter the work into the portfolio. They had to ensure that they kept the record of their work up to date. However, with the introduction of the ICT homework tasks, the children were then equally responsible for choosing the tasks to complete at home. They were then responsible for the completion of the work. Indeed if they didn't understand how to complete the work, the onus was put onto them to find out how to complete the task.

3. Make pupils feel competent. – In essence, this is similar to the first approach regarding teacher support. The portfolio was organised in such a way as to provide initial success, through easy activities, so that the children felt that they could achieve the required standard. Furthermore, the curriculum was organised to cover the majority of generic skills within the classroom so that when the children began to choose their own activities to complete at home over the period of the year, they had some of the necessary skills. Thus the teacher was 'scaffolding' the students experience. By providing such support, the teacher was engendering success for the students. As Ward and Tiessen (1997) state,

> 'scaffolding of student activities is provided to support and constrain student activities to those which are likely to be educationally profitable.' Pg 22

Therefore, in this instance, the portfolio, scaffolded the childrens learning to promote their successes at home.

4. Teach pupils to set realistic goals. – Through discussion, each child, chose activities that met their level of competence. With a wide range of activities within the portfolio, each child would be able to develop their own 'learning path.'

5. Help pupils to evaluate themselves rationally. – At all stages the objectives of activities were displayed and discussed. By encouraging the children to use and be aware of the objectives, then it will be easier for them to see if they have been successful in completing an activity. To this end, objectives for each current ICT activity were displayed and work with relevant objectives was kept on view as a benchmark for performance.

6. Encourage realistic self-praise. – Again, by increasing the childrens awareness of the objectives of the work that they are doing, a child will have a raised awareness of whether their work justifies praise or not. Within the portfolio, each child had to check the work that they had completed, reinforcing their success and the objectives. Then for a complete set of work, a merit award, which was part of the schools reward scheme, was awarded. In effect, praise was given, where praise was due.

Therefore with reference to changes in the children's independence, analysis of the research showed;

At School – An increase in self-help and self-encouragement.

Table 1A, B and C highlights the individual that encourages a child to carry out an ICT task. As is evident in table 1B, at the beginning of the research the In School Survey revealed that the children did not engage in self-motivation or self-encouragement. As the majority thought, that when given a choice of teacher, partner or self to provide encouragement, they placed the self as last. However the results from the final survey indicated that two thirds of the class, from a sample of 30, now regarded themselves as the main or 2nd person to provide encouragement with an ICT task.

Table 1A - In School Survey B3 – Who were you encouraged by ? – Teacher

	19.5.99	19.6.99	20.10.99	1.2.00	12.7.00	Total
1	15	11	22	22	19	89
2	6	8	3	3	6	26
3	3	5	2	4	5	19
No response	6	6	3	1	0	16

Table 1B – In School Survey B3 – Who were you encouraged by ? – Self

	19.5.99	19.6.99	20.10.99	1.2.00	12.7.00	Total
1	3	4	1	2	5	15
2	8	7	7	10	14	46

3	13	13	19	17	11	73
No response	6	6	3	1	0	16

Table 1C - In School Survey B3 - Who were you encouraged by ? - Partner

	19.5.99	**19.6.99**	**20.10.99**	**1.2.00**	**12.7.00**	**Total**
1	6	9	4	5	6	30
2	9	9	17	8	11	54
3	8	6	6	16	13	49
No response	6	6	3	1	0	16

The above results were collapsed illustrating only who was highlighted as the 1st and second choice of who helped the children.

Table 1D - Analysis of 1st and second choices.

	19.5.99	**12.7.00**
Self	11	19
Other	36	42

Pupils believe that they are the main or second most significant person to encourage them with their ICT tasks in school. (Binomial Test, $p<0.0001$).

Furthermore, the results indicated a change in the children's perceptions of who helps them most with ICT tasks. Tables 2A - 2F highlight the individual that the children believe helps them the most with ICT tasks. Table 2A illustrates that the teacher remained the main helper throughout the study. However in table 2B the 'self' steadily increased during the course of the study. The results of the final In School Survey showed that 21 children, from a possible 30 thought that they were 2nd or 3rd to provide the most help.

Table 2 A - In School Survey B 5 - Who helped you most ? - Teacher

	19.5.99	**19.7.99**	**20.10.99**	**1.2.00**	**12.7.00**	**Total**
1	23	6	11	19	25	84
2	0	0	4	4	3	11
3	0	2	1	4	1	8
4	0	1	4	0	1	6
5	0	1	0	1	0	2
6	0	0	0	1	0	1
No response	7	20	5	1	0	33

Table 2 B - In School Survey B 5 - Who helped you most ? - Self

	19.5.99	**19.7.99**	**20.10.99**	**1.2.00**	**12.7.00**	**Total**

1	5	1	0	2	0	8
2	0	3	3	5	11	22
3	0	1	4	5	10	20
4	0	0	4	7	2	13
5	0	2	9	9	5	25
6	0	2	5	1	2	10
No response	25	20	5	1	0	51

Table 2 C - In School Survey B 5 - Who helped you most ? - Partner

	19.5.99	**19.7.99**	**20.10.99**	**1.2.00**	**12.7.00**	**Total**
1	1	1	0	2	3	7
2	0	1	4	10	8	23
3	0	2	7	9	14	32
4	0	3	9	8	2	22
5	0	2	2	0	3	7
6	0	1	3	0	0	4
No response	29	20	5	1	0	55

Table 2 D - In School Survey B 5 - Who helped you most ? – Other Pupil

	19.5.99	**19.7.99**	**20.10.99**	**1.2.00**	**12.7.00**	**Total**
1	1	1	1	3	3	9
2	0	3	6	6	4	19
3	0	2	5	9	2	18
4	0	2	5	4	19	30
5	0	1	4	5	2	12
6	0	1	4	2	0	7
No response	29	20	5	1	0	55

Table 2 E - In School Survey B 5 - Who helped you most ? - Computer Help

	19.5.99	**19.7.99**	**20.10.99**	**1.2.00**	**12.7.00**	**Total**
1	0	0	0	0	0	0
2	0	1	1	2	0	4
3	0	1	4	1	2	8
4	0	4	3	5	3	15
5	0	3	6	7	11	27
6	0	1	11	14	14	40
No response	30	20	5	1	0	56

Table 2 F - In School Survey B 5 - Who helped you most ? - Teachers Instructions

	19.5.99	**19.7.99**	**20.10.99**	**1.2.00**	**12.7.00**	**Total**
1	0	2	9	6	0	17
2	0	1	7	1	3	12
3	0	2	3	1	2	8
4	0	0	0	5	4	9
5	0	0	2	5	8	15
6	0	5	4	11	13	33
No response	30	20	5	1	0	56

When collapsing the results, the low results in the first survey meant that this set had to be omitted. However, in using the next set of dates, the following compares the children's second and third choices of the 'self' helping against the other categories of who helps most.

Table 2G - Analysis of 2nd and 3rd choice.

	19.7.99	12.7.00
Self	4	24
Other	15	39

Pupils believe that they are the second or third most significant person to help them with their ICT tasks in school. (Binomial Test, $p<0.0001$).

At home - An increase in self-help and self-encouragement.

Similarly, analysis of the Out of School Survey showed an increase in the children 'helping themselves.' The children were asked specifically who helps with the computer? There were, in the first Surveys, mainly references to parents, siblings but no references to themselves. However, analysis of the final results showed that the number of children identifying themselves as helpers increased to 10, from a sample of 29. Table 3A illustrates which members of the family are seen as computer helpers.

Table 3a - Out of School Survey A9 - Who helps you with the computer ?

	Parents	Brothers	Sisters	Friends	Grandparents	Computer Help	Computer Book	On Line Help	Other Family	Self	Total
4/5/99	17	4	3	1	0	1	2	0	0	1	28
16/9/99	24	8	12	11	6	7	8	1	2	0	79
23/2/00	22	5	8	10	5	3	2	1	4	11	71
17/5/00	27	8	7	8	2	3	1	1	1	10	68

When comparing the 'self' to all the other categories, the following analysis was obtained.

Table 3b - Analysis of self as helper

	4.5.99	17.5.00
Self	1	10

Other	28	57

The children increasingly identify themselves as a helper at home. (Binomial Test, $p<0.0344$)

Furthermore through the ICT Target Survey, a sample of 30 children were asked to identify who helped most with their ICT problems (Q4) and tasks (Q5). Tables 4A and 4B show who helps with computer tasks and problems at home.

Table 4a - ICT Target 4 - Who helps you with the problems ?

	Dad	**Nobody**	**NR**	**Myself**	**Mam**	**Sister**	**Grandad**	**Computer**	**Brother**	**Aunty**	**Total**
5/1/00	6	12	2	2	1	1	0	0	0	0	24
6/3/00	2	6	14	1	0	1	1	0	0	0	27
5/5/00	8	12	0	3	0	1	1	1	0	0	26
4/6/00	9	7	6	3	9	0	0	0	0	0	34

Table 4b - ICT Target 5 - Who helps you with the tasks?

	Dad	**Nobody**	**NR**	**Myself**	**Mam**	**Sister**	**Friend**	**Aunty**	**Grandparents**	**Aunty**	**Total**
5/1/00	5	12	2	2	5	3	0	0	0	0	29
6/3/00	2	7	14	2	4	1	0	0	0	0	30
5/5/00	11	0	0	6	7	10	0	0	0	0	34
4/6/00	10	0	6	7	10	1	1	0	0	0	35

As Tables 4a and 4b show, the number of children identifying themselves as the main helper with ICT tasks increased from 2 to 7.

When collapsing these results, comparison was made between references to the 'self' as the main helper and other categories.

Table 4C - Analysis of self

	5.1.00	**4.6.00**	**Total**
Self	2	7	9
Other	27	28	55

The children increasingly identify themselves as the main helper at home. (Binomial test, $p<0.0007$)

The lack of similar results for question 4 regarding the helper of ICT problems urged more analysis. The children had identified 'no-one,' as the main helper. It could be said that this suggests that they solved their own problems and had, 'no-one' to help. Indeed support for this point of view was found, when the parents were questioned, through the Parent ICT Survey. They were asked to comment on how the problems that their child faced with ICT had changed over the year. (Parent ICT Survey 4d) One third of the parents within the Year Four class stated that their child solved their own problems. One parent commented, 'because the printer at home is broken, Christopher is now able to save onto floppy disk,' (21) whilst another, 'he is now more of an IT natural than the rest of us – He helps to solve our problems.' (22) However one parent was more cautious, 'William tries more to solve problems, but a little bit of knowledge is a dangerous thing.' (29)

However most encouraging was the way in which the children perceived that they learned their new skills. Through the ICT Portfolio Questionnaire, the children were asked to choose one statement that was indicative of the way that they had learnt their new skills. From the list of alternatives which indicated either independent or supported ICT use, 19 children chose either, 'I tried myself and solved my own problems' or 'I tried myself and asked when I had a problem.' This 'have a go' attitude was indicative of the general increase in the independence that could be seen.

Activities

For O'Hagan (1986) in Coleman (1998) empowerment in education is about, 'providing people with knowledge and skills which allow them to struggle for, and gain power for themselves.' Pg 36 At the beginning of the study, it wasn't surprising that the majority of the children saw the computer merely as a games machine. Through the Out of School Questionnaire, as seen in Table 5, a sample of 29 children identified that they used the computer almost solely to play games.

Table 5 - Out of School ICT A7b - Programs Mentioned

	Educational	Game	No response	Total
4/5/99	3	19	7	29
16/9/99	7	18	2	27
23/2/00	13	13	1	27

17/5/00	15	10	4	29

It was hoped that by implementing the portfolio, the children would be able to see what activities they could use the computer for. It was hoped that in some way by using their skills and engaging in different ICT activities, they would see what they were capable of. This empowerment was in no way to be restrictive, by, for example, making the children use only educational software. Its aim was to give the children a view of a wide range of possibilities. To this end analysis of the research illustrated changes in the childrens use of ICT with regards to the following factors;

Software – An increase in the use of educational software.

The children were asked to identify the types of software that they used in one computer session, the results can be seen in table 5.

To ease analysis, the children were classified as using 'game' or 'educational' software depending on the type of software that they mentioned most. Indeed, as table 6 shows, to begin with, only 3 children mentioned educational software whilst the other 19 stated that they only used game based software. However by the end of the study the balance had changed to show that 15 children used mainly educational software and 10 mainly used game software.

When a comparison is made between the game and educational software, the following is apparent.

Table 6 B - Analysis of software

	4.5.99	**17.5.00**	**Total**
Educational	3	19	22
Games	15	10	25
Total	18	29	47

There is an increase in the number of children that use educational software and a decrease in the use of games. (Chi-square = 10.64, p is less than or equal to 0.01, df = 1)

Similarly when the 22 parents of Year Three and 26 of Year Four were asked to comment on the software that their children used there was a definite difference between the two classes. (Parent ICT Survey Q4b) The Year Four parents made more

reference to their children using Word, reference material and the Internet. Similarly when the parents commented on the computer tasks that their children engaged in the Year Four parents mentioned more use of generic software for word processing and desk top publishing. (Parent ICT Survey Q4c) Indeed a far greater number of the Year Four parents mentioned specific pieces of software such as Kid Pix, Castle Explorer or Mighty Maths. This suggested that they had had experience of the software or had been plagued to buy it !

Time – An increase in quality time spent working with ICT.

When asked how long they spent for one ICT session, the 29 children, in the Out of School Questionnaire, showed an increase in the time spent, as table 7 shows below.

Table 7A - Out of School ICT A6 - How long do you use the computer during the week ?

	1hr+	1hr	50mins	40mins	30mins	less30 mins	No Response	Total
4/5/99	10	4	2	0	5	6	0	27
16/9/99	15	2	0	0	4	4	2	27
23/2/00	17	3	0	1	4	3	1	29
17/5/00	17	1	1	0	5	2	2	28
Total	59	10	3	1	18	15	5	111

To collapse these results, comparisons were made between the children that used more than 50 minutes and 40 minutes or less.

Table 7 B - Analysis of time spent

	4.5.99	17.5.00
1hr +	10	17
1hr or less	17	11

More children spend a longer amount of time on the computer. (Chi-square = 3.083, p is less than or equal to 0.10, df = 1) However one half of parents did notice an increase in the time that the children spent on the computer. The following comments were indicative of the fact that this increase was 'quality' time; 'More independent work, not just games,' 'short spells with a purpose.'

Activity Selection – From entertainment to engagement..

Table 8 illustrates that at the beginning of the study the main reason that the 30 children enjoyed their ICT work was because it was fun.

Table 8A - In School Survey A4a - Why did you enjoy it the most ?

	19.5.99	19.7.99	20.10.99	1.2.00	12.7.00	Total
Fun	8	8	9	20	16	61
Find things out	2	2	0	0	0	4
Like Learning	0	0	5	1	0	6
Helps Me	0	0	5	1	0	6
Like subjects	2	1	2	0	3	8

Similarly when the ICT homework tasks were set, the children said, to begin with, that the main reason that they chose a particular activity was that it was fun. However by the end of the Fourth set of homework the childrens ideas had changed ! The element of fun decreased and the children chose the activities because they were interesting.

By comparing the references to fun and the references to other categories, the following analysis can be made.

Table 8B -Analysis of enjoyment

	19.5.99	20.10.99	Total
Fun	8	9	17
Interest	2	12	14

Whilst children still enjoy their ICT work, they are also developing an interest the task itself. (Chi-square = 3.77358943577431, p is less than or equal to 0.10, df = 1)

Difficulty of the chosen task – An increase in the difficulty of the tasks chosen.

The children chose simple activities for the first set of ICT homework that they were engaged in. Activities such as making cards, lists, instructions, poems, stories or letters, it could be said, provide the security and simplicity that they needed. However as the time progressed, the majority of the children began to pick more difficult activities, which required more independent thought and more application and learning of skills.

Activities such as changing clip art, changing and printing information from a database and listing favourite web addresses required far more involved thought and skill.

Instrumental versus conceptual development..

There is no doubt that the current generation of children use computers in their everyday lives. As Tapscott (1998) states, 'they are so bathed in bits that they think technology is part of the landscape.' Pg 7 Teachers could be excused for thinking that such individuals would not need as much tuition to develop at the same rate as other subjects, such as Maths for instance. Indeed Harel (1998) argues that, part of the culture of the new generation is that 'Learning is cool.' So with a group of children who should and could learn what is the problem for educators ?

The crux of the problem lies with their understanding. Whilst children have no difficulty actually carrying out certain activities, jumping through the necessary hoops to complete the task, it could be said that their main downfall, as a group, will be the transferral and development of their skills and the purpose of the activities. In short, it is felt, that they develop effective techniques without developing true understanding. Effectively the children are lacking the direction that their learning objectives, learning goals would provide. As Murphy (1991) points out,

> 'pupils have to understand the goals of their learning so that they can judge their own progress against them.' Pg 126

So without an understanding of what has to be attained and the criteria against which success is to be judged, their learning will lack the focus that helps them to develop as independent learners, understanding. With this in mind, analysis of the research showed a change in the following aspects of children's performance;

Language – A change towards ICT based language.

The analysis of the survey results showed that the children had developed an increased ability to express themselves using ICT terms, over the period of the study. One simple illustration of this involved them identifying the problems that they had encountered. (ISS Q6) At the beginning of the study, the main problems were printing and saving. However by the end of the study 'printing' had elaborated to; 'the wrong driver,'

'pressing the wrong buttons,' 'a slow printer,' 'not turning it on first' or 'the paper was jammed.' (ISS Q6 1/2/00) Similarly loading had been elaborated to include, 'saving into the wrong folder' or 'saving and loading images from a disk.' (ISS Q6 1/2/00)

Activities – An increased knowledge of the purpose of the activity that they are involved in.

At the beginning of the study, the question, *What was the programme for ?*, threw all the children. (In School Survey QB6) It seemed to be incomprehensible that the activity that they were involved in should actually have a purpose. Indeed it was only towards the end of the study that the children actually began to return answers to the question on the questionnaire. In the final survey, the children stated that they had used the programme for; sensing, making a web page, making a newspaper article and research. But what was more pleasing was the number of children that understood the sensing and web page activities. By answering in this way 23 children out of 30 showed that they understood why they had completed these activities.

Learning – An increased knowledge of what has been learnt.

Similarly when the children were asked, as part of the In School Survey, to note down what they had learnt, the commonest responses, initially, mentioned how to save, print and load. (In School Survey 19/5/99 Q7) Obviously this reflected their lack of understanding of the purpose of the activity that they were involved in. By the end of the study the children said that they had, made a web page, saving and loading images from disk, added gifs into Publisher. (In School Survey 12/7/00 Q7) Thus illustrating that they understood not only what they did, but what they had learnt.

Other Contributing factors.

It was felt that whilst it would be lovely to believe that the ICT portfolio brought about these changes on its own, some light should be shed on the other elements that are considered to have contributed. On the whole, it was felt that all of the following elements are part of a classroom 'culture.' They are elements of a classroom culture that focuses on and includes ICT in every possible facet of the classroom curriculum and classroom life.

Time spent – ICT was given priority as a subject in its own right. In the context of a school that didn't have an ICT suite and where ICT wasn't taught as a subject. Every day ICT was 'down graded,' it became a subject that 'hosted' others. We looked for ICT in English, Maths and other subjects. However, it was felt that there should be a refocus of the priority of ICT. In essence, we should have been looking for Maths in ICT, Geography in ICT. To this end, within this classroom ICT was presented as a worthwhile, stand alone subject. The children were given quality time to spend on the computer by flexing and reviewing their priorities. If we take an example of a Literacy or Numeracy lesson, this would illustrate how this was implemented;

Within the current National Curriculum and the associated National Literacy and Numeracy Strategies, it is suggested that children use the classroom computer only for the duration of the independent work part of the lesson. In a 'standard' literacy or numeracy lesson this corresponds to approximately 20 minutes. Moreover, it is also suggested, that the ICT work should link directly with the subject that is being taught. For example if, in Maths, you teach fractions, then time, then subtraction, in one week, then the teacher has to find relevant ICT tasks to match this. However, within this classroom, the children who were 'on' the computer, participated in the first part of the lesson. This 'shared' session covers the most important elements of the lesson which once completed allowed the children the next hour or so, to work on an ICT activity. Effectively, they had had a 'potted' lesson and still had quality ICT time. Obviously with more time and more emphasis placed upon the expected quality of their work, the resulting completed tasks are far more reflective of what the children can do.

Discussion – Nothing is set in stone, everything is open for discussion and can easily be reviewed. In the classroom, the children were made aware of this. They knew that if they had an idea that they thought would improve a process, they would suggest it and it would be discussed. An example of this was the way in which the children went on the computer. The class, at the beginning of the year, went on alphabetically. The children believed that this wasn't fair, so they came up with different systems from a reverse of the alphabet, to alphabetical order of first names, the first and last in the register, the middle of the register, clockwise order around the classroom and so on. What was important was that the children felt that they had a legitimate voice.

Teachers Enthusiasm – All too often it is the teacher that 'kills' ICT use within the classroom. In this instance the teacher's enthusiasm for and drive to see development in ICT was beneficial.

Developing skills – Before the children were 'set off' to undertake an ICT task at home, they were taught the basic skills. They learnt, through class lessons, generic skills that would help them with their task. To a certain extent, they were given the skills to complete the task. However it was the application of those skills that was interesting. Vygotsky (1978) defines the Zone of Proximal development as,

> 'the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers.' Pg 86

Therefore in this instance, the teacher was bridging the gap between the actual and potential level of development. He was providing support initially then a challenge to 'test' their level of application of these new skills.

Teachers Instruction and Objectives – At the beginning of the research, when the children were introduced to a particular activity on the computer, the teacher provided a set of instructions, which detailed how to perform the task. This freed the teacher to spend time with other children, not just explaining how to complete the task. It also encouraged the children to think in a logical order, using specifically ICT language. Furthermore, with each activity came a set of objectives for that activity. The objectives were regularly used as part of the classroom discussion and were referred to specifically

when discussing the portfolio. Such use of the objectives helped the children to see what they were doing not just how to do it.

Teachers ICT language – It was felt that children have a vast capacity to learn. If they are to be taught complex terminology in Maths and English, then why not in ICT? The objectives were expressed using ICT relevant terms and the children were encouraged to use them in their discussions. One example of the culmination of this came at the end of the academic year. Having used a DTP programme called Page Plus, the children were discussing how they were going to carry out a particular task, when a computer fault reoccurred. With no screen to round off the discussion, the process was illustrated using a pen and a white board. When the computer was fixed most of the children completed the activity with few problems.

Overall, as a resume of the changes that occurred, the result of implementing the portfolio-based approach to ICT within the school context can be seen through the following dimensions; The children that were involved in the project showed an increase in their independence, becoming, on the whole, more responsible and competent through their ICT work with the support of the teacher, the portfolio and their peers. They developed a more positive approach to their ICT tasks and showed that they could be more self-supporting both at home and at school. As a result of this they demonstrated a change in their approach to ICT work. That is to say that they focused on individual, increasingly difficult tasks for longer periods of time. Furthermore, that through these tasks they showed that they were beginning to see the interconnectedness of their learning, through the application of their learnt ICT skills, knowledge, understanding and language.

Conclusion

The study began as a result of a set of tensions that were apparent within the researcher's sphere of ICT in education. More specifically, these restrictions were;

- *The restriction of the Literacy and Numeracy Hour,* that the structure of the morning sessions can easily stifle and restrict the use of ICT.
- *The off white heat of technology,* ' referring to the big discrepancies between what promises are made of ICT use in education and what is delivered.
- *The need for assessment,* which illustrated the difficulties that teachers face in balancing meaningful, valuable assessment with their workload.

These tensions were then confirmed and expanded by an ICT SWOT analysis of children's Home and School ICT use. In typical action research style, the problem begged a solution and the researcher began to develop and use tools to address this deficit. Of those tools, the following are worth mention and evaluation.

Action Research

Such a form of classroom research was essential. Within the sphere of the busy primary classroom it is very difficult, if not impossible for the teacher / researcher to 'take a step back,' or indeed for them to make objective scientific analysis. By its very nature, action research demands that the researcher is part of the focus, that they are directly involved. Essentially it accepts that the researcher and their perceptions are an important part of the context. But equally importantly it accepts that there is no need to control the research context, ie the classroom. Moreover, having identified problems that need to be addressed, the action researcher doesn't need to find solutions to 'universal truths' but an answer to solve their problem. This, effectively, is what the action research allows. As each cycle unfolded, the research turned different corners, different ideas were revealed. To address this, a variety of tools were developed. In each instance, the developing research was piecing together a solution to the overall problem.

Hot Pencil

This element of the research was particularly important for two reasons. Firstly, with reference to the need for assessment, this form of evaluation gives children some of the necessary experience to meaningfully assess their learning. By asking them to think about what they have learnt, which elements they enjoyed or didn't and why, what they want to do again, we are asking them assess their learning in a very structured way. The skills that they use for such an evaluation obviously bear great relevance to further, more detailed assessment of their curricular subjects. Secondly, this tool bore great relevance for the teacher. It is quite rare that teachers get to see what their children really think about their learning - and not just their learning but also their everyday feelings and thoughts. Essentially it provides a most valuable picture for the teacher and allows them to really adapt their teaching to meet the needs of the children.

Portfolio

Above all, the main tool that was implemented within the research was the Portfolio based curriculum. In essence, this brought about a style of teaching and learning that is illustrated by;

- A portfolio based approach to teaching and learning.
- An objectives driven curriculum.
- Simple, uncluttered provision of a curriculum for the children and the teacher.
- Children involved in choosing, negotiating and evaluating their learning tasks.
- Tasks sent home so that, the children's skills can be applied and developed, so that parents can become involved in their learning tasks.

As the research has shown, by using this portfolio-based approach to ICT, the majority of the children within the test class showed a change in their approach and attitude towards ICT. Most important of all was the change that they showed in their approach to learning, illustrating that they could apply their skills more widely and effectively learn for themselves. Furthermore, they showed that there was an increase in self-reliance, focussing not on others for help and support but themselves.

In addition to this, the implementation and use of the portfolio also engendered a variety of other benefits;

- Teacher guidance.

It is difficult within Primary Education for teachers to be inventive and innovative with every subject. Due to the fact that they are teaching 9 or more subjects, there are great constraints on their time and energies. As a result, there will always be subjects that are not delivered as well as the others. By providing a simple set of objectives and activities, the teacher is given a 'concentrated' scheme of work. This approach cuts out a lot of the unnecessary paper and reading, freeing up more time for actual preparation and teaching.

- A better curriculum.

Whilst certain published curriculums, QCA for example, save a lot of time and are helpful they still have shortfalls, which can be challenged by the approach to ICT that this study implemented;

Published Schemes.	ICT Portfolio.
They can be driven by activities and not objectives. Activity based schemes can be prescriptive and thus restrictive.	By focussing on objectives it is far easier to be creative. Objectives can be fulfilled through lots of different activities. The teacher and indeed the children are allowed far more flexibility and adaptability. They can use 'their curriculum' and not an imposed one.
They can be seen to isolate the activity and not encourage interconnected learning.	By focussing on the objectives that are the focus for the children's learning, opportunities can be created to flex the curriculum and provide more relevant educational experiences to this group of students. If subjects are taught in isolation, then they can stay isolated within the child's mind. If the teacher tries to connect all the relevant strands of learning then the child is likely to develop 'Higher order knowledge' in the Vygotsky sense.
They can be designed for use by the	Such an approach provides a structure that

teacher alone.	the teacher teaches from and the child learns with. Its design can be relatively simple and encourages the children to use it and organise it themselves.
Assessment can be an added extra and not an integral to the scheme.	Assessment is created as the children progress through their ICT tasks. The assessment is an integral part of the process. Equally it is something that the children can be involved in, if not indeed feel a sense of ownership for.

- Changes in classroom practice.

If a portfolio is used in the way that has been suggested within this study, then it appears to be very effective in changing the way in which a subject is delivered. By using a portfolio the teacher is effectively agreeing that children should have more control of their learning. They are agreeing that their children should have a valued voice and that discussion about learning is healthy and necessary. All of these elements can promote a classroom environment in which negotiation is the key process.

- Homework.

Homework raises a number of challenges. The teacher attempts to balance the child's purposeful activity with the extra marking and evaluation that will ensue once the activity is finished. To simplify this problem, the portfolio provides an excellent balance between child driven activities and teacher guidance. Marking and evaluation can equally be split between the child and the teacher. But above all such work can be far more purposeful and long reaching with a definite goal at the end. It equally gives the children a sense of ownership. They are given an element of choice which can be a highly motivating factor.

- Parental Involvement.

An obvious side effect of the children taking work home was that their parents became involved in the work. It could be said that parents will not become involved if they feel

that the work is not purposeful. Traditionally homework has been targeted towards Maths and English. However by setting ICT based homework, it gives the work credibility and purpose, it raises its importance in the eyes of the parents. To this end, they become more involved, support their children more and in some respects became aware of, then value their child's ability more. Equally they are also, then, more able to understand the ICT goals that the school aims to achieve.

- Breadth of activities.

The portfolio encourages the children to participate in a wide range of ICT activities. It shows the children the wide range of the activities that can be achieved using ICT. This encourages some children to develop their ICT use at home beyond that of game playing to include a wider range of activities. As a result of this, they are realising more of the potential of their home computer and developing their skills.

However with such perceived benefits there will inevitably be problems;

- Time

It was felt that a lot of the time was lost within the 'first run' of this type of ICT portfolio. The organisation of the children's homework, entry of that work into the portfolio and checking off of objectives within the portfolio all took time. And whilst it was time well spent, it did encroach into other subject time. This would only really become a concern, if once this approach was used again, it still took a long time.

- School based approach.

Obviously following on from the previous perceived problem, any development of new skills or approaches cannot be carried out in the isolation of one classroom. If such an approach were adopted school wide, then the time element would decrease, as the process would become second nature to the children. This would create benefits in terms of coherence for the children. But as with a lot of new methods, the main hurdle, within a school, is convincing the teachers that it is worthwhile. Due to the fact that a lot of new methods are 'imposed' by government, then anything else is often seen as too

much. To get an ICT portfolio to happen on a large scale, then obviously we need estimates of how much time is required.

- Teacher guidance.

Whilst it is all very well to provide minimal paperwork, it is recognised that some teachers will need more explanation. They may not understand certain activities or certain terminology. To this end written explanations could be provided. However it would be far easier if the teacher could rely on the knowledge of the ICT co-ordinator within the school to solve their problems. This obviously places restrictions on the time of the ICT co-ordinator and raises questions as to whether the ICT co-ordinator can cope with such demands.

- Dilution of the approach.

Following on from the previous perceived problem, any initiative that is implemented within a school is liable to be subject to changes within individual classrooms. The teachers enthusiasm can either inhibit or promote the individual initiative. To this end, it would be beneficial to actively promote monitoring of the approach and provide checks to ensure continuity.

- Children in control.

Inevitably if the whole school adopts the portfolio-based approach to ICT, then the children will very quickly become used to this approach. As a result, there will need to be some way of giving over more control of their choice of activities to the children. Perhaps one way would be to provide more spaces within the activities section for the children to choose their own activities to match the set objectives.

So the study ended with a great deal of ICT development within the research context. By addressing the tensions, the research had introduced a different approach to teaching ICT. It had begun to shift emphasis from the teacher to the child, giving elements of choice and control. It had supported and extended all children where necessary. It focussed the children on their ICT tasks and began to break down the traditional schoolwork, homework definitions. Overall such a portfolio based ICT curriculum

increased the children's ICT independence. Independence was shown not only in terms of their skills, knowledge and language, but also in their sheer tenacity when faced with a problem.

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Appendices

School ICT SWOT Analysis - Appendix One

		In School					At Home		
	Strengths	Weaknesses	Opportunities	Threats		Strengths	Weaknesses	Opportunities	Threats
Games	4	3	5	0		7	1	9	2
history	3	0	0	0		1	0	0	0
Problems	0	4	0	14*		0	9	0	12
Internet	1	1	1	0		3	0	4	0
Hardware	1	3	1	0		1	1	0	1
Software	5	8	9	2		9	4	7	0
Helpers	1	2	0	0		0	0	0	0
Different Computers	0	0	0	1		0	0	0	0
More Computers	0	1	4	0		0	0	0	0
Partner Work	0	0	0	1		0	0	0	0
Don't have to write	2	0	0	0		0	0	0	0
You do it not just talk	1	0	0	0		0	0	0	0
Progs for girls and boys	0	0	0	0		0	0	0	0
Time to load	0	4	1	0		0	0	0	0

*Problems
Printing
Crashing
Pressing Wrong Thing
Break Something
Don't Know what to do
Unsave work
Shutting down

Appendix Two - In School ICT Use Questionaire

Section A : Write your answers in the spaces provided

1. Roughly how many times per week do you use the computer ? ____ times per week.

2. On average how long did you use the computer for ? _____ hr(s) _____ min(s) per week.

3. Please fill in the information about the computer programmes that you used in school:

Name of the programme	What you used it for
1.	
2.	
3.	
4.	
5.	

4. The computer programme / work that I enjoyed doing the most was number ____ above.
Why did you enjoy it ?

5. The computer programme / work that I enjoyed doing the least was number ____ above.
Why did you not enjoy it ?

6. What problems have you had using the computer ?

7. How have you felt when using the computer ?

8. What have you learned to do using the computers ?

Section B Please tick the appropriate answer in the space provided.

1. In school I mainly used an Acorn Computer ____
PC Computer ____
E Mate computer ____

Appendix Two - In School ICT Use Questionaire

2. Did you mostly work.... Alone ____

With a partner ____
In a group of 3-4 ____
In a group of 5-6 ____
In a group of more than 6 ____

3a. Rate who encourages you to work on the computer ?Use 1 for the person who encourages you the most and 3 for the person who encourages you the least.

Teacher ____ Self ____ Partner____

3b. Does anyone else in school encourage you to work on the computer ?

_____

4. Rate which of these usually encourages you to work on the computer. Use 1 for what encourages you the most up to 5 for what encourages you the least.

a. My work would be finished quicker on the computer ____

b. My work would be neater if I used the computer ____

c. My work would be more accurate if I used the computer ____

d. I would enjoy the work more if I used the computer ____

e. My work would be easier if I used the computer ____

f. Other (Please specify) _____

_____ ____

5. Rate whose instructions helped you with these problems ?
Use 1 for the instructions that helped the most up to 5 for the Instructions that helped the least.

Teacher ____
Self ____
Partner ____
Other pupil ____
Computer help ____
Teachers Instructions ____

Appendix Three - Out of School ICT Questionnaire

Section A - About You.

1. Do you have a computer at home ? Yes No

2. Do you have a games console (Playstation,SNES) at home ? Yes No

3. Does your computer have a CD ROM ? Yes No

4. Is your computer connected to the internet ? Yes No

5. Rate how often you use each type of computer work using :-

1 – every day 2 – 2 or 3 days a week 3 – Once a week 4 - Once a month 5 - Never

a. Basic Computer Skills eg. Saving, printing, loading ____

b. Word Processing eg. Writing stories, letters, making posters ____

c. Spreadsheets – using numbers on the computer ____

d. Database – graphs / CD Rom – researching information ____

e. Internet eg. Surfing the web, sending E mails. ____

f. Games – eg. Either educational or for fun. ____

g. Creative work – drawing, making pictures, music ____

h. Other _____ ____

6. How long do you use the computer for each time ?During the week ____ hr(s) ____min(s)

At the weekend ____ hr(s) ____min(s)

7. In a typical computer session, how many programmes will you use ? On average I use ____ programmes.

Which programmes are they ? 1_____2_____3. _____

4. _____5. _____

8. My favourite programme is number ____ above. Why is this your favourite programme ?

9. If you have problems circle <u>all</u> the people that help you with the computer ?

Appendix Three - Out of School ICT Questionnaire

Parent(s) Brother(s) Self Sister(s) Other Family

Friends Grandparent(s) Computer help Computer book / magazine

On line help

10. What sorts of things do they help you with ?

11. Rate where you use the computer the most? Home _____School_____Friends _____

Use 1 for the most and 3 for the least.

Section B – About the people at home.

Rate how often each person uses each type of computer work using :-
1 – every day 2 – 2 or 3 days a week 3 – Once a week 4 - Once a month 5 - Never

	Mum	Dad	Brother(s)	Sister(s)	Friend	Grand parent(s)
Basic Computer Skills eg. Saving, printing, loading						
Word Processing eg. Writing stories, letters, making posters						
Spreadsheets – using numbers on the computer						
Database – graphs / CD Rom – researching information						
Internet eg. Surfing the web, sending E mails.						
Games – eg. Either educational or for fun.						

Appendix Three - Out of School ICT Questionnaire

Creative work - Drawing, making pictures, music						
Other						
How long do they use the computer for each time ?	___hr(s) ___min(s)	___hr(s) ___min(s)	___hr(s) ___min(s)	___hr(s) ___min(s)	___hr(s) ___min(s)	___hr(s) ___min(s)

ICT In School Survey Results - Appendix 4

In School ICT Results

		19.5.99
A1. How often did you use the computer ?	0	3
	1	19
	2	3
	3	0
	4	1
2. How often did you use the computer ?	10	2
	20	0
	30	6
	40	1
	50	13
	1hr	0
	1hr+	2
	1hr30+	3
	NR	0

3a. Programmes Used.

Rivers	2	Egyptians	19	Max	2	Writing	1
MutliMedia	7	Landmarks	13	Encyclopedia	7	Tea Party	1
Word Processor	7	Arc Venture II	13	Word Pro	13		
Logo	9	Map Skills	9	Castles	1		

ICT In School Survey Results - Appendix 4

3b. What programmes are used for ?	Finding Out	9	Looking	1	Writing	10	Digging	3	Game	4
	Copying work	3	Learn maps	5	Learning more	1	Finding Treas.	3	Making Shapes	4
4a. Enjoyed most	Landmarks	1	Logo	4	Egyptians	12	Arc Venture II	4		
	Multimedia	1	Castles	1	Word Pro	2	Encyclopedia	1		
Why	Drawing pics.	4	Tombs	7	Writing stories	2	Interesting	2		
	find out more	4	fun	3	Travel in time	5	Not much to do	1		
5a Enjoyed Least	Landmarks	5	Logo	2	Egyptians	1	Arc Venture II	1	Encyclopedia	1
	Word Pro	5	rivers	2	Map Skills	2	Word Processor	2	Tea party	1
	Multimedia	3								
Why	Dress a bear	1	Boring	7	write too much	1	Map Skills	1	Had to wait	1
	Was just game	1	Would go anyw.	2	Had no activities	1	Couldn't go there	1	Wasn't Fun	2
	Too complicated	1	More exciting	1	Don't like writing	3	Didn't do much	1		

ICT In School Survey Results - Appendix 4

6. Problems encountered.	Changing to capitals	1	Loading	2	Getting onto game	1	Shutting Down	2	Getting mouse to move	2
	None	1	Printing	7	Getting the frog	1	Saving	9		
7. How did you feel ?	Positive	22								
	Negative	14								
	NR	3								
8. What have you learned ?	Nothting	1	Do things	2	Load	2	Use Keyboard	1	Print	2
	Use computer	2	Egyptians	3	Things from past	1	Where sun sets	1	Spave	1
	What everything does	1	Interesting	1	Save	4	Not to press	1		

Section B.

1. Which computer maily worked on?	Acorn	5
	PC	21
	Emate	1
2. Who did you work with ?	Alone	1
	With Partner	25
	Group of 3-4	2
	Group of 5-6	1

ICT In School Survey Results - Appendix 4

3. Encouraged by who ?	Teacher		
		1	27
		2	2
		3	0
		NR	0
	Self		
		1	4
		2	8
		3	17
		NR	0
	Partner		
		1	2
		2	7
		3	10
		NR	0
4. Which of these encourages you ?	finished quicker		
		1	13
		2	0
		3	0
		4	0
		5	0
	NR		16
	Neater		
		1	23
		2	0
		3	0
		4	0
		5	0
	NR		6

ICT In School Survey Results - Appendix 4

4. Which of these encourages you ?	More Accurate	
	1	13
	2	0
	3	0
	4	0
	5	0
	NR	16
	Enjoy More	
	1	18
	2	0
	3	0
	4	0
	5	0
	NR	11
	Easier	
	1	6
	2	0
	3	0
	4	0
	5	0
	NR	23

ICT In School Survey Results - Appendix 4

Who helped you most.

Teacher		
	1	28
	2	0
	3	0
	4	0
	5	0
	6	0
	NR	1
Self		
	1	5
	2	0
	3	0
	4	0
	5	0
	6	0
	NR	24
Partner		
	1	13
	2	0
	3	0
	4	0
	5	0
	6	0
	NR	16

Who helped you most.

Other Pupil		
	1	12
	2	0
	3	0
	4	0
	5	0
	6	0
	NR	17
Comp Help		
	1	3
	2	0
	3	0
	4	0
	5	0
	6	0
	NR	26
Teachers Instr.		
	1	15
	2	0
	3	0
	4	0
	5	0
	6	0
	NR	14

Out of School Survey Results - Appendix 5

Section A

Full sample analysis of /29 in bold.

1. Do you have a computer at home ?	**Yes**	**No**
	26	**3**

2. Do you have a games console ?	**Yes**	**No**
	21	**8**

3. Does your computer have a CD ROM?	**Yes**	**No**
	22	**7**

4. Computer connected to the internet ?	**Yes**	**No**
	9	**20**

5. Often you use each type of comp work?	EveryDay	2/3 Days wk	Once wk	Once month	Never	NR
a.Basic Computer Skills	0	8	4	2	1	0
b.Word processing	1	5	5	4	0	0
c.Spreadsheets	0	1	5	3	6	0
d.Database	3	2	2	6	2	0
e. Internet	0	0	2	2	2	9
f. Games	6	9	0	0	0	0
g. Creative Work	0	0	0	0	0	15

6. How long use the computer - Weekdays	**1hr+**	**1hr**	**50mins**	**40mins**	**30mins**	**less 30mins**	**NR**
	3	**8**	**4**	**2**	**2**	**6**	**4**

6. How long use the computer - Weekend	**1hr+**	**1hr**	**50mins**	**40mins**	**30mins**	**less 30mins**	**NR**
	3	**8**	**4**	**2**	**2**	**6**	**4**

7. No of progs used in one comp session	**1**	**2**	**3**	**4**	**5**	**5+**
	5	**10**	**13**	**0**	**2**	**0**

Programmes Mentioned	**Educ Soft**	**Games**	**NR**
	12	**12**	**5**

Out of School Survey Results - Appendix 5

8. Why is this favourite game ?	Ref to fun	Ref to game	NR
	10	10	9

9. Who helps with the computer ?	Parents	Brothers	Sisters	Friends	Grandp	Comp help	Comp Book
	25	7	3	0	0	6	7

	On line help	Other Fam	Self
	3	0	0

10. What things do they help you with ?	Saving	Printing	Crashing	Connect/load	Other	NR	Maths
	6	4	5	6	8	0	0

11. Where do you use the computer most?	Home	School	Friends
1st	23	1	2
2nd	1	19	6
3rd	2	6	18

Section B

Often you use each type of comp work?	EveryDay	2/3 Days wk	Once wk	Once month	Never	NR
Mum						
a.Basic Computer Skills	1	7	3	0	4	0
Dad						
a.Basic Computer Skills	2	5	6	2	0	0
Brother						
a.Basic Computer Skills	1	7	1	1	1	4
Sister						
a.Basic Computer Skills	0	4	1	0	0	10
Friend						
a.Basic Computer Skills	0	1	2	4	7	1
Grandparent						
a.Basic Computer Skills	0	1	0	1	13	0
Mum						
b.Word Processing	1	5	3	3	3	0
Dad						
b.Word Processing	2	1	4	7	1	0
Brother						
b.Word Processing	0	1	6	3	1	4
Sister						
b.Word Processing	0	1	6	3	1	4

Out of School Survey Results - Appendix 5

Often you use each type of comp work?	EveryDay	2/3 Days wk	Once wk	Once month	Never	NR
Friend						
b.Word Processing	0	1	1	4	8	1
Grandparent						
b.Word Processing	0	0	1	1	13	1
Mum						
c.Spreadsheets	2	5	1	3	4	0
Dad						
c.Spreadsheets	4	1	3	3	4	0
Brother						
c.Spreadsheets	1	0	1	2	7	4
Sister						
c.Spreadsheets	0	0	1	0	4	10
Friend						
c.Spreadsheets	1	2	6	3	2	1
Grandparent						
c.Spreadsheets	0	0	1	1	12	1
Mum						
d.Database	2	5	1	3	4	0
Dad						
d.Database	1	3	4	5	2	0
Brother						
d.Database	1	2	2	2	5	0
Sister						
d.Database	1	2	0	1	1	10
Friend						
d.Database	0	1	0	1	10	3
Grandparent						
d.Database	0	0	0	0	2	13
Mum						
e.Internet	0	0	1	1	10	3
Dad						
e.Internet	1	2	1	1	7	3

Out of School Survey Results - Appendix 5

Often you use each type of comp work?	EveryDay	2/3 Days wk	Once wk	Once month	Never	NR
Brother e.Internet	7	0	0	2	2	4
Sister e.Internet	0	0	1	1	3	10
Friend e.Internet	0	1	0	1	10	3
Grandparent e.Internet	0	0	0	1	11	3
Mum f.Games	2	0	3	3	7	0
Dad f.Games	3	2	3	2	5	0
Brother f.Games	8	3	0	0	0	4
Sister f.Games	2	3	0	0	0	10
Friend f.Games	1	2	6	3	2	1
Grandparent f.Games	0	0	1	1	12	1
Mum g.Creative Work	0	0	0	0	0	15
Dad g.Creative Work	0	0	0	0	0	15
Brother g.Creative Work	0	0	0	0	0	15
Sister g.Creative Work	0	0	0	0	0	15
Friend g.Creative Work	0	0	0	0	0	15
Grandparent g.Creative Work	0	0	0	0	0	15

Out of School Survey Results - Appendix 5

Time Spent	1hr+	1hr	50mins	40mins	30mins	less 30mins
Mum	4	1	2	1	3	4
Dad	3	5	1	0	4	2
Brother	3	3	1	0	0	8
Sister	0	1	0	1	1	12
Friends	1	3	1	1	2	7
Grandparent	0	1	0	0	1	13

Hot Pencil Weekly Review

A : Write down the activities you remember doing this week

B : Put a tick next to the ones you chose to do.
C : Choose your favourite activities and write down what you did for each one.

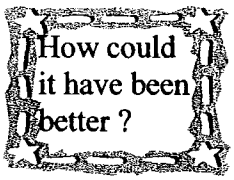
D: Write about the activity that you enjoyed the most.

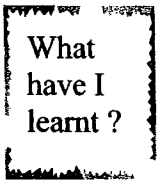
E: Write about the activity that you enjoyed the least.

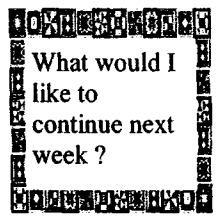
F : Write about what you would like to continue to do next week and why.

Hot Pencil Weekly Review

A : Write down the activities you remember doing this week







B : Use the ideas above to evaluate the activities that were important for you this week.

Learning the skills - Put a ring around the face when you can do a particular skill.	I can do this	Collecting the evidence Use all the skills to do these tasks. When completed ring the face, add the date and where you did it.	Date - Home (H) or School (S)
Database.			
- Change information in a saved database.	☺	Change print an existing set of data.	☺ _____
- Print lists / graphs from a database.	☺	Type out some questions using	☺ _____
- Create bar and line graphs.	☺	and for the data.	
- Use search questions with 'and.'	☺	_____	☺ _____
CD ROM			
- Explore the information on a CD ROM.	☺	Print text / pictures from a CD.	☺ _____
- Look for specific entries on a CD ROM.	☺	Evaluate a CD ROM.	☺ _____
- Print out information from a CD ROM.	☺	_____	☺ _____
Multimedia.			
- Include sound and video in an application with text and graphics.	☺	Make a written explanation of the	
- Recognise different medias in different applications.	☺	media you use in one application.	☺ _____
- Compose a piece of music.	☺	Print out your composition.	☺ _____
		_____	☺ _____
Control			
- Give and respond to movement instructions.	☺	Design a set of shape instructions.	☺ _____
- Transfer instructions from paper to screen.	☺	Make print the shape using logo.	☺ _____
- Make shapes on the screen.	☺	Print the instructions.	☺ _____
- Use procedures to make more complex shapes.	☺	Estimate angles, distances on	
- Estimate distance and angle sizes.	☺	other shapes.	☺ _____
		_____	

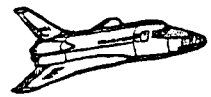
Appendix Seven - Year 4 Portfolio

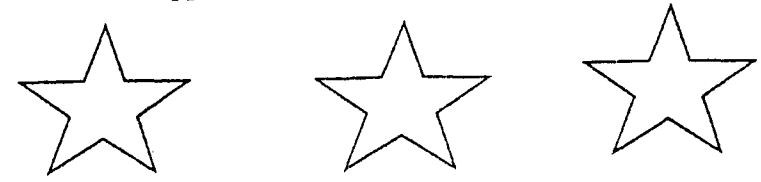
Learning the skills - Put a ring around the face when you can do a particular skill.	I can do this	Collecting the evidence Use all the skills to do these tasks. When completed ring the face, add the date and where you did it.	Date - Home (H) or School (S)
WWW			
- Be able to connect to the World Wide Web.	☺	Print a screen from a favourite	
- Be able to type in a WWW address.	☺	web site.	☺ _____
- Use a search engine for a complex search using and.	☺	Produce a list of your favourite	
- Compose / send and receive E Mails.		web sites.	☺ _____
		Print out an email that you	
		sent / received.	☺ _____
		_____	☺ _____
Spreadsheets			
- Undersatnd column and row references.	☺	Print out a spreadsheet.	☺ _____
- Include data in a spreadsheet.	☺		
- Use simple calculations.	☺	_____	☺ _____
Sensing / Data.			
- Record temperature changes using the computer.	☺	Temperature graph and data.	☺ _____
		_____	☺ _____
Graphics	☺	Print out some changed clipart.	☺ _____
- Make your own pictures and use them in your work.	☺	Print out a picture on a theme.	☺ _____
- Use painting effects and different textures.	☺	Copy the work of an artist.	☺ _____
- Alter existing clipart and reuse it.		_____	☺ _____

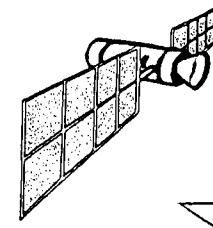
Appendix Seven - Year 4 Portfolio

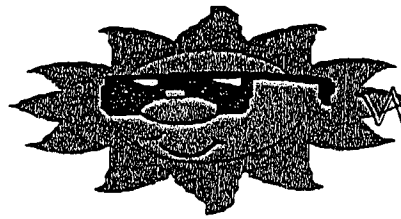
Learning the skills *- Put a ring around the face when you can do a particular skill.*	*I can do this*	*Collecting the evidence* *Use all the skills to do these tasks. When completed ring the face, add the date and where you did it.*	*Date* *- Home (H) or School (S)*
General skills. - You will use these skills in everything you do.			
- Load programmes and saved work.	☺		
- Save your work in the right place.	☺		
- Delete from disk and hard drive.	☺		
- Print out your work.	☺		
- Recgnise different file types.	☺		
Word Processing.			
- Change the font and size of the text.	☺	*Write a set of instructions.*	☺ _____
- Highlight text and move it around the page.	☺	*Write a story.*	☺ _____
- Centre, right and left align text.	☺	*Write a list.*	☺ _____
- Spell check and use the thesaurus.	☺	*Write a poem.*	☺ _____
- Check for and correct errors in your writing.	☺	_____	☺ _____
Desk Top Publishing			
- Combine your own pictures and text.	☺	*Make a newspaper article*	☺ _____
- Change the size and position of a picture.	☺	*Make a collage from clip art.*	☺ _____
- Use clip art in your work.	☺	*Make a greetings card.*	☺ _____
- Use boxes and borders in your work.	☺	_____	☺

Appendix Seven - Portfolio Reward Sheet

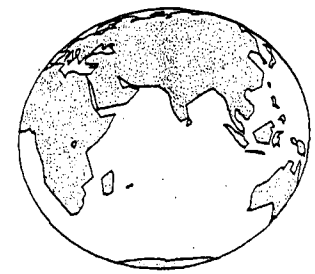








Have you completed a section ?
Brilliant, well done, you are really doing well.
Just write the name of the section that you have completed in a star and get the teacher to stamp it.
Keep going, you are a real star.



ICT In School Survey Results - Appendix 8

In School ICT Results

		19.5.99
A1. How often did you use the computer ?	0	6
	1	17
	2	7
	3	0
	4	0
2. How often did you use the computer ?	10	1
	20	3
	30	18
	40	0
	50	0
	1hr	0
	1hr+	4
	1hr30+	0
	NR	4
3a. Programmes Used.		ArcVenture
		27
		PaintBox
		23
		WordPro
		19
		Logo
		30
		Enclyclopedia
		1

ICT In School Survey Results - Appendix 8

		19.5.99
3b. What programmes are used for ?		NR
		0
4a. Enjoyed most ?		Arcventure
		21
	fun	8
	find things	2
	like learning	0
	helps me	0
	like subjects	2 (maths)
5a Enjoyed Least ?		History Encyc.
		10
		NR
		10
6. Problems encountered ?	Printing	5
	Saving	1
	None	7
	NR	5
	Errors	1
	Crashing	6
	Loading	8
7. How did you feel ?	Positive	24
	Negative	4
	NR	2

ICT In School Survey Results - Appendix 8

		19.5.99
8. What have you learned ?	NR	12
	Load	4
	Save	1
	Print	2
	Nothing	2
Section B.		
1. Which computer maily worked on?	Acorn	27
	PC	26
	Emate	0
2. Who did you work with ?	Alone	8
	With Partner	28
	Group of 3-4	4
	Group of 5-6	0
3. Encouraged by who ?	Teacher	
	1	15
	2	6
	3	3
	NR	6
	Self	
	1	3
	2	8
	3	13
	NR	6
	Partner	
	1	6
	2	9
	3	8
	NR	6

ICT In School Survey Results - Appendix 8

		19.5.99
4. Which of these encourages you ?	finished quicker	
	1	4
	2	1
	3	3
	4	0
	5	1
	NR	21
	Neater	
	1	3
	2	4
	3	1
	4	0
	5	1
	NR	21
	More Accurate	
	1	1
	2	0
	3	4
	4	2
	5	1
	NR	21
	Enjoy More	
	1	0
	2	4
	3	0
	4	3
	5	2
	NR	21
	Easier	
	1	0
	2	0
	3	2
	4	3
	5	3
	NR	21

ICT In School Survey Results - Appendix 8

		19.5.99
Who helped you most ?		
	Teacher	
	1	23
	2	0
	3	0
	4	0
	5	0
	6	0
	NR	7
	Self	
	1	5
	2	0
	3	0
	4	0
	5	0
	6	0
	NR	25
	Partner	
	1	1
	2	0
	3	0
	4	0
	5	0
	6	0
	NR	29
	Other Pupil	
	1	1
	2	0
	3	0
	4	0
	5	0
	6	0
	NR	29

		19.5.99
Who helped you most ?	Comp Help	
	1	0
	2	0
	3	0
	4	0
	5	0
	6	0
	NR	30
	Teachers Instr.	
	1	0
	2	0
	3	0
	4	0
	5	0
	6	0
	NR	30

Out of School Survey Results - Appendix 9

Section A
Full sample analysis /29 in bold.

1. Do you have a computer at home ?	**Yes**	**No**
	24	**5**

2. Do you have a games console ?	**Yes**	**No**
	20	**9**

3. Does your computer have a CD ROM?	**Yes**	**No**
	25	**4**

4. Computer connected to the internet ?	**Yes**	**No**
	11	**18**

5. Often you use each type of comp work?	EveryDay	2/3 Days wk	Once wk	Once month	Never	NR
a.Basic Computer Skills	1	5	1	0	3	0
b.Word processing	1	2	1	2	4	0
c.Spreadsheets	0	0	0	1	9	0
d.Database	0	2	2	1	5	0
e. Internet	1	1	1	0	7	0
f. Games	4	3	0	2	1	0
g. Creative Work	4	3	0	2	1	0

6. How long use the computer - Weekdays	**1hr+**	**1hr**	**50mins**	**40mins**	**30mins**	**less 30mins**	**NR**
	10	**4**	**2**	**0**	**5**	**6**	**2**

6. How long use the computer - Weekend	**1hr+**	**1hr**	**50mins**	**40mins**	**30mins**	**less 30mins**	**NR**
	10	**4**	**2**	**0**	**0**	**6**	**2**

7. No of progs used in one comp session	**1**	**2**	**3**	**4**	**5**	**5+**
	2	**5**	**7**	**4**	**5**	**0**

Programmes Mentioned	**Educ Soft**	**Games**	**NR**
	3	**19**	**7**

Out of School Survey Results - Appendix 9

8. Why is this favourite game ?	Ref to fun	Ref to game	NR
	8	10	11

9. Who helps with the computer ?	Parents	Brothers	Sisters	Friends	Grandp	Comp help	Comp Book
	17	4	3	1	0	1	2

	On line help	Other Fam	Self
	0	0	0

10. What things do they help you with ?	Saving	Printing	Crashing	Connect/load	Other	NR	Maths
	1	2	10	2	12	0	0

11. Where do you use the computer most?	Home	School	Friends
1st	24	1	2
2nd	1	16	10
3rd	2	10	15

Section B

Often you use each type of comp work?	EveryDay	2/3 Days wk	Once wk	Once month	Never	NR
Mum						
a.Basic Computer Skills	1	2	1	1	5	0
Dad						
a.Basic Computer Skills	3	2	0	1	4	0
Brother						
a.Basic Computer Skills	0	1	0	0	4	5
Sister						
a.Basic Computer Skills	2	2	1	1	2	2
Friend						
a.Basic Computer Skills	1	5	0	0	4	0
Grandparent						
a.Basic Computer Skills	1	0	0	0	8	1
Mum						
b.Word Processing	2	0	1	1	6	0
Dad						
b.Word Processing	2	0	1	1	6	0
Brother						
b.Word Processing	1	1	0	0	3	5

Out of School Survey Results - Appendix 9

Often you use each type of comp work?	EveryDay	2/3 Days wk	Once wk	Once month	Never	NR
Sister b.Word Processing	3	1	1	1	2	2
Friend b.Word Processing	0	2	1	1	6	0
Grandparent b.Word Processing	2	0	0	0	7	1
Mum c.Spreadsheets	1	1	1	0	0	7
Dad c.Spreadsheets	3	2	0	1	4	0
Brother c.Spreadsheets	1	0	0	0	4	5
Sister c.Spreadsheets	1	0	0	1	6	2
Friend c.Spreadsheets	0	0	0	0	1	9
Grandparent c.Spreadsheets	1	0	0	0	8	1
Mum d.Database	1	1	2	0	6	0
Dad d.Database	3	1	1	1	4	0
Brother d.Database	1	1	0	0	3	5
Sister d.Database	2	1	0	1	4	2
Friend d.Database	0	0	0	1	9	0
Grandparent d.Database	0	1	0	0	8	1
Mum e.Internet	0	0	0	0	10	0

Out of School Survey Results - Appendix 9

Often you use each type of comp work?	EveryDay	2/3 Days wk	Once wk	Once month	Never	NR
Dad e.Internet	1	0	0	0	9	0
Brother e.Internet	1	0	0	0	4	5
Sister e.Internet	2	0	0	1	5	2
Friend e.Internet	0	1	0	1	8	0
Grandparent e.Internet	0	0	0	0	9	1
Mum f.Games	0	1	2	2	5	0
Dad f.Games	3	0	2	3	2	0
Brother f.Games	2	0	0	0	3	5
Sister f.Games	3	4	0	1	0	2
Friend f.Games	3	4	1	1	1	0
Grandparent f.Games	0	0	0	2	7	1
Mum g.Creative Work	0	1	1	0	7	1
Dad g.Creative Work	2	1	1	0	5	1
Brother g.Creative Work	1	1	0	0	4	5
Sister g.Creative Work	2	2	0	1	3	3
Friend g.Creative Work	0	0	0	2	5	3
Grandparent g.Creative Work	0	0	0	0	8	2

Out of School Survey Results - Appendix 9

Time Spent	1hr+	1hr	50mins	40mins	30mins	less 30mins	NR/0
Mum	3	0	0	2	1	0	4
Dad	3	3	2	0	0	0	2
Brother	1	0	0	0	1	0	8
Sister	2	2	0	0	1	0	5
Friends	7	2	0	0	0	0	1
Grandparent	1	0	0	0	1	1	7

Hot Pencil SWOT Analysis

Y3 14/6/99

Strengths	Pictures make paper attractive / funny	5
	Spellings aren't important	3
	Helps you to write	1
Weaknesses	Its hard to write on the pencil picture	5
	Nowhere to put your name / date	5
	Its hard to think what to do	2
Opportunities	Move the picture to the corner	4
	You could colour the picture in	2
Threats	Too many lines	5
	Its hard to think of 10 things	2

Y4 14/6/99

Strengths	Pictures make paper attractive / funny	6
	Icons remind you of what to do	4
	Lots of lines so you can write more	1
Weaknesses	Its hard to write on the pencil picture	5
	The icons should be at the top	2
	Add a special space for the name / date	2
	Too many lines	1
Opportunities	Move the picture / icons to the corner / top	6
	Make the picture lighter	2
	Add lines for name and date	2
	Make separate questions	1
Threats	Too many lines	5
	Not enough lines	1
	Its hard to think of 10 things for that week	5

Portfolio SWOT Analysis

Strengths	Get to circle smiley faces	5
	Get Merits	5
	It reminds you which ones you have done	2
	You can choose which star to write on	1
	You can learn something	1
	You get to put a merit on the stars	1
Weaknesses	Don't understand some words	5
	Don't know what to do	1
Opportunities	Make the writing bigger	2
	Make the words easier	2
	Words could be described	1
	Adding more space	1
Threats	None	2

Appendix 12 - ICT Targets Sheet

ICT Tasks - I would like to try to . . . . .

1.

2.

3.

4.

ICT Tasks - I would like to try to . . . . .

1.

2.

3.

4.

ICT Targets Questionnaire Sheet

1 Which ICT pieces of evidence did you try to do over Easter ?

1

2

3

4

2. Write down which ICT tasks you completed and why you chose to do them.

1

2

3

4

3. Did you have any problems ?

4. Who helped with your problems ?

5. Who helped with your tasks ?

6. Which programmes did you use ?

ICT Preferences Questionnaire

For each of the programmes below write how you would prefer to work and why.
Use 1 for working alone, 2 for working in pairs, 3 for working in groups of 3 or more.

1. (PC) Mad about Maths ____
Why ?

2. (Acorn) Tudors ____
Why ?

3. (Acorn) Style ____
Why ?

4. (PC) Logo ____
Why ?

5. (Acorn) Prime Art ____
Why ?

6. (Acorn) Data Sweet____
Why ?

7. (PC) Castle Explorer ____
Why ?

8. (PC) Tudor CD Rom ____
Why ?

9. (PC) Page Plus ____
Why ?

Appendix 14 - ICT Preferences Questionnaire

Which sort of ICT work do you like doing . . . .

10. By Yourself.

11. In pairs.

12. In groups of 3 or more

13. Which is your favourite way of working and why ?

ICT Portfolio Questionnaire.

1. What I like about using the ICT Portfolio is . . . .

2. What I don't like about using the ICT Portfolio is . . . .

3. What do you think about getting ICT homework form your portfolio ? Why ?

4. Has your computer homework caused any problems . . . .
A) With the computer at home ?

B) With the people at home ?

5. A) How confident do you feel about using the computer at home ? (Circle all the feelings and write any others underneath.)

Confident Excited Scared Frightened
Nervous

B) Why do you feel like this ?

6. Which new skills have you learnt at home when doing the ICT homework ?

7. How did you learn these skills ?

a) Someone showed me then I did it myself.
b) I learnt by trying it myself and solving my own problems.
c) I learnt by reading a book / computer help
d) I learnt by trying myself and asking someone when I had a problem.

e) Other

_____

_____

8. Who helped you to learn these new skills ?

Mum Dad Brother Sister Self Computer book / help

Grandparent Online Help Other Family member

9. Can you think of anything that you now do on the computer that you didn't do before starting this ICT portfolio / homework ?

10. Is there anything that you don't understand about the ICT portfolio ?

11. How would you improve the ICT portfolio ?

ICT Target Questionnaire Results - Appendix 16

1.Which evidence ? 2. Completed ?	Evidence 05/01/2000	Completed 05/01/2000	Evidence 06/03/2000	Completed 06/03/2000	Evidence 05/05/2000	Completed 05/05/2000	Evidence 04/06/2000	Completed 04/06/2000
Card	12	7	2	2	2	0	2	1
List	20	12	8	3	6	6	1	0
Instructions	11	9	6	5	4	3	0	0
Poem	17	14	12	4	7	3	3	2
Story	18	15	4	0	8	6	2	0
Letter	2	2	0	0	0	0	0	0
Clip Art Collage	3	2	0	0	0	0	0	0
Print text/pics from CD	5	2	1	0	1	1	1	1
Print Screen from Wsite	4	2	4	3	10	9	7	6
News Article	4	2	9	5	1	1	2	1
None	0	2	1	0	0	0	1	1
Connect to the Inernet	0	0	1	1	0	0	0	0
Written exp of media in one app.	0	0	2	2	0	0	3	1
Change clipart	0	0	2	1	11	9	5	4
Print out email	0	0	2	1	3	3	2	1
Fact file	0	0	2	2	2	1	5	4
Evaluate Website	0	0	1	0	1	1	3	3
Change/print info in database	0	0	0	0	7	7	1	1
Ask questions about data	0	0	0	0	7	7	0	0
List favourite websites	0	0	1	1	9	9	1	1
Evaluate CD ROM	0	0	0	0	2	2	0	0

ICT Target Questionnaire Results - Appendix 16

2b Why did you choose to do it ?	05/01/2000	06/03/2000	05/05/2000	04/06/2000
Looked fun	11	9	14	4
Easy to do	8	0	8	6
NR	3	14	3	11
It is good	2	2	0	0
Exciting	1	0	0	0
Interesting	2	0	0	6
Looked at new CD ROM	1	0	0	0
Got the software	2	1	0	0
Like the subject	4	0	0	1
Sometimes Hard	1	0	0	0
Looked good	1	0	0	0
Because I know how	2	0	0	0
So I could fill the section	2	1	3	0
Nothing else to do	1	1	1	0
Because I had the idea	1	0	0	0
Ive never done it	1	1	1	1
It was a challenge	2	0	1	0
Wanted to write on the computer	0	1	0	0
Would get merit	0	4	0	0
Because ive got free net time	0	1	0	0
To raise my skills	0	1	1	0
Only ones to do without PC	0	0	1	0
I need a list for holiday	0	0	1	0
It would be the quickest	0	0	1	1
Mr Knox told me to	0	0	0	2

ICT Target Questionnaire Results - Appendix 16

3. Problems	05/01/2000	06/03/2000	05/05/2000	04/06/2000
Printer	7	3	0	6
Crashed	1	1	5	3
Loading programmes	1	0	0	0
Spellings	1	0	1	0
Saving	1	0	0	0
None	10	9	10	12
NR	2	15	0	4
Clip art	1	0	1	0
People on the computer	2	0	4	0
Millenium bug!	1	0	0	0
Screen Saver	1	0	0	0
Internet problems	0	1	2	0
Printing so I put it onto a floppy	0	0	1	0
Black ran out so I printed in colour	0	0	1	1
Couldn't find saved document	0	0	1	0

4. Who helped with problems ?	05/01/2000	06/03/2000	05/05/2000	04/06/2000
Dad	6	2	8	9
Nobody	12	6	12	7
NR	2	14	0	6
Myself	2	1	3	3
Mam	1	0	3	9
Sister	1	1	2	0
Grandad	0	1	0	0
Computer	0	1	1	0
Brother	0	0	1	0
Aunty	0	0	1	0
Pokemon Trading cards	0	0	1	0
Friends Mum	0	0	0	1

ICT Target Questionnaire Results - Appendix 16

5. Who helped with tasks ?	05/01/2000	06/03/2000	05/05/2000	04/06/2000
Dad	5	2	11	10
Nobody	12	7	0	0
NR	2	14	0	6
Myself	2	2	13	7
Mam	5	4	12	10
Sister	3	1	4	1
Friend	0	0	1	1
Aunty	0	0	1	0
Grandma	0	0	1	0
Grandad	0	0	1	0
Uncle	0	0	1	0

6. Programmes Used.	05/01/2000	06/03/2000	05/05/2000	04/06/2000
MS Word	12	8	18	10
Abode Page Maker	1	1	0	1
Emate	3	1	0	0
NR	2	0	0	7
Clip Art	2	0	0	2
Encarta	3	2	2	3
Freelance Graphics	1	0	3	0
Word Pro	3	2	1	0
Gretacard	1	1	0	0
Internet Explorer	1	3	7	4
Foot Words	0	1	0	0
Creative Writer	0	1	0	0
Kids Encyclopedia	0	3	0	4
Art Attack	0	0	3	0
Dogz	0	0	1	0
Kid Pix	0	0	1	0
Paint	0	0	3	4

ICT Preferences Questionnaire Results - Appendix 17

How would you prefer to use . .

1. Mad About Maths

Alone	8
In pairs	20
In groups of 3 or more	2

Why										
	Hard Questions	5	Like Paired work	4	Harder by self	3	Enjoy it more	10	Don't turn take	2
	Get stuck can ask	4	Supposed to be for	2	Win or loose	1	Compare with partner	1	Get more goes	2

2. Tudors

Alone	14
In pairs	11
In groups of 3 or more	5

Why										
	One player game	1	Get free choice	10	More fun	6	Help	8	Its easy	4
	Get ideas	1								

3. Style

Alone	10
In pairs	16
In groups of 3 or more	4

why										
	Do what you want	10	More ideas	9	Easier	3	Work Quicker	1	More fun	5
	Someone to help	2								

ICT Preferences Questionnaire Results - Appendix 17

4. Logo									
Alone		11							
In pairs		15							
In groups of 3 or more		4							
Why	No arguments	13	Make something cool	1	More fun	4	More ideas	7	Easier 5
5. Prime Art									
Alone		16							
In pairs		12							
In groups of 3 or more		2							
Why	Different Ideas	9	No turn taking	7	Easier	7	Quicker	1	Help you 1
	share ideas	2	Better	1	Fun	1	No sharing mouse	1	Can talk 2
6. Data Sweet									
Alone		6							
In pairs		22							
In groups of 3 or more		2							
Why	Helps	17	Easier	8	Use it more	2	More fun	2	Quicker 1

ICT Preferences Questionnaire Results - Appendix 17

7. Castle Explorer

Alone	13
In pairs	13
In groups of 3 or more	4

Why									
	Get advice / help	10	More ideas	1	No partner probs	6	Gender problems	3	Easier	9
	Find more gold	1								

8. Tudor CD Rom

Alone	12
In pairs	13
In groups of 3 or more	7

Why									
	NR	3	Better	3	Fun	10	Take Turns	4	Do what you want	6
	Help	3	Kept Crashing	1						

9. Page Plus

Alone	15
In pairs	12
In groups of 3 or more	3

Why									
	Do own thing	13	Better	2	Funny		Work Quicker	8	Do more ideas	1
	Easier	4	Make good pics	1	Work as a team	1				

ICT Preferences Questionnaire Results - Appendix 17

10		
Which progs do you prefer to use by yourself ?	Art Programmes	17
	CD Roms	6
	Maths	4
	Page Plus	3
	Data Sweet	2
	Style	1
	Castle Explorer	5
11		
Which progs do you prefer to use in pairs ?	Art Programmes	4
	CD Roms	2
	Maths	10
	Page Plus	7
	Data Sweet	10
	Style	2
	Castle Explorer	11
12		
Which progs do you prefer to use in groups of 3+ ?	Art Programmes	1
	CD Roms	9
	Maths	1
	Page Plus	0
	Data Sweet	0
	Style	4
	Castle Explorer	4
	None	12

ICT Preferences Questionnaire Results - Appendix 17

13
Which grouping is your favourite ?

Alone	13
In pairs	14
In groups of 3 or more	3

Why ?	Choose what to do	6	Better ideas	6	Own ideas	3	More goes	2	Think harder 1
	Help	3	Fun	6	Easier	1	Like working with others	1	

ICT Portfolio Questionnaire Results - Appendix 18

1. What I like about portfolio	Keeps a record 8	Cant loose ICT work 6	Good 2	Fun 10
	You can do some at home 2	Like working at home 1	Get merits 4	Go on comp at home 3
	Feel more confident 1	Like printing work 1	Learn A lot 2	
2. What I don't like	Cant do some of it 1	Boring 9	Don't have a PC 1	Hard 2
	Not enough tasks 1	Don't like putting work in 3	Computer crashing 1	Gets Messy 1
	Nothing 9	When I have to write 1	Find evidence to ring 2	
3. What do you think about ICT homework	Good 17	Okay 2	Great 1	Like it 7
	Boring 1	Fun 1	Don't Like it 1	
3. Why	Test Skills 1	Get Merits 3	Do things at home 2	Work on computer 2
	Like to find things 1	Learn A lot 4	Get to use home computer 8	Keeps me occupied 3
	Like it 3	Fun typing 2	Don't have time 1	Have fun 3
	Hard 1	Get to do new things 1		

ICT Portfolio Questionnaire Results - Appendix 18

4a Problems with computer	No	No ink	Not booting up	Printer didn't work
	17	4	1	7
	Saving	Crashing		
	1	1		
4b Problems with people	Dad wants computer	No	Brother on computer	Sister in the way
	4	12	4	1
	Mam doing work on comp	Dad complained	Mam didn't understand	Brother complained
	3	1	1	1
	Sister wants to play	Sister wants to do homework	Wrong advice	Dad pushed me off
	1	3	1	1
	Internet busy	Dad wouldn't let me on		
	1	1		
5a How did you feel	confident	Excited	Scared	frightened
	14	12	1	1
	Nervous			
	5			
5b Why	Used comp before	Like doing ICT	Don't use ICT every day	Don't know what to do
	3	6	2	2
	Incase it crashes	Mum helping me	I can do it	Its all new
	2	1	2	1
	Dad there to help	Having fun	Doing work	Know what to do
	1	1	1	6
	usually play games	Listen to teacher, know then	Choose my own work	
	1	1	1	

ICT Portfolio Questionnaire Results - Appendix 18

6. New skills	bar graph / Print 1	Use boxes / borders 1	set out a list 1	get on internet 11
	Drawing on computer 1	Using it more 1	Save work 4	None 3
	Make card 2	Insert pictures 2	Writing stories 2	Install / uninstall 1
7. How did you learn it	Someone showed me 11	Trying myself, solve on own 6	Reading 0	Trying myself ask when problems 13
8. Who helped ?	Dad 22	Mum 10	brother 5	sister 3
	Self 3	Computer book / help 0	Grandparent 1	Online help 0
	Other family member 1			
9. What else do you do now ?	Go on internet 8	Newspaper Articles 2	No 8	Saving myself 1
	Use computer more 3	Write stories 4	Add backgrounds 3	Loading things 1
	Make posters 2			
10. Anything you don't understand ?	No 10			
11. Anything you would improve ?	No 27	Help 1	More fun stuff 1	More things 1

Whickham Parochial Primary School
Broadway, Whickham,
NE16 5QW

Childs Name :

Year :

As part of the schools improvement of their ICT provision we are comparing the use of computers at home and in school. To help use we would be grateful if you could complete this survey and return it to school by Friday 7th July.

Part A

1. Do you have a computer at home ? Yes No

2. Does it have a CDROM ? Yes No

3. Is the computer connected to the internet ? Yes No

4. Who primarily was the computer bought for ?

5. How many people in the household use this computer ? 1 2 3 4 5+

6. Who are the people that use the computer in relation to your child in Year3 / Year4 ? E.g. Mother, brother

Part B

Thinking particularly about your child in Year 3 / Year 4.

1. Does your child use this computer ? Yes No

2. How often do they use the computer ? Every Day 2/3 times a week Once a week Only at weekends Other _____

3. Where is the computer in relation to this child ? In a communal part of the house

In their bedroom In a brothers / sisters room Other _____

4. Please comment on the attitude of your child, over the past academic year, towards the computer in terms of . . .
a) The length of time they spend on the computer.

b) The programmes that they use

c) The activities that they do

d) The problems that they encounter / need solving.

e) The home work that requires some computer input or use.

5. In terms of access to the computer does the child . . .

Use it when they want Use it when they ask Share the use with siblings

Use it in a set time period Use it as a reward / treat

6. Over the past academic year has your child instigated or requested any changes to the computer system in terms of . . . .

a) Software (adding programmes, removing programmes, buying non game programmes)

b) Hardware (purchase of printers, scanners, CD ROM, DVD, improvement of computer.)

c) Internet (connection, change of modem, changing Internet Service Provider)

7. Who helps them . . . .

a) If they have a problem with a programme or piece of software? Parent
Brother Sister

Friend Them-self On Line help Computer Help

Other Family Member Grandparent

b) If they have a problem with the computer / printer / scanner or other hardware ?

Parent Brother Sister Friend Them-self

On Line help Computer Help Other Family Member Grandparent

Parent ICT Questionnaire Results - Appendix 20

Part A	Y3	Y4
1. Do you have a computer at home ?		
Yes	21	25
No	1	1
2. Does it have a CD ROM ?		
Yes	19	25
No	3	1
3. Is it connected to the internet ?		
Yes	15	24
No	7	1
4. Who was the computer bought for ?		
Business	2	11
Family	3	0
Father	6	5
Mother	4	1
Parents	2	0
Sister	3	1
Brother	2	1
Children	0	1
NR	0	5
5. How many people are there in the household ?		
1	0	4
2	0	0
3	9	7
4	11	14
5+	0	2
6. What relation are they to the child ?		
Father	16	21
Sister	10	13
Mother	16	17
Brother	11	4
StepDad	2	0
NR	0	2
Part B		
1. Does the child use the computer ?		
Yes	23	24
No	0	0
2. How often do they use the computer ?		
Every Day	3	4
2/3Times a week	9	12
Once a week	6	3
Weekends	0	1
2/3 times a month	1	0
Not very often	1	0
When he wants	1	0

Parent ICT Questionnaire Results - Appendix 20

	Y3	Y4
3. Which part of the house is the computer in ?		
Communal	12	17
Bedroom	2	0
Brothers/Sisters Room	3	2
Music Room	0	1
Office	3	2
Computer Room	0	1
Parents Room	1	0
4a. Comment on the computer time spent.		
Prefers to play outside-comp used in bad weath.	1	1
Unchanged	3	0
Slightly more	3	
NR	5	1
Time given 3hrs +	2	0
3hrs	0	0
2hrs	1	5
1hr	2	4
30 mins	3	2
More homework - more time	0	1
Spent Longer	0	11
Moreindependent time -not just games.	0	1
Short spells with a purpose	0	1
Always wants to spend longer	0	1
4b Comment on software used.		
Games	8	7
Easy Programme	1	0
Word	6	12
Changes Continuously	1	0
Internet	2	6
Encyclopedia	1	1
NR	6	1
Educational	3	4
Draw	2	1
Clipart	1	0
Ref Material	1	7
Maths	1	1
Challenging	0	1
Whatever is used at school	0	2
More knowledgable	0	1
More varied / inependent	0	3

Parent ICT Questionnaire Results - Appendix 20

	Y3	Y4
4c Comment on computer tasks.		
Enjoys them	1	1
Word Processing	4	9
DTP	4	11
Clip Art	0	1
Whatever is done at school.	0	1
Castle Explorer	0	1
Kid pix	0	1
Mighty Maths	0	1
Fact Finding	3	3
Homework	1	4
Draw	4	1
Internet	3	4
Games	4	10
NR	6	1
Confident/Absorbed	0	2
4d Comment on their problems.		
Sister	1	0
Parents	2	1
Letters on Keyboard	2	0
Crashing	1	0
Opening programmes	1	0
Painting	1	0
Problem Solving skills	1	0
Frustration/boredom	1	0
We help once he has tried himself	1	0
Errors	1	0
Programme Installations	1	0
NR	9	0
Solves him/herself	1	11
Less help	0	1
Printer Problems	0	1
Only things out of the ordinary	0	1
Saving onto floppy disk	0	2
Spelling	0	1
Internet Searches	0	2
4e Comment on homework		
Keener to do it on computer than by hand	3	6
Often takes twice as long	0	1
NR	10	3
Needs more help	0	2
Manages themselves	0	4
Enjoys	0	5
Aid to homework	0	1
Uses Encarta	4	0
None brought	4	0

	Y3	Y4
5. When can they use the computer.		
When they want.	10	11
When they ask.	9	12
Share use with siblings.	5	7
Use it in a set time period	0	0
Use it as a reward/treat.	0	0
NR	1	2
6a. What changes - software.		
CastleExplorer	0	5
NR	3	2
No	11	14
Deleting games.	0	1
Adding educational programmes.	7	6
Internet	2	0
6b What changes - hardware.		
Adding RAM	1	2
Upgrade video card	1	0
No	11	15
Faster Modem	2	0
Printer/Scanner	2	0
NR	3	3
Digital Camera	1	0
CDROM	1	0
DVD	0	2
6c What changes - internet		
Connection	2	7
No	13	15
NR	3	3
Faster Modem	2	0
Not allowed / too young	2	0
7a Who helps with a problem - software		
Parent	23	19
Brother	9	6
Sister	5	4
Friend	1	4
Self	3	9
On line help	0	0
Computer help	2	0
Other Family Member	2	3
Grandparent	2	1
NR	0	1

	Y3	Y4	
7b Who helps with a problem - hardware			
Parent		23	20
Brother		8	5
Sister		3	4
Friend		0	3
Self		1	8
On line help		1	0
Computer help		1	0
Other Family Member		2	1
Grandparent		0	1
NR		0	1

Appendix 21 Hot Pencil References

All references include childrens own spellings and grammar

11/6/99

Self concept – SB(not so good at hand writing), SB (like reading), GG (don't like spelling incase I got it wrong), EG(didn't like reading because im not on red), SH(Emma got lots of points in ICT)
Religious – SB
ICT – EG (chose to go on)
Difficulty – MW (It is hard to think about what to write in a story)
Perceptions of subjects – MH (PE helps muscles), MH (yard is good, break from work), PG(Handwriting is hard), KL(Learn to write), WW(didn't like singing, my voice is wasted), LG(computers is fun)

18/6/99

Perceptions of subjects – SM(didn't enjoy making Viking heads, it was messy), EJ(Viking heads, I like getting sticky), JS(enjoyed PE, don't have to write), SD(literacy was too hard for me), MH(football, helps the muscles), MH(Viking heads are fun to make), WW(spellings are easy), LG(don't like singing)
Reference to plans – WW(use maps to test accuracy), ES(go on maths blaster), MH(want to finish Viking heads), SH(want more science)
Choice – RF(don't like singing, didn't get to choose songs)

25/6/99

Reference to behaviour – MW(didn't like silent reading, KL was talking to me), DM(didn't like football, Y4 got in the way)
Reference to fun – KL(3D pictures were fun), KA(3D pictures looked like they were shooting out of the page)
Self concept – WW(I got my 10 step award, hooray for me)

2/7/99

Fun – SE(it was fun), CW(Mr Alderson thinks I am good)
Perceptions of others / self – KA(Jonathon was best), DM(Spelling was worst because im not very good), EG(My mam was there)
PE – MW(We had a long game), JS(It was good because we didn't work), MH(Rounders helps your muscles and catching), SM(You can choose and it was fun)
Choice – RF(You could choose and it was fun), LT(You could choose which page), EG(You could choose which kind of leaf you wanted to draw), PG(We chose our own ice cream with 1 pound), JS(You could choose art)
Skills – PG(You had to field at a bay), SH(Spelling because its lots of work)
Subject Perceptions – CW(Maths is boring), JS(Art, because you have to work)
Equipment – JS (The chairs were too high), SB(I didn't like maths because I didn't have a calculator)

9/7/99

Choose – MW(Salt dough – do what you want)

Fun – KA (It was fun and good), SE (Art because we make things)
Perceptions of subjects – TW(Drawing was difficult), KW(Didn't enjoy drawing because it was difficult), KW(Reading was good because you read books you've never read before), SM(Maths was boring), SH(Maths was good because it was easy to do), EJ(Science was too hard.)
PE – JS(It was good because I love rounders.)
Self Perceptions – CW(I did well in my music practice), DM(I'm not good at spelling.)
Change – LG (Literacy wasn't good because it was in someone elses class.)

17/9/99

Learning – PG(A chest pass is powerful and straight)
ICT – RS(Best bit was playing on the computer), SE(I would like to go on the computer), ES(You get to draw on it), EG(The computer work was fun and we get to make our own telephone company logo on the computer.)
Self concept – RF(Spelling was worst because I cant do it), JS (I learnt that I can do it neat in pen), DF(Best bit was maths because it is my best subject.)
Learning – SH(Spelling could have been better by learning them, the best thing was that I got a few right), LG(I could have improved maths by concentrating more.)
Better – ES(By having more time), KA(If we had more time.)

24.9.99

Self Concept – SD(I was very good on my tudor house)
ICT - SR(I learnt how to print), ES (the Tudors on the PC was good), SE (I would have much more fun going on the compuer), DM(How to chose a picture), CW(I liked printing my picture), SB(I would like to go on the PC next week.)
Better – SB(PE could have been better if we had more time.) EJ(more books to choose)
Learning – WW(Ive learnt some sums and a quicker way to do them), EG(Ive learnt some new letters and words), MH(I have learned how to chest pass.)

1/10/99

Learnt – RF(How to chest and shoulder pass), RS(About life in tudor times), DM(We learnt about area)
ICT – CS(The computer would have been better if it had worked), ES(PC was good but it could have been better if it had worked), SB(The best bit was on mad about spelling where you zap), SB (There is never a worse bit on the computer because computers is my best thing even if the PC brakes and we never get it back I will still like it), SH(I think we should have had more time), KA(The best bit was that I won), SB(I want to work on the computer next week), SE(I like it on the computer), SE(I would like more time on the computer), JS (The acorn could not have been better I have learnt about moving things into other boxes I have learnt where the letter on the keypad are, I have learn how to get the Y4 graphics box up, I have also learnt how to save things. I chose what tyepe, I chose th style of my writing, Best bit was dragging things to other boxes and the worst bit was waiting for it to print and save. On the acron I whould like to do the same thing you have to do a biger picture more writing and a much much biger sheet and you can write whatever you want.)

15.10.99

Learnt – RF(how to draw concentric circles), ES(How to bounce pass), SR(Javelin Pass)
Self Concept – RF(I got a merit for spelling.)
ICT – RS(The best bit was the PC), ES(I like the computer there were no bad bits), MH(Mad about maths could have been better if wed been longer), SB (It could have been bettwe if we had a bit longa. I learnt how to send messages and how to print and we learnt how to move the pointer round. We learnt how to high light how to change the style. We chose the vube. The best bit was change the vube the worse bit was the last bit when you hat to think on your own), DM(Emates are fun but I think we shud have londer and we should spend more time on them but it is still fun. I have learnt how to high light and press delet and it will get rid of the entyr word when I was putting in words in the sentence. The best bit had to be the bit when I chared the sentince to the spibyled on the new paper.) KA(I learnt how to change a shapes direction), PG (the best bit was the games were funny and good to play on), SS(I could have had longer time on the computer.)

19/5/00

Learnt – JS(How to work better at maths), JS(How to hit a ball better), CS(Baseball bats hit the ball the longest), ES(How to swim better), SD(How to round numbers up and down)
Motivation / Self Concept – DF(Ending the test and getting sweets was the best), CS(I caught my sister out), LG(Better if I had got them all right on the tables test) EG(the worst bit was not getting a rounder), CW(I have learnt that Year 6 are better than us), JS(The worst bit was when I found out that you could only run to first base when you hit it behind.) SB(The worst bit was the easy stuff.)

27.5.00

Learnt – MH(To swim backwards and forwards), SM(To swim on my back), CW(To play rounders better), ES(subtract better), LG(I have to try hard)
Easier – EG(If the reading words were easier), PG(Maths could have been better if it was easier)
Motivation – FK(I got 10/10), LG(I have to try hard), SB(better if I got good news of me moving up to the big pool but I am cool with that because the teacher always says the right thing), EG(Would be better if we learnt more), SM(Best bit was getting the spellings right)

9.6.00

Learnt – JS(How to swim underwater better), WW(To be careful in dodge ball)
Better – JS(If we didn't draw each other)
Worst – LG(when we lost), MH(when they got a rounder), CS(Swimming will be bad because we have to bring pyjamas next time)
Motivation – LG(Better if I didn't have to use a float), WW(Moving into the big pool), RF(I got 10/10), RF(I got all mine right 55/55), LS(I want to continue getting 10/10 in spelling)

16.6.00

Worst – LG(When I got stuck)
Chose – FK(Samantha as a partner for the division game)
Learnt – CW(To hit the ball harder), KA(better persuasive writing), LG(how to draw from the side), LG(to divide), KW(how to spell words rite), EG(To swim in pyjamas), SH(to spell atmposphere)
Best – CS(getting rounders in PE), JS(I wasn't out during the whole game)
Better – CS(If I got 10/10), LG(If I did it neat), JS(If I had more time to write), PG(If the swimming teacher didn't shout), WW(Getting 10/10 instead of 9/10), SH(If we had more silent reading), EJ(If spellings were a bit harder)

23/6/00

Learnt – EG(How to chest pass), ES(How to set letters out), SH(better writing), SR(the help position), MH(about Cragside house and the power circuit), CW(to swim properly without floats), SR(how to divide), KL(about William Armstrong), MH(to swim backwards with one float), SD(that you can do the divide sign a different way)
Ref to ICT – LS(better if we had more time on the PC), CS(best bit was getting onto Level 2), FK(Learnt about graphs and how to sense the noise of the class), SB(Learnt some sums when we get onto the next level)
Worst – KA(Coming back to school)
Best – JS(getting 10/10), SM(was the ducks at Lunch), RS(seeing the dead mole)
Better – LG(If we had more time)

ICT In School Survey Results - Appendix 22

		19.5.99	19.7.99	20.10.99	1.2.00	12.7.00
A1. How often did you use the computer ?	0	6	0	0	0	0
	1	17	16	18	12	18
	2	7	1	10	15	8
	3	0	6	0	2	4
	4	0	7	0	0	0
2. How often did you use the computer ?	10	1	3	1	0	0
	20	3	0	0	0	0
	30	18	15	8	8	0
	40	0	1	4	4	0
	50	0	2	2	5	0
	1hr	0	0	7	7	0
	1hr+	4	9	5	5	14
	1hr30+	0	0	0	0	16
	NR	4	0	0	0	0

3a. Programmes Used.										
	ArcVenture	27	Maths Blaster	17	MAM1	27	CastleExplorer	29	Publisher	25
	PaintBox	23	ArcVenture	27	MAM2	27	PagePlus	25	Page Plus	20
	WordPro	19	History Ecyc	18	MASpelling	24	Notate	24	Outnumbered	27
	Logo	30			Tudors	26	First Logo	16	Logit Live	28
					Style	18	Prime Art	22	WorldBook	27

ICT In School Survey Results - Appendix 22

		19.5.99	19.7.99	20.10.99	1.2.00	12.7.00
3b. What programmes are used for ?		NR 0	Find out things 14	numbers/fract. 10	Make Picutres 25	Sensing 23
				Shape/Measure 11	Make Music 18	Make Webpage 23
				Spelling 11	Have adventure 20	News Article 14
				Design tele.co. 10		Maths Work 10
						Research 12
4a. Enjoyed most		Arcventure 21	Maths Blaster 11	MAM2 10	Castle Explorer 17	Outnumbered 19
			ArcVenture 10	MASpelling 11	Page Plus 10	
	fun	8	8	9	20	16
	find things	2	2	0	0	0
	like learning	0	0	5	1	0
	helps me	0	0	2	0	0
	like subjects	2 (maths)	1 (art)	2 (tudors)	0	3 (maths)
5a Enjoyed Least		History Encyc. 10	Logo 7	Style 11	Logo 7	Nothing 11
		NR 10	Word Pro 6	NR 10	Data Sweet 8	Sening 7
			Paint Box 6		Nothing 2	Encarta 6

ICT In School Survey Results - Appendix 22

		19.5.99	19.7.99	20.10.99	1.2.00	12.7.00
6. Problems encountered.	Printing	5	20	3 18*		2
	Saving	1	0	1 18#	5&	
* wrong driver / wrong buttons / slow / not turning it on first / paper jammed	None	7	0	0	18	0
	NR	5	0	7	18	0
	Errors	1	0	0	18	0
# wrong folder	Crashing	6	13	11	18	7
	Loading	8	2	3	18	5
& saving/loading from disk.	Load pics/gifs	0	0	0	0	9
	Overlapping obj	0	0	0	0	4
	Sensing	0	0	0	0	3
	Gifs not moving	0	0	0	0	5
7. How did you feel ?	Positive	24	27	23	26	26
	Negative	4	2	9	4	10
	NR	2	1	2	1	0
8. What have you learned ?	NR	12	0	7	7	0
	Load	4	7	11	0	0
	Save	1	8	12	4	0
	Print	2	7	12	6	0
	Nothing	2	2	0	0	0
	Change font	0	0	5	0	0
	Save into folder	0	0	0	8	0
	Draw pictures	0	0	0	4	0
	Make web page	0	0	0	0	9
	Save/load disk	0	0	0	0	13
	Gifs into publis.	0	0	0	0	3

ICT In School Survey Results - Appendix 22

			19.5.99	19.7.99	20.10.99	1.2.00	12.7.00
Section B.							
1. Which computer maily worked on?	Acorn		27	17	1	3	0
	PC		26	25	6	26	30
	Emate		0	0	21	0	0
2. Who did you work with ?	Alone		8	5	0	2	0
	With Partner		28	23	28	27	30
	Group of 3-4		4	0	0	0	0
	Group of 5-6		0	0	0	0	0
3. Encouraged by who ?	Teacher						
		1	15	11	22	22	19
		2	6	8	3	3	6
		3	3	5	2	4	5
		NR	6	6	3	1	0
	Self						
		1	3	4	1	2	5
		2	8	7	7	10	14
		3	13	13	19	17	11
		NR	6	6	3	1	0
	Partner						
		1	6	9	4	5	6
		2	9	9	17	8	11
		3	8	6	6	16	13
		NR	6	6	3	1	0

ICT In School Survey Results - Appendix 22

4. Which of these encourages you ?		19.5.99	19.7.99	20.10.99	1.2.00	12.7.00
	finished quicker					
	1	4	1	6	8	1
	2	1	3	0	5	10
	3	3	1	3	4	7
	4	0	1	7	2	5
	5	1	6	9	10	7
	NR	21	18	5	1	0
	Neater					
	1	3	6	10	13	20
	2	4	1	7	11	5
	3	1	3	6	3	3
	4	0	2	3	2	2
	5	1	0	2	1	0
	NR	21	18	2	1	0
	More Accurate					
	1	1	1	2	0	0
	2	0	2	7	5	7
	3	4	3	6	14	13
	4	2	6	7	7	6
	5	1	0	4	2	4
	NR	21	18	4	1	0
	Enjoy More					
	1	0	4	8	6	9
	2	4	4	7	4	8
	3	0	2	4	5	3
	4	3	1	3	3	9
	5	2	1	3	11	2
	NR	21	18	5	1	0
	Easier					
	1	0	4	1	1	0
	2	0	1	5	4	0
	3	2	1	6	3	3
	4	3	1	6	7	8
	5	3	4	7	14	19
	NR	21	18	5	1	0

ICT In School Survey Results - Appendix 22

Who helped you most.

		19.5.99	19.7.99	20.10.99	1.2.00	12.7.00
Teacher						
	1	23	6	11	19	25
	2	0	0	4	4	3
	3	0	2	1	4	1
	4	0	1	4	0	1
	5	0	1	0	1	0
	6	0	0	0	1	0
	NR	7	20	5	1	0
Self						
	1	5	1	0	2	0
	2	0	3	3	5	11
	3	0	1	4	5	10
	4	0	0	4	7	2
	5	0	2	9	9	5
	6	0	2	5	1	2
	NR	25	20	5	1	0
Partner						
	1	1	1	0	2	3
	2	0	1	4	10	8
	3	0	2	7	9	14
	4	0	3	9	8	2
	5	0	2	2	0	3
	6	0	1	3	0	0
	NR	29	20	5	1	0
Other Pupil						
	1	1	1	1	3	3
	2	0	3	6	6	4
	3	0	2	5	9	2
	4	0	2	5	4	19
	5	0	1	4	5	2
	6	0	1	4	2	0
	NR	29	20	5	1	0

ICT In School Survey Results - Appendix 22

		19.5.99	19.7.99	20.10.99	1.2.00	12.7.00
Who helped you most.	Comp Help					
	1	0	0	0	0	0
	2	0	1	1	2	0
	3	0	1	4	1	2
	4	0	4	3	5	3
	5	0	3	6	7	11
	6	0	1	11	14	14
	NR	30	20	5	1	0
	Teachers Instr.					
	1	0	2	9	6	0
	2	0	1	7	1	3
	3	0	2	3	1	2
	4	0	0	0	5	4
	5	0	0	2	5	8
	6	0	5	4	11	13
	NR	30	20	5	1	0

Out of School Results

Section A
Full sample analysis /29 in bold.

1. Do you have a computer at home ?	Yes	No
04/05/1999	24	5
16/09/1999	22	5
23/02/2000	27	2
17/05/2000	28	1

2. Do you have a games console ?	Yes	No
04/05/1999	20	9
16/09/1999	17	10
23/02/2000	20	9
17/05/2000	22	7

3. Does your computer have a CD ROM?	Yes	No
04/05/1999	25	4
16/09/1999	21	6
23/02/2000	27	2
17/05/2000	27	2

4. Computer connected to the Internet ?	Yes	No
04/05/1999	11	18
16/09/1999	11	16
23/02/2000	20	4
17/05/2000	23	6

Out of School Survey Results - Appendix 23

5. Often you use each type of comp work?	EveryDay	2/3 Days wk	Once wk	Once month	Never	NR
a.Basic Computer Skills 04/05/99	1	5	1	0	3	0
a.Basic Computer Skills 16/09/99	1	5	3	0	1	0
a.Basic Computer Skills 23/2/00	1	5	3	0	1	0
a.Basic Computer Skills 17/05/00	0	6	2	1	1	0
b.Word processing 04/05/99	1	2	1	2	4	0
b.Word processing 16/09/99	0	0	2	3	5	0
b.Word processing 23/2/00	1	2	0	2	5	0
b.Word processing 17/05/00	0	2	2	3	3	0
c.Spreadsheets 04/05/99	0	0	0	1	9	0
c.Spreadsheets 16/09/99	0	0	0	3	7	0
c.Spreadsheets 23/2/00	1	0	2	3	4	0
c.Spreadsheets 17/05/00	0	0	2	6	2	0
d.Database 04/05/99	0	2	2	1	5	0
d.Database 16/09/99	0	2	0	3	5	0
d.Database 23/2/00	1	0	6	0	3	0
d.Database 17/05/00	1	0	4	3	2	0
e. Internet 04/05/99	1	1	1	0	7	0
e. Internet 16/09/99	0	0	2	1	7	0
e. Internet 23/2/00	1	3	2	0	5	0
e. Internet 17/05/00	0	4	1	3	2	0
f. Games 04/05/99	4	3	0	2	1	0
f. Games 16/09/99	2	2	0	1	5	0
f. Games 23/2/00	3	3	2	0	2	0
f. Games 17/05/00	1	4	2	1	2	0
g. Creative Work 04/05/99	4	3	0	2	1	0
g. Creative Work 16/09/99	0	1	3	0	6	0
g. Creative Work 23/2/00	2	2	2	1	3	0
g. Creative Work 17/05/00	0	2	1	5	2	0

Out of School Survey Results - Appendix 23

6. How long use the computer - Weekdays	1hr+	1hr	50mins	40mins	30mins	less 30mins	NR	
04/05/1999	10	4	2	0	5	6	2	
16/09/1999	15	2	0	0	4	4	2	
23/02/2000	17	3	0	1	4	3	1	
17/05/2000	17	1	1	1	5	2	2	

6. How long use the computer - Weekend	1hr+	1hr	50mins	40mins	30mins	less 30mins	NR	
04/05/1999	10	4	2	0	0	6	2	
16/09/1999	17	2	2	1	1	1	3	
23/02/2000	19	1	1	2	4	0	4	
17/05/2000	20	1	0	1	4	1	0	

7. No of progs used in one comp session	1	2	3	4	5	5+
04/05/1999	2	5	7	4	5	0
16/09/1999	6	10	3	0	0	4
23/02/2000	5	10	9	3	0	1
17/05/2000	3	5	8	3	1	2

Programmes Mentioned	Educ Soft	Games	NR
04/05/1999	3	19	7
16/09/1999	7	18	2
23/02/2000	3	13	1
17/05/2000	15	10	4

8. Why is this favourite game ?	Ref to fun	Ref to game	NR
04/05/1999	8	10	11
16/09/1999	5	14	8
23/02/2000	7	18	4
17/05/2000	10	12	7

9. Who helps with the computer ?	Parents	Brothers	Sisters	Friends	Grandp	Comp help	Comp Book	On line help	Other Fam	Self
04/05/1999	17	4	3	1	0	1	2	0	0	0
16/09/1999	24	8	12	11	6	7	8	1	2	0
23/02/2000	22	5	8	10	5	3	2	1	4	11
17/05/2000	27	8	7	8	2	3	1	1	1	10

10. What things do they help you with ?	Saving	Printing	Crashing	Connect/load	Other	NR	Maths
04/05/1999	1	2	10	2	12	0	0
16/09/1999	0	2	11	15	1	0	0
23/02/2000	3	9	16	7	3	2	0
17/05/2000	1	6	14	4	4	1	0

Out of School Survey Results - Appendix 23

11. Where do you use the computer most?	Home	School	Friends
1st 04/05/1999	24	1	2
1st 16/09/1999	23	3	1
1st 23/02/2000	16	6	1
1st 17/05/2000	21	7	0
2nd 04/05/1999	1	16	10
2nd 16/09/1999	3	21	5
2nd 23/02/2000	6	15	5
2nd 17/05/2000	7	19	2
3rd 04/05/1999	2	10	15
3rd 16/09/1999	4	2	23
3rd 23/02/2000	3	3	22
3rd 17/05/2000	1	2	26

Section B

Often you use each type of comp work?	EveryDay	2/3 Days wk	Once wk	Once month	Never	NR
Mum						
a.Basic Computer Skills 04/05/99	1	2	1	1	5	0
a.Basic Computer Skills 16/09/99	3	1	0	0	5	1
a.Basic Computer Skills 23/2/00						
a.Basic Computer Skills 17/05/00	0	3	2	1	4	0
Dad						
a.Basic Computer Skills 04/05/99	3	2	0	1	4	0
a.Basic Computer Skills 16/09/99	1	2	1	1	4	1
a.Basic Computer Skills 23/2/00						
a.Basic Computer Skills 17/05/00	2	2	2	2	2	0
Brother						
a.Basic Computer Skills 04/05/99	0	1	0	0	4	5
a.Basic Computer Skills 16/09/99	1	1	0	0	1	7
a.Basic Computer Skills 23/2/00						
a.Basic Computer Skills 17/05/00	0	0	1	1	3	6

Out of School Survey Results - Appendix 23

Often you use each type of comp work?	EveryDay	2/3 Days wk	Once wk	Once month	Never	NR
Sister						
a.Basic Computer Skills 04/05/99	2	2	1	1	2	2
a.Basic Computer Skills 16/09/99	0	2	2	1	2	3
a.Basic Computer Skills 23/2/00	2	0	0	2	6	0
a.Basic Computer Skills 17/05/00	1	0	4	0	2	3
Friend						
a.Basic Computer Skills 04/05/99	1	5	0	0	4	0
a.Basic Computer Skills 16/09/99	0	2	3	0	0	5
a.Basic Computer Skills 23/2/00	1	3	3	1	2	0
a.Basic Computer Skills 17/05/00	0	2	4	0	2	0
Grandparent						
a.Basic Computer Skills 04/05/99	1	0	0	0	8	1
a.Basic Computer Skills 16/09/99	2	0	1	0	5	2
a.Basic Computer Skills 23/2/00	1	1	1	0	5	2
a.Basic Computer Skills 17/05/00	1	0	1	0	6	2
Mum						
b.Word Processing 04/05/99	2	0	1	1	6	0
b.Word Processing 16/09/99	3	0	0	0	6	1
b.Word Processing 23/2/00	1	2	2	1	4	0
b.Word Processing 17/05/00	1	5	1	0	3	0
Dad						
b.Word Processing 04/05/99	2	0	1	1	6	0
b.Word Processing 16/09/99	1	2	0	1	5	1
b.Word Processing 23/2/00	3	1	0	2	4	0
b.Word Processing 17/05/00	1	3	2	1	3	1
Brother						
b.Word Processing 04/05/99	1	1	0	0	3	5
b.Word Processing 16/09/99	0	2	0	0	1	7
b.Word Processing 23/2/00	0	0	1	1	1	7
b.Word Processing 17/05/00	0	0	0	2	3	5
Sister						
b.Word Processing 04/05/99	3	1	1	1	2	2
b.Word Processing 16/09/99	2	2	0	0	1	5
b.Word Processing 23/2/00	1	0	1	0	6	2
b.Word Processing 17/05/00	1	0	3	1	2	3

Out of School Survey Results - Appendix 23

Often you use each type of comp work?	EveryDay	2/3 Days wk	Once wk	Once month	Never	NR
Friend						
b.Word Processing 04/05/99	0	2	1	1	6	0
b.Word Processing 16/09/99	0	2	1	2	0	5
b.Word Processing 23/2/00	1	0	1	0	6	2
b.Word Processing 17/05/00	1	2	1	0	3	3
Grandparent						
b.Word Processing 04/05/99	2	0	0	0	7	1
b.Word Processing 16/09/99	2	0	1	1	4	2
b.Word Processing 23/2/00	1	0	0	1	6	2
b.Word Processing 17/05/00	1	0	0	0	7	2
Mum						
c.Spreadsheets 04/05/99	1	1	1	0	0	7
c.Spreadsheets 16/09/99	1	1	1	0	6	1
c.Spreadsheets 23/2/00	1	0	1	0	8	0
c.Spreadsheets 17/05/00	0	2	2	0	5	1
Dad						
c.Spreadsheets 04/05/99	3	2	0	1	4	0
c.Spreadsheets 16/09/99	1	2	0	0	6	1
c.Spreadsheets 23/2/00	2	2	1	0	5	0
c.Spreadsheets 17/05/00	1	3	2	0	4	0
Brother						
c.Spreadsheets 04/05/99	1	0	0	0	4	5
c.Spreadsheets 16/09/99	0	1	0	0	2	7
c.Spreadsheets 23/2/00	0	0	1	1	1	7
c.Spreadsheets 17/05/00	0	0	0	1	5	4
Sister						
c.Spreadsheets 04/05/99	1	0	0	1	6	2
c.Spreadsheets 16/09/99	0	1	0	1	6	2
c.Spreadsheets 23/2/00	1	0	0	0	6	3
c.Spreadsheets 17/05/00	0	2	0	1	3	4

Out of School Survey Results - Appendix 23

Often you use each type of comp work?	EveryDay	2/3 Days wk	Once wk	Once month	Never	NR
Friend						
c.Spreadsheets 04/05/99	0	0	0	0	1	9
c.Spreadsheets 16/09/99	0	0	2	1	2	5
c.Spreadsheets 23/2/00	0	0	0	0	8	2
c.Spreadsheets 17/05/00	1	2	1	0	3	3
Grandparent						
c.Spreadsheets 04/05/99	1	0	0	0	8	1
c.Spreadsheets 16/09/99	1	0	0	0	7	2
c.Spreadsheets 23/2/00	0	1	0	0	7	2
c.Spreadsheets 17/05/00	1	0	1	0	6	2
Mum						
d.Database 04/05/99	1	1	2	0	6	0
d.Database 16/09/99	2	1	1	0	5	1
d.Database 23/2/00	2	0	2	1	5	0
d.Database 17/05/00	0	2	4	0	4	0
Dad						
d.Database 04/05/99	3	1	1	1	4	0
d.Database 16/09/99	1	1	2	2	3	1
d.Database 23/2/00	0	3	1	3	3	0
d.Database 17/05/00	1	2	2	2	3	0
Brother						
d.Database 04/05/99	1	1	0	0	3	5
d.Database 16/09/99	1	1	0	0	2	6
d.Database 23/2/00	1	0	1	0	1	7
d.Database 17/05/00	0	0	1	1	3	5
Sister						
d.Database 04/05/99	2	1	0	1	4	2
d.Database 16/09/99	0	1	0	1	6	2
d.Database 23/2/00	0	1	0	1	5	3
d.Database 17/05/00	1	1	2	0	3	3
Friend						
d.Database 04/05/99	0	0	0	1	9	0
d.Database 16/09/99	0	0	2	1	2	1
d.Database 23/2/00	1	0	2	0	5	2
d.Database 17/05/00	1	1	2	0	3	3

Out of School Survey Results - Appendix 23

Often you use each type of comp work?	EveryDay	2/3 Days wk	Once wk	Once month	Never	NR
Grandparent						
d.Database 04/05/99	0	1	0	0	8	1
d.Database 16/09/99	1	0	0	0	7	2
d.Database 23/2/00	1	0	0	0	6	3
d.Database 17/05/00	0	1	2	1	3	3
Mum						
e.Internet 04/05/99	0	0	0	0	10	0
e.Internet 16/09/99	1	1	1	0	6	1
e.Internet 23/2/00	0	0	0	0	9	1
e.Internet 17/05/00	0	2	1	1	5	0
Dad						
e.Internet 04/05/99	1	0	0	0	9	0
e.Internet 16/09/99	0	1	0	0	8	1
e.Internet 23/2/00	2	1	1	0	4	2
e.Internet 17/05/00	1	2	2	1	3	1
Brother						
e.Internet 04/05/99	1	0	0	0	4	5
e.Internet 16/09/99	0	1	0	0	4	5
e.Internet 23/2/00	1	0	0	1	2	6
e.Internet 17/05/00	0	0	0	1	3	6
Sister						
e.Internet 04/05/99	2	0	0	1	5	2
e.Internet 16/09/99	0	1	0	0	4	5
e.Internet 23/2/00	1	1	0	0	4	2
e.Internet 17/05/00	0	0	2	2	3	3
Friend						
e.Internet 04/05/99	0	1	0	1	8	0
e.Internet 16/09/99	1	1	0	1	2	5
e.Internet 23/2/00	0	1	1	0	5	3
e.Internet 17/05/00	1	1	1	1	3	3
Grandparent						
e.Internet 04/05/99	0	0	0	0	9	1
e.Internet 16/09/99	0	0	0	0	8	2
e.Internet 23/2/00	1	0	1	0	5	3
e.Internet 17/05/00	1	1	0	0	6	2

Out of School Survey Results - Appendix 23

Often you use each type of comp work?	EveryDay	2/3 Days wk	Once wk	Once month	Never	NR
Mum						
f.Games 04/05/99	0	1	2	2	5	0
f.Games 16/09/99	2	0	1	0	6	1
f.Games 23/2/00	1	1	0	0	4	4
f.Games 17/05/00	1	2	1	0	6	0
Dad						
f.Games 04/05/99	3	0	2	3	2	0
f.Games 16/09/99	2	1	0	1	5	1
f.Games 23/2/00	2	2	0	0	5	1
f.Games 17/05/00	1	4	2	1	2	0
Brother						
f.Games 04/05/99	2	0	0	0	3	5
f.Games 16/09/99	2	0	0	0	1	7
f.Games 23/2/00	0	0	2	0	2	6
f.Games 17/05/00	1	0	0	1	3	5
Sister						
f.Games 04/05/99	3	4	0	1	0	2
f.Games 16/09/99	2	1	1	1	1	4
f.Games 23/2/00	2	0	2	1	2	5
f.Games 17/05/00	1	3	0	1	2	3
Friend						
f.Games 04/05/99	3	4	1	1	1	0
f.Games 16/09/99	2	2	1	0	1	4
f.Games 23/2/00	2	2	1	3	0	2
f.Games 17/05/00	1	2	1	0	3	3
Grandparent						
f.Games 04/05/99	0	0	0	2	7	1
f.Games 16/09/99	2	0	0	0	6	2
f.Games 23/2/00	0	0	0	0	8	2
f.Games 17/05/00	1	0	0	0	7	2

Out of School Survey Results - Appendix 23

Often you use each type of comp work?	EveryDay	2/3 Days wk	Once wk	Once month	Never	NR
Mum						
g.Creative Work 04/05/99	0	1	1	0	7	1
g.Creative Work 16/09/99	0	0	0	2	6	2
g.Creative Work 23/2/00	2	1	2	0	5	0
g.Creative Work 17/05/00	1	2	1	1	6	0
Dad						
g.Creative Work 04/05/99	2	1	1	0	5	1
g.Creative Work 16/09/99	0	0	0	2	6	2
g.Creative Work 23/2/00	3	0	0	2	5	0
g.Creative Work 17/05/00	1	2	1	0	6	0
Brother						
g.Creative Work 04/05/99	1	1	0	0	4	5
g.Creative Work 16/09/99	0	0	0	1	2	7
g.Creative Work 23/2/00	2	0	0	0	1	7
g.Creative Work 17/05/00	0	0	1	1	4	4
Sister						
g.Creative Work 04/05/99	2	2	0	1	3	3
g.Creative Work 16/09/99	0	1	1	1	1	6
g.Creative Work 23/2/00	1	2	1	0	3	3
g.Creative Work 17/05/00	1	0	1	1	3	0
Friend						
g.Creative Work 04/05/99	0	0	0	2	5	3
g.Creative Work 16/09/99	1	1	1	1	1	5
g.Creative Work 23/2/00	0	0	2	0	5	3
g.Creative Work 17/05/00	0	2	1	1	3	3
Grandparent						
g.Creative Work 04/05/99	0	0	0	0	8	2
g.Creative Work 16/09/99	0	0	0	0	7	3
g.Creative Work 23/2/00	1	1	0	0	6	2
g.Creative Work 17/05/00	1	0	0	0	7	2

Out of School Survey Results - Appendix 23

Time Spent	1hr+	1hr	50mins	40mins	30mins	less 30mins	NR/0	
Mum 04/05/1999	3	0	0	2	1	0		4
16/09/1999	2	0	0	0	1	1		6
23/02/2000	3	0	0	0	1	1		5
17/05/2000	6	2	0	0	1	0		1
Dad 04/05/1999	3	3	2	0	0	0		2
16/09/1999	2	1	0	0	1	1		3
23/02/2000	4	0	1	0	1	1		3
17/05/2000	8	0	0	0	1	0		1
Brother 04/05/1999	1	0	0	0	1	0		8
16/09/1999	1	0	0	0	0	0		9
23/02/2000	1	0	0	0	0	9		0
17/05/2000	1	0	0	0	1	3		5
Sister 04/05/1999	2	2	0	0	1	0		5
16/09/1999	0	0	0	0	1	1		8
23/02/2000	3	0	0	1	0	6		
17/05/2000	3	0	0	0	0	1		6
Friends 04/05/1999	7	2	0	0	0	0		1
16/09/1999	0	1	0	1	0	1		7
23/02/2000	3	0	0	0	1	6		0
17/05/2000	2	1	0	0	2	0		5
Grandparent 04/05/1999	1	0	0	0	1	1		7
16/09/1999	1	0	0	1	0	1		7
23/02/2000	1	0	0	1	0	0		8
17/05/2000	2	1	0	0	2	0		5